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December 19, 2003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: River Bend Station – Proposed Upgraded Emergency Action Levels (EALs) Using NEI 99-01 Revision 4 Methodology– LAR 2003-027

River Bend Nuclear Station
Docket No. 50-458
License No. NPF-47

Reference: NEI 99-01, Rev 4 "Methodology for Development of Emergency Action Levels".

RBG-46211

Ladies and Gentlemen:

Upgraded Emergency Action Levels (EALs) for River Bend Station are enclosed for NRC staff review and approval as required by 10CFR50 Appendix E, IV.B. These new EALs were written using the methodology outlined in NEI 99-01, "Methodology for Development of Emergency Action Levels" (Revision 4, January 2003). NEI 99-01 has been endorsed by the NRC Staff in Regulatory Guide 1.101, Revision 4, July 2003, "Emergency Planning and Preparedness for Nuclear Power Reactors" and in NRC Regulatory Issue Summary (RIS) 2003-18, October 8, 2003, "Use of NEI 99-01, 'Methodology for Development of Emergency Action Levels,' Revision 4, Dated January 2003."

These changes have been reviewed and approved by the Onsite Safety Review Committee and the States of Mississippi and Louisiana and local government authorities.

The guidance contained in NEI 99-01 was found to be acceptable to the NRC staff as an alternative method to that described in Appendix 1 to NUREG-0654/FEMA-REP-1 and NUMARC/NESP-007 for developing EALs required in Section IV of Appendix E to 10CFR50 and 10CFR50.47(b)(4).

A045

River Bend Station specific information is attached in the following order:

- Current Emergency Plan Mark-Up
- Proposed Emergency Plan Pages – Changes Incorporated
- Proposed EALs – To Be Incorporated in Procedure
- Proposed EAL Bases - To Be Incorporated in Procedure
- NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications

The plant specific differences and deviations do not reduce the capability to meet the standards in 10 CFR 50.47.

EALs for the Independent Spent Fuel Storage Facility (ISFSI) are included in this submittal. RBS has not implemented an ISFSI at the current time. However, RBS will implement these EALs in accordance with 10 CFR 50.54(q) as needed to support the schedule for the ISFSI.

The goal of this upgrade is to provide consistent emergency classifications internally and between the Entergy plants to the greatest extent possible, limited only by plant specific design or location.

If you have any questions regarding this submittal, please contact Ms. Myra Jones at 225-378-3311.

Sincerely,

DN Lorfing

for J. W. Leavines
DNL/BMB

attachments:

Attachment 1	Current Emergency Plan Mark-Up
Attachment 2	Proposed Emergency Plan Pages – Changes Incorporated
Attachment 3	Proposed EALs – To Be Incorporated in Procedure
Attachment 4	Proposed EAL Bases - To Be Incorporated in Procedure
Attachment 5	NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications

cc: see next page

cc: Mr. Michael Webb
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Attachment 3

TO

RBG-46211

Proposed EALs – To Be Incorporated in Procedure

RIVER BEND STATION

ABNORMAL RAD LEVELS / EFFLUENT EAL

MODE APPLICABILITY: ALL

Abnormal Radiation Level / Radiological Effluent

GENERAL EMERGENCY

AG1 **Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥ 1000 mRem TEDE or ≥ 5000 mRem CDE Thyroid for the actual or projected duration of the release**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2)

1. Radiological effluent release in excess of **Table R1** "General Emergency" unless releases can be determined to be below "General Emergency" thresholds within 15 minutes by dose projection using actual meteorology
2. Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** column "General Emergency" threshold

SITE AREA EMERGENCY

AS1 **Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥ 100 mRem TEDE or ≥ 500 mRem CDE thyroid for the actual or projected duration of the release**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2)

1. Radiological effluent release in excess of **Table R1** "Site Area Emergency" unless releases can be determined to be below "Site Area Emergency" thresholds within 15 minutes by dose projection using actual meteorology
2. Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** "Site Area Emergency" threshold

ALERT

AA1 **Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 X ODCM limit for ≥ 15 minutes**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2 or 3)

1. Unplanned liquid release greater than 200 times the high alarm setpoint of RMS-RE107 and failure of isolation valve LWS-AOV257 to close lasting for ≥ 15 minutes
2. Unplanned radiological effluent release in excess of **Table R1** "Alert" for ≥ 15 minutes unless releases can be determined to be below "Alert" thresholds within 15 minutes by sample
3. Unplanned gaseous or liquid radiological releases in excess of **Table R1** "Alert" sample or field team survey threshold for ≥ 15 minutes

NOUE

AU1 **Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 X ODCM limit for ≥ 60 minutes**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2 or 3)

1. Liquid release greater than two times the high alarm set point of RMS-RE107 and failure of isolation valve LWS-AOV257 to close lasting for ≥ 60 minutes.
2. Unplanned radiological effluent release in excess of **Table R1** "NOUE" for ≥ 60 minutes unless releases can be determined to be below "NOUE" thresholds within 60 minutes by sample.
3. Unplanned gaseous or liquid radiological releases exceeding **Table R1** "Unusual Event" sample threshold for ≥60 minutes

Table R1
EAL THRESHOLD

Method	NOUE DRMS	NOUE Threshold	ALERT DRMS	ALERT Threshold	SITE AREA DRMS	SITE AREA Threshold	GENERAL DRMS	GENERAL Threshold
Main Plant Vent	1GE125 4GE125 1GE126	$3.98X10^{-3}$ µCi/cc $9.78X10^{-4}$ µCi/sec $1.46X10^{-3}$ µCi/cc	2GE125 4GE125	$1.33X10^{-1}$ µCi/cc $3.26X10^{-6}$ µCi/sec	4GE125	$5.40X10^{-6}$ µCi/sec	4GE125	$5.40X10^{-7}$ µCi/sec ≥ 15 minutes
Fuel Building Vent	1GE005 4GE005 5GE005	$3.53X10^{-3}$ µCi/cc $9.84X10^{-3}$ µCi/sec $3.17X10^{-3}$ µCi/cc	2GE005 4GE005	$1.18X10^{-1}$ µCi/cc $3.25X10^{-5}$ µCi/sec	4GE005	$3.49X10^{-6}$ µCi/sec	4GE005	$3.49X10^{-7}$ µCi/sec ≥ 15 minutes
Radwaste Building Vent	1GE006 4GE006 5GE006	$5.18X10^{-4}$ µCi/cc $5.11X10^{-3}$ µCi/sec $1.21X10^{-4}$ µCi/cc	1GE006 4GE006 5GE006	$1.73X10^{-2}$ µCi/cc $1.70X10^{-5}$ µCi/sec $4.02X10^{-3}$ µCi/cc	N/A		N/A	
Sample	≥ 2 X ODCM for ≥ 60 minutes		≥ 200 X ODCM for ≥ 15 minutes		N/A		N/A	
Field Team Monitoring (At or beyond site boundary)	N/A		≥ 10 mRem/hr ≥ 15 minutes		≥ 100 mRem/hr ≥ 1 hour OR ≥ 500 mRem CDE Thyroid ≥ 1 hour		≥ 1000 mRem/hr ≥ 1 hour OR ≥ 5000 mRem CDE Thyroid ≥ 1 hour	
CADAP Dose Projection	N/A		N/A		≥ 100 mRem TEDE OR ≥ 500 mRem CDE Thyroid		≥ 1000 mRem TEDE OR ≥ 5000 mRem CDE Thyroid	

AA2 **Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2)

1. Valid radiation readings ≥ 15 mRem/hr in any area requiring continuous occupancy to maintain plant safety functions:
   Main Control Room
   Central Alarm Station
   Remote Shutdown Panel
2. Valid radiation readings ≥ **Max. Safe Operating Values** in any area requiring infrequent access to maintain plant safety functions:

Area	DRMS Grid 2	Max. Safe
HPCS Equip Room	1212	9.5 E + 03 mR/HR
RHR Equip Room A	1213	9.5 E + 03 mR/HR
RHR Equip Room B	1214	9.5 E + 03 mR/HR
RHR Equip Room C	1215	9.5 E + 03 mR/HR
LPCS Equip Room	1216	9.5 E + 03 mR/HR
HPCS Penetration Area	1217	9.5 E + 03 mR/HR
LPCS Penetration Area	1218	9.5 E + 03 mR/HR
RCIC Equip Room	1219	9.5 E + 03 mR/HR

AA3 **Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1)

1. A valid reading of ≥ 9500 mRem/hr on one or more area radiation monitors in an irradiated fuel pool vicinity

   AND

   a. Valid indication of an uncontrolled water level decrease in the Containment reactor refueling cavity, the Fuel building spent fuel pool, or the fuel transfer tube that has or will result in irradiated fuel assemblies becoming uncovered.

   OR

   b. Observed event that caused damage to irradiated fuel.

AU2 **Unplanned increase in plant area radiation levels by a factor of 1000**

Op. Modes: 1, 2, 3, 4, 5, Defueled

EAL Threshold Value: (1 or 2)

1. Valid area radiation monitor reading(s) or survey results indicate an unplanned increase in plant radiation levels by a factor of 1000 over normal levels
2. Valid indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer system with all irradiated fuel assemblies remaining covered by water

   AND

   Valid area radiation monitor reading increase by a factor of 1000 over normal levels

Operating Modes
❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
RCS Leakage	**CG1 Loss of RPV inventory affecting Fuel Clad Integrity with Containment challenged with irradiated fuel in the RPV** *Op. Modes: 4, 5* EAL Threshold Value: (1) 1. RPV level < **-162** inches for > **30** minutes **OR** RPV level cannot be monitored with core uncovery indicated for > **30** minutes, **AND** Containment is challenged as indicated by: Containment hydrogen concentration in the unsafe zone of the HDOL **OR** Containment pressure is ≥ **15** psig **OR** Containment closure is not established **OR** Secondary Containment area radiation monitor above the EOP Max Safe Operating Value in one or more areas. **Area** / **DRMS Grid 2** / **Max. Safe** HPCS Equip Room / 1212 / 9.5 E + 03 mR/HR RHR Equip Room A / 1213 / 9.5 E + 03 mR/HR RHR Equip Room B / 1214 / 9.5 E + 03 mR/HR RHR Equip Room C / 1215 / 9.5 E + 03 mR/HR LPCS Equip Room / 1216 / 9.5 E + 03 mR/HR HPCS Penetration Area / 1217 / 9.5 E + 03 mR/HR LPCS Penetration Area / 1218 / 9.5 E + 03 mR/HR RCIC Equip Room / 1219 / 9.5 E + 03 mR/HR	**CS1 Loss of RCS inventory affecting core decay heat removal capability with irradiated fuel in the RPV** *Op. Modes: 4, 5* EAL Threshold Value: (1 or 2) 1. With Containment Closure **not** established: a. Loss of RCS inventory as indicated by RPV level **<-149 in** **OR** b IN MODE 4 - RPV level cannot be monitored for **>30** minutes with loss of inventory as indicated by unexplained floor or equipment sump level increase **OR** c IN MODE 5 - RPV level cannot be monitored with indication of core uncovery as evidenced by other indication 2. With Containment Closure established: a. Loss of RCS inventory as indicated by RPV level **<-162 in** **OR** b. IN MODE 4 - RPV level cannot be monitored for **>30** minutes with loss of RPV inventory as evidenced by other indication **OR** c. IN MODE 5 -RPV level cannot be monitored with indication of core uncovery as evidenced by other indication	**CA1 Loss of RCS inventory with irradiated fuel in the RPV** *Op. Modes: 4, 5* EAL Threshold Value: (1 or 2) 1. Unplanned loss of RCS inventory and RPV level cannot be restored and maintained **>-143** inches 2. RPV level cannot be monitored for **≥15** minutes **AND** Loss of RPV inventory as indicated by unexplained floor or equipment drain sump level increase	**CU1 RCS leakage** *Op. Modes: 4* EAL Threshold Value: (1) 1. Unplanned loss of RCS inventory and RPV level cannot be restored and maintained **> 9.7** inches **CU2 Unplanned loss of RCS inventory with irradiated fuel in the RPV** *Op. Modes: 5* EAL Threshold Value: (1 or 2) 1. Unplanned RCS level decrease below the RPV flange for ≥ **15** minutes 2. RPV level cannot be monitored **AND** Loss of RPV inventory as indicated by unexplained floor or equipment drain sump level increase

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

RIVER BEND STATION

COLD SHUTDOWN / REFUELING EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of Decay Heat Removal			**CA2 Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV** *Op. Modes: 4, 5* EAL Threshold Value: (1 or 2 or 3) 1. An unplanned event results in RCS temperature **>200 °F** **AND** Containment Closure **and** RCS integrity **not** established. 2. An unplanned event results in RCS temperature **>200 °F** for **>20 minutes** **AND** Containment Closure established **AND** **either** RCS integrity not established **or** RCS inventory reduced 3. An unplanned event results in RCS temperature **>200 °F** for **>60 minutes** **OR** results in RPV pressure increase **> 10 psig**	**CU3 Unplanned loss of decay heat removal capability with irradiated fuel in the RPV** *Op. Modes:4, 5* EAL Threshold Value: (1 or 2) 1. An unplanned event results in RCS temperature **> 200°F** 2. Loss of all RCS temperature **and** RPV level indication for **> 15 minutes**
Loss of AC Power			**CA3 Loss of all offsite and onsite AC Power to essential busses** *Op. Modes: 4, 5* EAL Threshold Value: (1) 1. Unplanned Loss of AC power to ENS-SWG1A **and** ENS-SWG1B busses **AND** Failure to restore power to **either** ENS-SWG1A **or** ENS-SWG1B bus within **15 minutes** from the time of loss of both offsite and onsite AC power	**CU4 Loss of all offsite power to essential busses for > 15 Minutes** *Op. Modes: 4, 5* EAL Threshold Value: (1) 1. Loss of power to RTX-XSR1C and RTX-XSR1D and RTX-XSR1E and RTX-XSR1F for > 15 minutes
Loss of DC Power				**CU5** Unplanned loss of required DC power for >15 Minutes *Op. Modes:4, 5* EAL Threshold Value: (1) 1. **Unplanned** reduction in ENB-SWG1A **and** ENB-SWG1B voltage to **<105 VDC** **AND** Unable to restore power to **either** ENB-SWG1A **or** ENB-SWG1B within **15 minutes** after reaching **105 VDC**

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Inadvertent Criticality				**CU6 Inadvertent criticality.** *Op. Modes: 4, 5* EAL Threshold Value: (1) 1. An unplanned extended positive period observed on nuclear instrumentation
Loss of Communication				**CU7 Unplanned loss of all onsite or offsite communications capabilities** *Op. Modes, 4, 5* EAL Threshold Value: (1 or 2) 1. Unplanned loss of **all** onsite communication equipment: Plant radio system Plant paging system / Gaitronics Sound powered phones In-plant telephones Cell phones 2. Unplanned loss of **all** offsite communication equipment: ESP-COMM / Hotline All telephone lines (commercial and microwave) ENS HPN Cellular phones Satellite phones Radio

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling ○ Defueled

RIVER BEND STATION

INDEPENDENT SPENT FUEL STORAGE INSTALLATION EAL

MODE APPLICABILITY: N/A

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Confinement Boundary Damage				**EU1 Damage to a loaded cask confinement boundary** EAL Threshold Value: (1 or 2 or 3) 1. Natural phenomena event affecting a loaded cask confinement boundary: a. Tornado b. Hurricane force winds c. Earthquake d. Flood e. Lightning f. Extreme Environmental Temperature 2. Accident conditions affecting a loaded cask confinement boundary. a. Dropped cask b. Cask Tip-over c. Explosion d. Missile generated by Natural Phenomena e. Fire Damage f. Blockage of air vents and / or burial under debris 3. Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary
Security				**EU2 Confirmed security event with potential loss of level of safety of the ISFSI.** EAL Threshold Value: (1) 1. Security Event as determined from the RBS Security Plan and reported by the RBS Security Shift Supervision.

River Bend Station

FISSION BRODUCT BARRIER EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Fission Product Barrier Degradation				
FPB Loss / Potential Loss	**FG1** Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier *Op. Modes: 1, 2. 3* **EAL Threshold Value:** (1) 1. Loss of any two Fission Product Barriers **AND** Loss or Potential Loss of third barier	**FS1** Loss or Potential Loss of any two Fission Product Barriers *Op. Modes: 1, 2. 3* **EAL Threshold Value:** (1) 1. Loss or Potential Loss of Fuel Clad and RCS **OR** Loss or Potential Loss of RCS and Primary Containment **OR** Loss or Potential Loss of Primary Containment and Fuel Clad	**FA1** Loss or Potential Loss of EITHER Fuel Clad or RCS *Op. Modes: 1, 2. 3* **EAL Threshold Value:** (1) 1. Loss or Potential Loss of Fuel Clad **OR** Loss or Potential Loss of RCS	**FU1** Loss or Potential Loss of Primary Containment *Op. Modes: 1, 2. 3* **EAL Threshold Value:** 1. Loss or Potential Loss of Primary Containment

Fission Product Barrier Matrix

Fuel Clad (FC)

Parameter	Loss	Potential Loss
FC1 Primary Coolant Activity	Coolant activity ≥300 µCi/gm I_{131} dose equivalent.	None
FC2 RPV Water Level	RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches
FC3 Primary Containment Radiation Monitors	RMS-RE16 A / B >3,000 R/hr	None
FC4 MSL Radiation	MSL Rad level > the Hi Hi Alarm Setpoint (P601-19A-C01 and/or P601-19A-C03)	None
FC5 ED Judgment	Any condition in the opinion of the Emergency Director that indicates a loss of the fuel clad barrier	Any condition in the opinion of the Emergency Director that indicates a potential loss of the fuel clad barrier

Table F4 Area Radiation Levels
RC 3 Potential Loss of RCS

	DRMS GRID 2	Alarm
RHR Equipment Room (A)	1213	High Alarm
RHR Equipment Room (B)	1214	High Alarm
RHR Equipment Room (C)	1215	High Alarm
RCIC Equipment Area	1219	High Alarm

TABLE F3 Area Temperature
RC 3 Potential Loss of RCS

	Panel Alarm
Main Stm Tunn HI Ambient Temp (Isolation)	P601-19A-A1
RHR A Equip Area High Temp (isolation)	P601-20A-B4
RHR B Equip Area High Temp (isolation)	P601-20A-B4
RCIC Room HI Ambient Temp (isolation)	P601-21A-H2
RWCU Equip Rm Amb HI Temp (isolation)	P680-1A-A5

Reactor Coolant System (RCS)

Parameter	Loss	Potential Loss
RC1 Drywell Pressure	>1.68 psig in drywell and pressure increase due to reactor coolant leakage.	None
RC2 RPV Water Level	RPV water level cannot be restored and maintained above -162 inches with indications of a reactor coolant leak	None
RC3 RCS Leak Rate	Unisolable main steam line or RCIC steam line break	Unisolable RCS leakage >50 gpm inside the drywell OR Unisolable primary system leak outside PC as indicated by any area temperature alarm in Table F3 or area radiation level alarm in Table F4
RC4 SRV	SRV stuck open	None
RC5 ED Judgment	Any condition in the opinion of the Emergency Director that indicates a loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates a potential loss of the RCS barrier

Table F2 Area Radiation Levels
PC 3 Loss of Primary Containment

	DRMS GRID 2	Max Safe Operating Value
HPCS Area	1212	9.5e+03 mR/hr
RHR Equipment Room (A)	1213	9.5e+03 mR/hr
RHR Equipment Room (B)	1214	9.5e+03 mR/hr
RHR Equipment Room (C)	1215	9.5e+03 mR/hr
LPCS Equipment Room	1216	9.5e+03 mR/hr
HPCS Penetration Area	1217	9.5e+03 mR/hr
LPCS Penetration Area	1218	9.5e+03 mR/hr
RCIC Equipment Area	1219	9.5e+03 mR/hr

Primary Containment (PC)

Parameter	Loss	Potential Loss
PC1 Primary Containment Pressure	PC pressure response not consistent with LOCA conditions	PC pressure 15 psig and increasing
Hydrogen Concentration	None	PC hydrogen in the unsafe zone of HDOL curve OR DW hydrogen concentration >9%
PC2 RPV Water Level	None	Entry into PC flooding procedures SAP-1 and SAP-2
PC3 Primary Containment Isolation Failure or Bypass	Failure of both valves in any one line to close when isolation is required and downstream pathway to the environment exist OR Intentional venting of the containment per the EOPs or SAPs to maintain containment pressure < 30 psig or to restore and maintain containment hydrogen below the HDOL OR Unisolable primary system leak outside PC as indicated by any area temperature or area radiation level ≥ Max Safe Operating Value Table F1 or Table F2	None
PC4 Significant Radioactive Inventory in Primary Containment	None	Radiation monitor(s) RMS-RE16A and / or RMS-RE16BB reading > 10,000 R/hr
PC5 ED Judgment	Any condition in the opinion of the Emergency Director that indicates a loss of the Primary Containment barrier	Any condition in the opinion of the Emergency Director that indicates a potential loss of the Primary Containment barrier

Table F1 Area Temperatures
PC 3 Loss of Primary Containment

	Max Safe Operating Value
Main Steam Line Tunnel	200° F
RHR Equipment Area 1 (A)	200° F
RHR Equipment Area 2 (B)	200° F
RCIC Equipment Area	200° F
RWCU Pump Room 1 (A)/ 2(B)	200° F

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Security	**HG1 Security event resulting in loss of physical control of the facility** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 1. A hostile force has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions. Loss of physical control of the Control Room **OR** Loss of physical control of the Remote Shutdown Panel **OR** Loss of adequate core cooling or reactivity control	**HS1 Confirmed security event in a plant vital area** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1 or 2) 1. Intrusion into the plant vital area by a hostile force. 2. Other security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision	**HA1 Confirmed security event in the plant protected area** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1 or 2) 1. Intrusion into the plant protected area by a hostile force. 2. Other security events as determined from RBS Safeguards Contingency Plan and reportedby the RBS security shift supervision.	**HU1 Confirmed security event which indicates a potential degradation in the level of safety of the plant** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1 or 2) 1. Notification of a definite or perceived RBS specific security threat or possibility of sabotage and assessment by security shift supervision determines that the threat is credible 2. Security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision
Main Control Room Evacuation		**HS2 Control Room evacuation has been initiated and plant control cannot be established** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 1. Control room evacuation has been initiated **AND** Control of the plant from the Remote Shutdown Panels cannot be established per AOP-0031within 15 minutes	**HA2 Control Room evacuation has been initiated** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 1. Entry into AOP-0031, SHUTDOWN FROM OUTSIDE THE MAIN CONTROL ROOM and control room evacuation has been initiated	
Fire			**HA3 Fire affecting the operability of plant safety systems required to establish or maintain safe shutdown** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 1. Fire in any system or structure containing functions or systems required for safe shutdown: **AND** Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment within the specified area.	**HU2 Fire within protected area boundary not extinguished within 15 minutes of detection** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 1. Fire in buildings or areas contiguous to any vital area not extinguished within 15 minutes of control room notification or verification of a control room alarm: Reactor Building Auxiliary Building Control Building Diesel Generator Building Fuel Building Turbine Building Tunnels Normal Switchgear Building Standby Cooling Tower

Operating Modes
❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Toxic Gas			**HA4 Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of systems required to maintain safe operation or establish or maintain safe shutdown** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1 or 2) 1. Report or detection of toxic gases within or contiguous to a vital area in concentrations that may result in an atmosphere Immediately Dangerous to Life and Health (IDLH). 2. Report or detection of gases in concentration greater than the Lower Flammability Limit within or contiguous to a vital area.	**HU3 Release of toxic or flammable gases deemed detrimental to normal operation of the plant.** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1 or 2) 1. Report or detection of toxic or flammable gases that have or could enter normally occupied areas of the site in amounts that can affect normal plant operations. 2. Report by Local Parish or State Officials for evacuation or sheltering of site personnel based on an offsite toxic gas release event in amounts that are expected to enter normally occupied areas of the site that can affect normal plant operations
Natural and Destructive Phenomena			**HA5 Natural and destructive phenomena affecting the plant vital area** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1, 2, 3, 4, 5, 6, or 7) 1. Valid indication of a Safe Shutdown Earthquake seismic event: Receipt of annunciator "Seismic Event High/High" (P680-02A-B06) **AND** "Seismic Tape Recording System Start" (P680-02A-D06) **AND** Red light(s) on H13-P869 panel NBI-101 lit	**HU4 Natural and destructive phenomena affecting the protected area** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1, 2, 3, 4, 5, 6, or 7) 1. Valid indication of a felt earthquake. Vibratory ground motion felt in the protected area and recognized as an earthquake. **AND** Activated seismic Operating Basis Earthquake (OBE) switches as indicated by receipt of Annunciators "Seismic Event High" (P680-02A-C06) **AND** "Seismic Tape Recording SYS Start" (P680-02A-D06)

Operating Modes
❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY EAL

Natural and Destructive Phenomena

GENERAL EMERGENCY

Table H-1
AREA WATER LEVELS

Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Pump Room 70'EL	4 inches above floor (40%) (P870-51A-G4)
RHR A Room 70'EL	4 inches above floor (40%) (P870-51A-G4)
RHR B Room 70'EL	4 inches above floor.(40%) (P870-51A-G4)
RHR C Room 70'EL	4 inches above floor.(40%) (P870-51A-G4)
LPCS Room 70'EL	4 inches above floor.(40%) (P870-51A-G4)
RCIC Room 70'EL	4 inches above floor in.(40%) (P870-51A-G4)

SITE AREA EMERGENCY

Table H2
Structures Containing Functions or Systems Required for Safe Shutdown

Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

ALERT

HA5 Natural and destructive phenomena affecting the plant vital area (Continued)

2. Tornado striking (touching down) within the protected area boundary and resulting in visible damage to any of the plant structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.
3. Vehicle crash within protected area boundary and resulting in visible damage to any of the structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.
4. Explosion within the protected area affecting the operability of plant safety systems required to establish or maintain safe shutdown.

   AND

   Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment containing those systems or functions required for safe shutdown of the plant.
5. Turbine failure-generated missiles result in any visible damage to or penetration of any of the structures containing those systems or functions required for safe shutdown of the plant.
6. Uncontrolled flooding in Secondary Containment Table H1 area that result in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.
7. Hurricane or high sustained wind conditions ≥ 74 mph within protected area boundary and resulting in visible damage to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

NOUE

HU4 Natural and destructive phenomena affecting the protected area (Continued)

2. Report by plant personnel of a tornado striking (touching down) within the protected area boundary.
3. Vehicle crash into plant structures or systems within the protected area boundary that contain systems or functions required for safe shutdown of the plant.
4. Report by plant personnel of an unanticipated explosion within the protected area boundary resulting in visible damage to a permanent structure or equipment.
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals
6. Uncontrolled flooding and water level greater than the Maximum Safe Operating value in Secondary Containment (Table H1) that has the potential to affect safety related equipment needed for the current operating mode.
7. Severe weather or hurricane conditions with indication of sustained high winds ≥ 74 mph in the Protected Area.

Operating Modes
❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

SYSTEM MALFUNCTION EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of AC Power	**SG1 Loss of all offsite and onsite AC power to essential busses for > 4 hours** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Loss of all AC power to ENS-SWG1A **and** ENS-SWG1B **AND** Either: a. Restoration of AC power to **either** ENS-SWG1A **or** ENS-SWG1B within **4 hours** is **not** likely **OR** b. Conditions are imminent that a loss of two fission product barriers **and** loss or potential loss of the third (FG1) is expected to occur prior to restoration of AC power to **either** ENS-SWG1A **or** ENS-SWG1B	**SS1 Loss of all offsite and onsite AC power to essential busses** *Op. Modes:1, 2, 3* EAL Threshold Value: (1) 1. Loss of all AC power to ENS-SWG1A **and** ENS-SWG1B busses **AND** Failure to restore power to **either** ENS-SWG1A **or** ENS-SWG1B bus within **15 minutes** from the time of loss of **both** offsite **and** onsite AC power	**SA1 AC power capability to essential busses reduced to a single power source for >15 minutes such that any additional single failure would result in station blackout** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Available onsite or offsite AC power to ENS-SWG1A and ENS-SWG1B busses reduced to a single power source for >15 minutes **AND** Any additional single failure of the power source will result in a station blackout	**SU1 Loss of all offsite power to essential busses for > 15 Minutes** *Op. Modes:1, 2,3* EAL Threshold Value: (1) 1. Loss of power to RTX-XSR1C and RTX-XSR1D and RTX-XSR1E and RTX-XSR1F
Loss of DC Power		**SS2 Loss of all vital DC power** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. ENB-SWG1A **and** ENB-SWG1B **≤105 VDC** for **>15 minutes**		
Failure to Scram	**SG2 Failure of Reactor Protection System to complete an automatic reactor scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core** *Op. Modes: 1, 2* EAL Threshold Value: (1) 1. Indications exist that automatic and manual scrams did not bring the reactor subcritical **AND** **Either:** a. RPV level cannot be restored and maintained **> -186** inches **OR** b. Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone	**SS3 Failure of Reactor Protection System to complete or initiate an automatic reactor scram once a Reactor Protection System setpoint has been exceeded and manual scram was not successful** *Op. Modes: 1, 2* EAL Threshold Value: (1) 1. Automatic scram and manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical	**SA2 Failure of Reactor Protection System to complete or initiate an automatic reactor scram once a Reactor Protection System setpoint has been exceeded and manual scram was successful** *Op. Modes: 1, 2* EAL Threshold Value: (1) 1. Automatic scram failed to rapidly insert sufficient control rods to bring the reactor subcritical, and a manual scram was successful	

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
RCS Leakage				**SU2 RCS leakage** *Op. Modes: 1, 2, 3,* EAL Threshold Value: (1 or 2) 1. Unidentified or pressure boundary leakage **>10 gpm** 2. Identified leakage **>35 gpm**
Loss of Decay Heat Removal		**SS4 Complete loss of heat removal capability** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Inability to maintain Suppression Pool temperature within the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone		
Loss of Annunciation / Indication		**SS5 Inability to monitor a significant transient in progress** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Unplanned loss of most or all Control Room annunciators associated with safety systems **AND** Compensatory non-alarming indications for safety systems are not available **AND** Indications needed to monitor criticality **or** core heat removal **or** fission product barrier status are not available **AND** Significant transient in progress	**SA3 Unplanned loss of most or all safety system annunciation or indication in the control room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are not available** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Unplanned loss of most or all safety system annunciators or indications for **>15 minutes** **AND** **Either:** a. A significant transient is in progress **OR** b. Compensatory non-alarming indications are not available	**SU3 Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1) 1. Unplanned loss of most or all safety system annunciators or indications for **>15 minutes**
Inadvertent Criticality				**SU4 Inadvertent criticality** *Op. Modes: 3* EAL Threshold Value: (1) 1. An unplanned extended positive period observed on nuclear instrumentation

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of Communication				**SU5 Unplanned loss of all onsite or offsite communication capabilities** *Op. Modes: 1, 2, 3* EAL Threshold Value: (1 or 2) 1. Unplanned loss of **all** onsite communication equipment: Plant radio system Plant paging system / Gaitronics Sound powered phones In-plant telephones Cell phones 2. Unplanned loss of **all** offsite communication equipment: ESP-COMM / Hotline All telephone lines (commercial and microwave) ENS HPN Cellular phones Satellite phones Radio
Cladding Degradation				**SU6 Fuel clad degradation** *Op. Modes:1, 2, 3,* EAL Threshold Value: (1 or 2) 1. Offgas isolation due to valid Offgas Post Treatment monitor signal (1H13-P601-22A-A03) 2. Reactor Coolant sample activity >4.0 µCi/gm I-131 dose equivalent
TECH SPEC Time Limit Exceeded				**SU7 Inability to reach required shutdown within technical specification time limits** *Op. Modes: 1, 2, 3* EAL Threshold Value: 1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling O Defueled

RIVER BEND STATION

EMERGENCY DIRECTOR JUDGMENT EAL

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Discretionary	**JG1 Other conditions exist which in the judgment of the Emergency Director warrant declaration of General Emergency.** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 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. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	**JS1 Other conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency.** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 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. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.	**JA1 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert** *Op. Modes: 1, 2, 3 ,4, 5, Defueled* EAL Threshold Value: (1) 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 potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	**JU1 Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE.** *Op. Modes: 1, 2, 3, 4, 5, Defueled* EAL Threshold Value: (1) 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. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

Operating Modes

❶ Plant Operations ❷ Plant Startup ❸ Hot Shutdown ❹ Cold Shutdown ❺ Refueling ○ Defueled

Attachment 4

TO

RBG-46211

Proposed EALs Bases – To Be Incorporated in Procedure

Abnormal Radiation Levels / Radiological Effluent

BASES MATRIX

NOUE

AU1 Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological effluent ODCM for ≥ 60 minutes
Op. Modes: All

(page 1)

AU2 Unplanned increase in plant area radiation levels by a factor of 1000.
Op. Modes: All

(page 4)

ALERT

AA1 Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM for ≥ 15 minutes
Op. Modes: All

(page 6)

AA2 Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown
Op. Modes: All

(page 8)

AA3 Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel.

Op. Modes: All

(page 10)

SITE AREA EMERGENCY

AS1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥ 100 mRem TEDE or ≥ 500 mRem CDE thyroid for the actual or projected duration of the release.
Op. Modes: All

(page 12)

GENERAL EMERGENCY

AG1 Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥ 1000 mRem TEDE or ≥ 5000 mRem CDE thyroid for the actual or projected duration of the release using actual meteorology.
Op. Modes: All

(page 14)

ABNORMAL RAD LEVELS / EFFLUENTS

AU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds **2 X** ODCM limit for ≥ 60 min.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2 or 3)

1. Liquid release greater than two times the high alarm set point of RMS-RE107 and failure of isolation valve LWS-AOV257 to close lasting for ≥ 60 minutes.

2. Unplanned radiological effluent release in excess of **Table R1** "NOUE" for ≥ 60 minutes unless releases can be determined to be below "NOUE" thresholds within 60 minutes by sample

3. Unplanned gaseous or liquid radiological releases exceeding **Table R1** "NOUE" sample threshold for ≥60 minutes

Table R1
EAL THRESHOLD

Method	NOUE	
	DRMS	Threshold
Main Plant Vent	1GE125	$3.98X10^{-3}$ µCi/cc
	4GE125	$9.78X10^{+4}$ µCi/sec
	1GE126	$1.46X10^{-3}$ µCi/cc
Fuel Building Vent	1GE005	$3.53X10^{-3}$ µCi/cc
	4GE005	$9.84X10^{+3}$ µCi/sec
	5GE005	$3.17X10^{-3}$ µCi/cc
Radwaste Building Vent	1GE006	$5.18X10^{-4}$ µCi/cc
	4GE006	$5.11X10^{+3}$ µCi/sec
	5GE006	$1.21X10^{-4}$ µCi/cc
Sample	≥ 2 X ODCM for ≥ 60 minutes	
Field Team Monitoring (At or beyond site boundary)	N/A	
CADAP Dose Projection	N/A	

ABNORMAL RAD LEVELS / EFFLUENTS

Basis:

Dose Assessment using the methodology in the ODCM should be performed as soon as possible to ensure that an Alert is not warranted.

A sustained unplanned release that cannot be terminated in 60 minutes represents a potential or actual decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. The degradation in plant control implied by the fact that the release can not be terminated in 60 minutes is the primary concern, not the magnitude of the associated dose or dose rate.

Unplanned, as used in this context, includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc) on the applicable permit. The Emergency Director should not wait until 60 minutes has elapsed, but should declare an Unusual Event as soon as it is determined that the release duration has or will likely exceed 60 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown or cannot be determined, the Emergency Director should, in the absence of data to the contrary, assume the release has exceeded 60 minutes.

EAL #1 – Indexing the EAL to the ODCM setpoint insures that the EAL threshold will never be less than the threshold established by the specific discharge permit. The EAL criteria includes: unplanned liquid release as described above, AND a valid RMS-RE107 value greater than two time the high alarm setpoint, AND a failure of isolation valve 1LWS-AOV257 to close either automatically or by manual methods, AND the condition lasts for 60 minutes or longer. The system is designed for isolation valve LWS-AOV257 to isolate at the high alarm. Failure to isolate is included in the condition to validate the release is occurring. The monitoring instrument, after contaminated, may continue to read high for some period after the release is terminated. Other methods to isolate or stop the release such as a manual valve or stopping the pumps are not included in the EAL. If these confirmed manual termination methods are taken within the 60 minutes, there is no longer a release and the EAL is not met.

EAL #2 – is intended for established effluent monitoring and method to determine the setpoint is described under Table R1. This EAL is based on valid indications and is not met if the value is not sustained or exceeded for 60 minutes or longer. If a sample value indicates the effluent is less than the Table R1 value within 60 minutes of the start of the effluent reading above the setpoint, the EAL is not met.

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

ABNORMAL RAD LEVELS / EFFLUENTS

Table R1

Effluent Monitors - The Effluent Monitor value was determined in accordance with annual average meteorology and dose rate methodology as specified by ODCM. The release rate was determined by taking the high alarm set point which represents one third of the TRM 3.11.2.1 limit of 500 mRem/yr and multiplying by 6. Any one monitor exceeding the value in the table satisfies the criteria for NOUE

Table R1

Samples - Grab samples are used to determine release concentrations. Calculations in accordance with annual average meteorology and the ODCM methodology should be used to calculate the off-site dose rates for compliance with TRM 3.11.2.1 and meeting the criteria for NOUE.

References:

ABNORMAL RAD LEVELS / EFFLUENTS

AU2

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Unplanned increase in plant area radiation levels by a factor of 1000.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Valid Area Radiation Monitor reading(s) or survey results indicate an unplanned increase in plant radiation levels by a factor of 1000 over normal levels.

2. Valid indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer system with all irradiated fuel assemblies remaining covered by water.

AND

Valid area radiation monitor reading increase by a factor of 1000 over normal levels.

Basis:

Classification of an Unusual Event is warranted as a precursor to more serious events. The concern of this EAL is the loss of control of radioactive material representing a potential degradation of the level of safety of the plant. The threshold value tends to have a long lead-time relative to a radiological release and thus the threat to public health and safety is very low.

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

EAL #1 addresses unplanned in-plant radiation level increases that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. This event escalates to an Alert per IC AA2 if the increase in dose rates impedes personnel access necessary for safe operation.

ABNORMAL RAD LEVELS / EFFLUENTS

EAL #2 addresses unexpected increases in radiation levels as a result of uncontrolled water level decreases in the Reactor Building Pools when level is above the RPV flange or the Fuel Building Pools.
Valid indications of may include any of the following:

1. Panel 870 Control Room indicators: SFC-LI28A(B) - Spent Fuel Pool, SFC-LI133 – Upper Transfer Pool, SFC-LI136 – Lower Transfer Pool, SFC-LI112, Refueling Cavity Level
2. Personnel observation and report of lowering level
3. Area Radiation monitors
4. Remote observation of lowering level using a video camera in the area if available.

References:

ABNORMAL RAD LEVELS / EFFLUENTS

AA1

Initiating Condition – ALERT

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 X ODCM limit for ≥ 15 min.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2 or 3)

1. Unplanned liquid release greater than 200 times the high alarm set point of RMS-RE107 and failure of isolation valve LWS-AOV257 to close lasting for ≥ 15 minutes

2. Unplanned radiological effluent release in excess of **Table R1** "Alert" for ≥ 15 minutes unless releases can be determined to be below "Alert" thresholds within 15 minutes by samples

3. Unplanned gaseous or liquid radiological releases in excess of **Table R1** "Alert" sample or field team survey threshold for ≥ 15 minutes

Table R1
EAL THRESHOLD

Method	ALERT DRMS	ALERT Threshold
Main Plant Vent	2GE125	$1.33X10^{-1}$ µCi/cc
	4GE125	$3.26X10^{+6}$ µCi/sec
Fuel Building Vent	2GE005	$1.18X10^{-1}$ µCi/cc
	4GE005	$3.25X10^{+5}$ µCi/sec
Radwaste Building Vent	1GE006	$1.73X10^{-2}$ µCi/cc
	4GE006	$1.70X10^{+5}$ µCi/sec
	5GE006	$4.02X10^{-3}$ µCi/cc
Sample	≥ 200 X ODCM for ≥ 15 minutes	
Field Team Monitoring (At or beyond site boundary)	≥ 10 mRem/hr ≥ 15 minutes	
CADAP Dose Projection	N/A	

ABNORMAL RAD LEVELS / EFFLUENTS

Basis:

Dose Assessment using actual meteorology should be performed a soon as possible to ensure that a Site Area Emergency is not warranted.

A sustained unplanned release of this greater magnitude that cannot be terminated in 15 minutes represents a situation that is an actual or potential substantial degradation of the level of safety of the plant. The degradation in plant control implied by the fact that the release can not be terminated in 15 minutes is the primary concern. The Emergency Director should not wait until 15 minutes has elapsed, but should declare an Alert as soon as the release is determined to be uncontrolled or projected to be non-isolable within 15 minutes.

EAL 1 - The system is designed for isolation valve LWS-AOV257 to isolate at the high alarm. Failure to isolate is included in the condition to validate the release is occurring. Other methods to isolate or stop the release such as a manual valve or stopping the pumps are not included in the EAL. If these confirmed manual termination methods are taken within the 15 minutes, there is no longer a release and the EAL is not met.

EAL 2 and EAL 3

Table R1
Effluent Monitors - The Effluent Monitor value was determined in accordance with annual average meteorology and dose methodology as specified by ODCM. The release rate was determined by taking the low range high alarm set point which represents one third of the TRM 3.11.2.1 limit of 500 mRem/yr and multiplying by 200. Any one monitor exceeding the value in the table satisfies the criteria for Alert. It should be noted that 1GE125, 5GE125, 1GE005 and 5GE005 will be off-scale and the mid-range channels for the Plant Vent (2GE125) and Fuel Building (2GE005) should be used for estimating the radioactivity being released. As a result, the Alert AA1 value is a factor of 3 more conservative than the actual 200 times the ODCM limit.

Table R1
Samples - Grab samples are used to determine release concentrations. Dose and dose rate calculations in accordance with the ODCM methodology should be used to calculate the off-site dose rates for compliance with TRM 3.11.2.1 and meeting the criteria for Alert.

Field Team Monitoring - Prorating the TRM 3.11.2.1 criteria of 500 mR/year for both time and the multiplier, the associated restricted area dose rate would be approximately 10 mR/hr. The release duration was reduced to 15 minutes in recognition of the increased severity and therefore represents a substantial degradation in the level of safety of the plant.

References:

ABNORMAL RAD LEVELS / EFFLUENTS

AA2

Initiating Condition -- ALERT

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

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown
Mode 4	Cold Shutdown
Mode 5	Refueling
	Defueled

Emergency Action Levels (1 or 2)

1. Valid radiation readings ≥ **15 mR/hr** in any area requiring continuous occupancy to maintain plant safety functions

   Main Control Room
   Central Alarm Station
   Remote Shutdown Panel

2. Valid radiation readings ≥ **Max. Safe Operating Values** in any area requiring infrequent access to maintain plant safety functions:

Areas Requiring Infrequent Access	DRMS Grid 2	Max. SafeOperating Values
HPCS Equipment Room	(1212)	9.5 E + 03 MR/HR
RHR Equipment Room A	(1213)	9.5 E + 03 MR/HR
RHR Equipment Room B	(1214)	9.5 E + 03 MR/HR
RHR Equipment Room C	(1215)	9.5 E + 03 MR/HR
LPCS Equipment Room	(1216)	9.5 E + 03 MR/HR
HPCS Penetration Area	(1217)	9.5 E + 03 MR/HR
LPCS Penetration Area	(1218)	9.5 E + 03 MR/HR
RCIC Equipment Room	(1219)	9.5 E + 03 MR/HR

ABNORMAL RAD LEVELS / EFFLUENTS

Basis:

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

This IC is not meant to apply to increases in the containment dome radiation monitors as these are events which are addressed in the fission product barrier matrix ICs. Nor is it intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

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

For areas requiring infrequent access, the site-specific value(s) should be based on radiation levels which result in exposure control measures intended to maintain doses within normal occupational exposure guidelines and limits (i.e., 10 CFR 20), and in doing so, will impede necessary access. As used here, impede, includes hindering or interfering provided that the interference or delay is sufficient to significantly threaten the safe operation of the plant. The EOP Max Safe Operating Values are used as the Alert threshold value.

References:

ABNORMAL RAD LEVELS / EFFLUENTS

AA3

Initiating Condition – ALERT

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

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels (1)

1. A valid reading of ≥ 9500 mR/hr on one or more area radiation monitors in an irradiated fuel pool vicinity

AND

   a. Valid indication of an uncontrolled water level decrease in the Containment reactor refueling cavity, the Fuel building spent fuel pool, or the fuel transfer tube that has or will result in irradiated fuel assemblies becoming uncovered.

   OR

   b. Observed event that caused damage to irradiated fuel.

Basis

This IC addresses specific events that have resulted, or may result, in unexpected increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and a degradation in the level of safety of the plant. These events escalate from IC AU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage, which is discussed in IC E-AU1.

EAL #1 addresses radiation monitor indications of fuel uncovery and/or fuel damage. The scale of the area radiation monitors on the fuel handling floor have a range of $1 - 10^5$ mR/hr. Calculations indicate that the dose rate at the top of the spent fuel pool wall would be approximately 18 R/hr if level in the pool lowered to approximately 103' 8" (approximately 4 ½ feet above the control rod blades). The dose is contributed to control

rod blades which would be uncovered before the fuel. The area radiation monitor reading of 9500 mR/hr was chosen as a conservative value based on the instrument range, including consideration of allowable deviation, of available monitoring instruments. Visual observation of fuel uncovery would not be possible due to radiation dose levels associated with the event. The area radiation monitor value is not indication that the fuel is uncovered but the EAL meets the consideration for an Alert classification: "Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant."

Increased readings on ventilation monitors may be indication of a radioactivity release from the fuel, confirming that damage has occurred but would be classified using AA1. Increased background at the monitor due to water level decrease may mask increased ventilation exhaust airborne activity and needs to be considered. While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered. For example, the monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Application of these Initiating Conditions requires understanding of the actual radiological conditions present in the vicinity of the monitor. Information Notice No. 90-08, *"KR-85 Hazards from Decayed Fuel"* should be considered in establishing radiation monitor EAL thresholds.

Escalation, if appropriate, would occur via IC AS1 or AG1 or Emergency Director judgment.

References:

Calculation G13.18.9.4*10
G13.18.9.4-034

AS1

Initiating Condition – SITE AREA EMERGENCY

Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥ 100 mR TEDE or ≥ 500 mR CDE thyroid for the actual or projected duration of the release.

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown
Mode 4	Cold Shutdown
Mode 5	Refueling
	Defueled

Emergency Action Levels (1 or 2)

1. Radiological effluent release in excess of **Table R1** "Site Area Emergency" unless releases can be determined to be below "Site Area Emergency" thresholds within 15 minutes by dose projection using actual meteorology

2. Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** "Site Area Emergency" threshold

Table R1
EAL THRESHOLD

Method	SITE AREA DRMS Threshold
Main Plant Vent	4GE125 $5.40X10^{+6}$ µCi/sec
Fuel Building Vent	4GE005 $3.49X10^{+6}$ µCi/sec
Radwaste Building Vent	N/A
Sample	N/A
Field Team Monitoring (At or beyond site boundary)	≥ 100 mRem/hr ≥ 1 hour OR ≥ 500 mRem CDE Thyroid ≥ 1 hour
CADAP Dose Projection	≥ 100 mRem TEDE OR ≥ 500 mRem CDE Thyroid

ABNORMAL RAD LEVELS / EFFLUENTS

Basis:

Table R1
Effluent Monitors - Classification is based on effluent monitor reading which would meet or exceed 10% of an EPA Protective Action Guideline (100 mRem TEDE or 500 mRem CDE) at the Site Boundary. It is the instantaneous release rate value if **NO** dose projections can be performed or verified **within 15 minutes** of meeting or exceeding the release rate values. The Effluent Monitor values were determined using CADAP methodologies with following assumptions:

- Wind Speed 4 mph
- Stability Class D
- Filtered Release (Plant Vent) or Pool Scrubbing (Fuel Building Vent)
- Clad Damage
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour

Table R1
Field Team Monitoring - The values are for radiation surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Direct reading iodine monitors are not available. Sampling of radioiodine by adsorption on Silver Zeolite media followed by field analysis are used for determining the iodine value.

Dose Projection - Any CADAP calculated dose projections of 100 mRem total effective dose equivalent or 500 mRem committed dose equivalent to the thyroid is classified based on 10% of the EPA Protective Action Guidelines for radiological exposures to the public.

AS1 and AG1 both provide that if dose assessment results are available, the classification should be based on the basis of the dose assessment result rather than the effluent radiation monitor EAL. Dose assessments are based on actual meteorology.

References:

ABNORMAL RAD LEVELS / EFFLUENTS

AG1

Initiating Condition – GENERAL EMERGENCY

Offsite dose resulting from an actual or imminent release of gaseous radioactivity **≥1000 mRem** TEDE or **≥5000 mRem** CDE Thyroid for the actual or projected duration of the release.

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown
Mode 4	Cold Shutdown
Mode 5	Refueling
	Defueled

Emergency Action Levels (1 or 2)

1. Radiological effluent release in excess of **Table R1** "General Emergency" unless releases can be determined to be below "General Emergency" thresholds within 15 minutes by dose projection using actual meteorology
2. Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** column "General Emergency" threshold

Table R1
EAL THRESHOLD

Method	GENERAL DRMS Threshold
Main Plant Vent	4GE125 $5.40X10^{+7}$ µCi/sec ≥ 15 minutes
Fuel Building Vent	4GE005 $3.49X10^{+7}$ µCi/sec ≥ 15 minutes
Radwaste Building Vent	N/A
Sample	N/A
Field Team Monitoring (At or beyond site boundary)	≥ 1000 mRem/hr ≥ 1 hour OR ≥ 5000 mRem CDE Thyroid ≥ 1 hour
CADAP Dose Projection	≥ 1000 mRem TEDE OR ≥ 5000 mRem CDE Thyroid

ABNORMAL RAD LEVELS / EFFLUENTS

Basis:

Table R1
Effluent Monitors - Classification is based on effluent monitor reading which would meet or exceed an EPA Protective Action Guideline (1 Rem TEDE or 5 Rem CDE) at the Site Boundary. It is the instantaneous release rate value if **NO** dose projections can be performed or verified **within 15 minutes** of meeting or exceeding the release rate value. The Plant Vent and Fuel Building vent values was determined using CADAP methodologies with the following assumptions:

- Wind Speed 4 mph
- Stability Class D
- Filtered Release (Plant Vent) or Pool Scrubbing (Fuel Building Vent)
- Clad Damage
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour

Table R1
Field Team Monitoring - The values are for radiation surveys or iodine air samples taken at or beyond the SITE BOUNDARY and are the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is 1 hour. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Sampling of radioiodine by adsorption on Silver Zeolite media followed by field analysis are used for determining the iodine value.

Dose Projection - Any calculated CADAP dose projections of 1 Rem total effective dose equivalent or 5 Rem committed dose equivalent to the thyroid is classified based on the Environmental Protection Agency Protective Action Guidelines which indicate that public protection is needed at these levels. Source term and release elevation values are options of the program. Actual meteorology provides the most accurate dose assessment and is used whenever possible. The CADAP default release duration is 2 hours.

AS1 and AG1 both provide that if dose assessment results are available, the classification should be based on the basis of the dose assessment result rather than the effluent radiation monitor EAL. Dose assessments are based on actual meteorology.

References:

RIVER BEND STATION

Entergy Nuclear South

COLD SHUTDOWN / REFUELING

BASES

NOUE	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
CU1 Reactor Coolant Leakage *Op. Mode: 4* (Page 1)	**CA1** Loss of RCS inventory with irradiated fuel in the RPV. *Op. Modes: 4, 5* (Page 12)	**CS1** Loss of RCS inventory affecting core decay heat removal capability with irradiated fuel in the RPV. *Op. Mode: 4, 5* (Page 17)	**CG1** Loss of RCS inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the RPV. *Op. Modes: 4, 5* (Page 19)
CU2 Unplanned loss of RCS inventory with irradiated fuel in the RPV. *Op. Mode: 5* (Page 2)	**CA2** Inability to maintain plant in cold shutdown with irradiated fuel in the RPV. *Op. Modes: 4, 5* (Page 14)		
CU3 Unplanned loss of decay heat removal capability with irradiated fuel in the RPV. *Op. Mode: 4, 5* (Page 4)	**CA3** Loss of all offsite and onsite AC Power to ESF busses. *Op. Mode: 4, 5* (Page 16)		
CU4 Loss of all offsite power to essential busses for > 15 minutes. *Op. Modes: 4, 5* (Page 6)			
CU5 Unplanned loss of required DC power for >15 Minutes. *Op. Modes: Op. Modes: 4, 5* (Page 7)			
CU6 Inadvertent criticality *Op. Modes: 4, 5* (Page 8)			
CU7 Unplanned loss of all onsite or offsite communications capabilities. *Op. Modes: Op. Modes: 4, 5* (Page 9)			

COLD SHUTDOWN / REFUELING

CU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability: Mode 4.....Cold Shutdown

Emergency Action Levels: (1)

1. Unplanned loss of RCS inventory and RPV level cannot be restored and maintained **>9.7** inches

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and is considered to be a potential degradation of the level of safety of the plant. The inability to restore RPV level above 9.7 inches was selected to indicate loss of RCS inventory since the leakage monitoring system may not be available in Cold Shutdown. The use of RPV level is consistent with SA4 and SS3 for modes 4 and 5.

The term restored and maintained is consistent with the EOP and is provided to allow level restoration after the isolation of shutdown cooling when RPV level 9.7 inches is reached. Further reduction of RPV level to -42 inches provides isolation to additional systems such as RWCU that may be a potential source of RCS leakage.

The difference between IC SU4 and IC SU5 addresses the different RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will be intact and RCS inventory and level monitoring means are normally available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means.

Escalation of the event to an Alert, due to prolonged loss of RCS inventory in Mode 4, may occur in accordance with either IC SA4 (Loss of RCS inventory) or IC SA5 (Inability to maintain plant in Cold Shutdown with irradiated fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Unplanned loss of RCS inventory with irradiated fuel in the RPV

Operating Mode Applicability: Mode 5 .....Refueling

Emergency Action Levels: (1 or 2)

1. Unplanned RCS level decrease below the RPV flange for ≥ **15 minutes**

2. RPV level cannot be monitored

   AND

   Loss of RPV inventory as indicated by unexplained floor or equipment drain sump level increase.

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and is 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 warrants declaration of a NOUE 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.

The difference between IC CU1 and IC CU2 addresses the different RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will be intact and RCS inventory and level monitoring means are normally available.

EAL 1 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 (covered by IC AU2 EAL1) until such time as the level decreases to the level of the vessel flange.

COLD SHUTDOWN / REFUELING

EAL 2 In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means. Redundant means of RPV 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 RPV inventory loss was occurring by observing sump and tank level changes. A rise in the floor or equipment drain sump levels for the Drywell, Containment, and Pedestal Sumps must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation of the event to an Alert, due to continued loss of RCS Inventory, will occur in accordance with either IC CA1 (Loss of RPV Inventory with Irradiated Fuel in the RPV) or IC CA2 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

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

Operating Mode Applicability: Mode 4.....Cold Shutdown
Mode 5.....Refueling

Emergency Action Levels: (1 or 2)

1. An unplanned event results in RCS temperature > **200°F**

2. Loss of all RCS temperature **and** RPV level indication for > **15 minutes**

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered. In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the RPV (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling).

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown. Escalation to the Alert level via SA5 is provided should an unplanned event result in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 30 minutes with containment closure not established.

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

COLD SHUTDOWN / REFUELING

Escalation of the event to an Alert, due to continued loss of RCS Inventory or RCS temperature increase, will occur in accordance with either IC SA4 (Loss of RPV Inventory with Irradiated Fuel in the RPV) or IC SA5 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CU4

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite power to essential busses for > 15 Minutes

Operating Mode Applicability: Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Level: (1)

1. Loss of power to RTX-XSR1C **and** RTX-XSR1D **and** RTX-XSR1E **and** RTX-XSR1F transformers for **>15 minutes**

Basis:

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (e.g., Station Blackout). This IC is met even if all emergency diesel generators start and provide AC power to ENS-SWG1A and ENS-SWG1B ESF busses. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the event to an Alert, due to subsequent loss of diesel generators such that only one source remains, will occur in accordance with IC CA3, (Loss of all offsite and onsite power to essential busses).

If this condition is met when defueled, the Emergency Director should consider spent fuel pool conditions and as necessary, declare a NOUE on discretionary judgment if warranted.

References:

COLD SHUTDOWN / REFUELING

CU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Unplanned loss of required DC power for >15 Minutes

Operating Mode Applicability: Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Level: (1)

1. Unplanned reduction in ENB-SWG1A **and** ENB-SWG1B voltage to **<105 VDC**

   AND

   Unable to restore power to **either** ENB-SWG1A **or** ENB-SWG1B within **15 minutes** after reaching **105 VDC**

Basis:

The purpose of this IC and its associated EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations. This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

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

The 105 VDC is based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate those loads. This voltage is usually near the minimum voltage selected when battery sizing is performed.

Escalation of the event to an Alert, if the loss results in the inability to maintain cold shutdown, will occur in accordance with CA2 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

OPERATING MODE APPLICABILITY Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Level: (1)

1. An **unplanned** extended positive period observed on nuclear instrumentation.

Basis:

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

This condition can be identified using period monitors. The term "extended" is used in order to allow exclusion of expected short term positive periods from planned control rod movements. (Example: Scram time testing, Control Rod blade manipulations, Control Rod testing))

References:

COLD SHUTDOWN / REFUELING

CU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Unplanned loss of all onsite or offsite communications capabilities

Operating Mode Applicability: Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Levels: (1 or 2)

1. Unplanned loss of **all** onsite communications equipment

   Plant radio system
   Plant paging system / Gaitronics
   Sound powered phones
   In-plant telephones
   Cell phones

2. Unplanned loss of **all** offsite communications equipment

   ESP-COMM
   All telephone lines
   ENS
   HPN
   Cellular phones
   Satellite phone
   Radio

Basis:

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

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

COLD SHUTDOWN / REFUELING

Site-specific list for onsite communications loss must encompass the loss of all means of routine communications (e.g., commercial telephones, sound powered phone systems, page party system (Gaitronics) and radios / walkie talkies).

Site-specific list for offsite communications loss must encompass the loss of all means of communications with offsite authorities. This should include the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems.

There is no escalation above the Notification of Unusual Event for this event.

References:

COLD SHUTDOWN / REFUELING

CA1

Initiating Condition -- ALERT

Loss of RCS inventory with irradiated fuel in the RPV

Operating Mode Applicability: Mode 4 .....Cold Shutdown
Mode 5 .....Refuel

Emergency Action Levels: (1 or 2)

1. Unplanned loss of RCS inventory and RPV level cannot be restored and maintained >-143 inches

2. RPV level cannot be monitored for >15 minutes

   AND

   Loss of RPV inventory as indicated by unexplained floor or equipment drain sump level increase

Basis:

These EALs serve as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum classification of Alert. The Low-Low ECCS Actuation Setpoint was chosen because it is a standard setpoint at which all available injection systems automatically start. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for typically 100 hours or longer after the reactor has been shutdown. Thus the heatup threat and therefore the threat, to damaging the fuel clad, may be lower for events that occur in the refueling mode with irradiated fuel in the RPV (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling).

COLD SHUTDOWN / REFUELING

In the cold shutdown mode, normal RCS level and RPV level instrumentation systems will normally be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost, during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. A rise in the equipment or floor drain sump levels for the Drywell, Containment, and Pedestal Sumps must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 15-minute duration for the loss of level indication was chosen because it is half of the IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV) duration. The 15-minute duration allows this EAL to be an effective precursor to SS4. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour per the analysis referenced in the SS4 basis. Therefore this EAL meets the definition for an Alert emergency.

Escalation of the event to a Site Area Emergency, if RPV level continues to decrease, will occur in accordance with IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CA2

Initiating Condition -- ALERT

Inability to maintain plant in cold shutdown with irradiated fuel in the RPV

Operating Mode Applicability: Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Levels: (1 or 2 or 3)

1. An unplanned event results in RCS temperature **>200 °F**

   AND

   Containment Closure **and** RCS integrity **not** established.

2. An unplanned event results in RCS temperature **>200 °F** for **>20 minutes** [See Note]

   AND

   Containment Closure established

   AND

   either RCS integrity not established **or** RCS inventory reduced.

3. An unplanned event results in RCS temperature **>200 °F** for **>60 minutes** [See Note]
   OR results in RPV pressure increase **> 10 psig.**

Note: If a decay heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable

Basis:

EAL 1 addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither containment closure nor RCS integrity are established. RCS integrity is in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams, RPV head tensioned). No delay time is allowed for EAL1 because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.

COLD SHUTDOWN / REFUELING

EAL 2 addresses the complete loss of functions required for core cooling for > 20 minutes during refueling and cold shutdown modes when containment closure is established but RCS integrity is not established or RCS inventory is reduced. As in EAL 1, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible. The allowed time frame is consistent with the guidance provided by Generic Letter 88-17, "Loss of Decay Heat Removal" (discussed later in this basis) and is believed to be conservative given that a low pressure containment barrier to fission product release is established. The Note indicates that EAL 2 is not applicable if actions are successful in restoring a decay heat removal system to operation and RCS temperature is being reduced within the 20 minute time frame.

EAL 3 addresses complete loss of functions required for core cooling for > 60 minutes during refueling and cold shutdown modes when RCS integrity is established. As in EAL 1 and 2, RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams, RPV head tensioned). The status of containment closure in this EAL is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety. The >10 psig pressure increase covers situations where, due to high decay heat loads, the time provided to restore temperature control, could be less than 60 minutes. RPV pressure would have to be monitored on the Plant Data System computer to determine the 10 psig pressure increase. The Note indicates that EAL 3 is not applicable if actions are successful in restoring a decay heat removal system to operation and RCS temperature is being reduced within the 60 minute time frame assuming that the RCS pressure increase has remained less than 10 psig.

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

Escalation of the event to a Site Area Emergency, should boiling result in significant RPV level loss leading to core uncovery, will occur in accordance with IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV).

References:

COLD SHUTDOWN / REFUELING

CA3

Initiating Condition -- ALERT

Loss of all offsite and onsite AC Power to essential busses

Operating Mode Applicability:

Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Level: (1)

1. Unplanned Loss of AC power to ENS-SWG1A **and** ENS-SWG1B busses

   AND

   Failure to restore power to **either** ENS-SWG1A **or** ENS-SWG1B bus within **15 minutes** from the time of loss of both offsite and onsite AC power

Basis:

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

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses. Even though an essential bus may be re-energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not functional on the energized bus, then the bus should not be considered restored for this EAL.

There is no escalation above the Alert for this event in operating modes 4 or 5.

References:

CS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of RCS inventory affecting core decay heat removal capability with irradiated fuel in the RPV

Operating Mode Applicability:

Mode 4 .....Cold Shutdown
Mode 5 .....Refueling

Emergency Action Level:

1. With Containment Closure **not** established:

   a. Loss of RCS inventory as indicated by RPV level **<-149 in**

   OR

   b IN MODE 4 - RPV level cannot be monitored for **>30** minutes with loss of inventory as indicated by unexplained floor or equipment sump level increase.

   OR

   c. IN MODE 5 - RPV level cannot be monitored with indication of core uncovery as evidenced by other indication

2. With Containment Closure established:

   a. Loss of RCS inventory as indicated by RPV level **<-162 in**

   OR

   b. IN MODE 4 - RPV level cannot be monitored for >30 minutes with a loss of RPV inventory as evidenced by other indication

   OR

   c. IN MODE 5 -RPV level cannot be monitored with indication of core uncovery as evidenced by other indication

Basis:

COLD SHUTDOWN / REFUELING

Under the conditions specified by this IC, continued decrease in RPV level below the ECCS initiation is indicative of a loss of inventory control. Inventory loss may be due to an RPV breach, pressure boundary leakage, or continued boiling in the RPV.

Core uncovery may be evidenced by either: (1) erratic Source Range Monitor indication, (2) Drywell, Containment, or Pedestal sumps levels rising unexpectedly, or (3) a significant rise in Containment Post Accident Monitor RMS-RE16A and / or RMS-RE16B or Drywell Post Accident Monitor RMS-RE20A and / or RMS-RE20B that is attributable to the loss of inventory. In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Thus the heatup threat, and therefore the threat to damaging the fuel clad, may be lower for events that occur in the refueling mode with irradiated fuel in the RPV.

In the cold shutdown mode, normal reactor vessel level indication systems will normally be available. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. A rise in the equipment or floor drain sump levels for the Drywell, Containment, and Pedestal Sumps 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.

A number of variables such as initial vessel level, or shutdown heat removal system design can have a significant impact on heat removal capability challenging the fuel clad barrier. Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, conservatively, 30-minutes were chosen.

The 30-minute duration allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative given that level is being monitored. Radiological release would be monitored and escalation would be via Abnormal Rad ICs if required. Thus, declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Expanded basis for these assumptions is provided in Appendix C of NEI 99-01.

References:

CG1

Initiating Condition -- GENERAL EMERGENCY

Loss of RPV inventory affecting Fuel Clad integrity with Containment challenged with irradiated fuel in the RPV

Operating Mode Applicability: Mode 4 Cold Shutdown
Mode 5 Refueling

Emergency Action Level: (1)

1. RPV level **< -162** inches for **> 30** minutes **OR** RPV level cannot be monitored with core uncovery indicated for **> 30** minutes,

AND

Containment is challenged as indicated by:

Containment hydrogen concentration in the unsafe zone of the HDOL

OR

Containment pressure is **≥ 15** psig

OR

Containment closure is not established

OR

Secondary Containment area radiation monitor above the EOP Max Safe Operating Value in one or more areas

Area	DRMS Grid 2	Max. Safe
HPCS Equip Room	1212	9.5 E + 03 mR/HR
RHR Equip Room A	1213	9.5 E + 03 mR/HR
RHR Equip Room B	1214	9.5 E + 03 mR/HR
RHR Equip Room C	1215	9.5 E + 03 mR/HR
LPCS Equip Room	1216	9.5 E + 03 mR/HR
HPCS Penetration Area	1217	9.5 E + 03 mR/HR
LPCS Penetration Area	1218	9.5 E + 03 mR/HR
RCIC Equip Room	1219	9.5 E + 03 mR/HR

COLD SHUTDOWN / REFUELING

Basis:

For EAL 1 in the cold shutdown mode, normal RCS level and RPV level instrumentation systems will normally be available. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. A rise in the equipment or floor drain sump levels for the Drywell, Containment, and Pedestal Sumps must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. For both cold shutdown and refueling modes 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.

Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. Indication of core uncovery may be identified by one or more of the following:

- Unplanned significant increase in Containment Post Accident Monitors RMS-RE16A and/or RMSRE16B reading.
- Erratic Source Range Monitor Indication

As water level in the RPV lowers, the dose rate above the core will increase. For most designs the dose rate due to this core shine should result in a rise in Containment High Range Monitor indication and possible alarm. A specific value for the PAM reading was <u>not</u> calculated since variables (time of shutdown, whether drywell and RPV head are installed) change and affect the expected radiation dose rate when the core is uncovered. Consideration should be given to the status of components such as the location of the drywell head, separator, etc. in monitoring rising dose rates. Additionally, post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

These EALs are based on concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*, SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*, NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*, and, NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management.* A number of variables, (e.g., such as initial vessel level, or shutdown heat removal system design) can have a significant impact on heat removal capability challenging the fuel clad barrier. Analysis in the above references indicates that core damage may occur within an hour following continued core uncovery therefore, conservatively, 30 minutes was chosen.

COLD SHUTDOWN / REFUELING

Containment challenges are identified in the Fission Product Barrier EALs as a Potential Loss of Containment and the addition of Containment closure not established for cold shutdown and refueling. Indication of Containment challenge is identified by one or more of the following:

- Explosive mixture inside Containment EOP/SOP Hydrogen Deflagration Operating Limit (HDOL)
- Primary Containment Pressure > 15 psig
- Containment closure not established
- Secondary Containment radiation level and/or temperature above the EOP Max Safe Operating value in one or more areas.

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

The site-specific pressure at which Containment is considered challenged may change based on the condition of the Containment. If the Unit is in the cold shutdown mode and the Containment integrity for the mode is established, then the site-specific setpoint is equivalent to the Containment pressure of 15 psig design pressure as used in the Fission Product Barrier EAL. This is consistent with the Emergency Operating Procedures and Severe Accident Procedures. If Containment closure is established before the 30 minute uncovery period is elapsed, this EAL condition is no longer met.

The use of secondary containment radiation monitors should provide indication of increased release that may be indicative of a challenge to secondary containment. The radiation monitor values are based on the EOP maximum safe operating values because these values are easily recognizable and have an emergency basis.

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

The GE in cold shutdown or refueling is declared on the occurrence of the loss or imminent loss of function of all three barriers. Based on the above discussion, RCS barrier failure resulting in core uncovery for 30 minutes or more may cause fuel clad failure. With the Containment breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE.

References:

RIVER BEND STATION
Entergy Nuclear South

INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

BASES MATRIX

NOUE	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
EU1 Damage to a loaded cask confinement boundary *Op. Mode: Not Applicable* (page 1)			
EU2 Confirmed Security Event with potential loss of level of safety of the ISFSI *Op. Mode: Not Applicable* (page 3)			

INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

EU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask confinement boundary

Operating Mode Applicability: **Not Applicable**

Emergency Action Levels: (1 or 2 or 3)

1. Natural phenomena events affecting a loaded cask confinement boundary
   Any one or more of the following:
   a. Tornado
   b. Hurricane force winds
   c. Earthquake
   d. Flood
   e. Lightning
   f. Extreme Environmental Temperature

2. Accident conditions affecting a loaded cask confinement boundary
   Any one or more of the following:

   a. Dropped cask
   b. Cask Tip-over
   c. Explosive Overpressure
   d. Damage by Missile generated by Natural Phenomena
   e. Fire Damage
   f. Blockage of air vents and / or burial under debris

3. Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary

Basis:

A NOUE in this IC is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage. The accidents analyzed in Chapter 11 of the HI-STORM FSAR show that the Multi-Purpose Canister (MPC) confinement boundary withstands all credible design basis postulated accidents and natural phenomena events..

INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

This Initiating Condition is applicable to the loss and or degradation of a loaded fuel storage cask confinement boundary during movement in the Fuel Building, transportation of the loaded cask onsite, and at the storage location. The loss or degradation of the confinement boundary must be determined by a visual and radiological inspection after the initiating event

EAL #1 addresses response to a natural phenomena event affecting a cask: The loss or degradation of the confinement boundary must be determined by a visual and radiological inspection after the event to meet this EAL. Other procedures such as AOP-0029 for severe weather, operating procedures, and alarm response procedures provide guidance on the identification of a natural event such as tornado or hurricane. The basis for the seismic event is the ISFSI design basis earthquake. The extreme environmental temperature is 125° F and assumed to exist for a sufficient duration to allow the HI-Storm 100 system to achieve thermal equilibrium.

EAL #2 addresses response to a dropped cask, a tipped over cask, explosion, missile damage, or fire damage. The loss or degradation of the confinement boundary must be determined by a visual and/or radiological inspection after the event to meet this EAL. The only concern for a fire is related to a transport vehicle fuel tank fire engulfing the loaded cask while it is being moved to the ISFSI.

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

References:
HI-STORM FSAR
Certificate of Compliance

INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

EU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Confirmed Security Event with potential loss of level of safety of the ISFSI.

Operating Mode Applicability: **Not Applicable**

Emergency Action Levels:

1. Security event as determined from the RBS Security Plan for ISFSI and reported by the RBS Security Shift Supervision

Basis:

The NOUE is based on the RBS Security Plan for ISFSI. Security events which do not represent a potential degradation in the level of safety of the ISFSI, are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72.

References:

RIVER BEND STATION
Entergy Nuclear South

FISSION PRODUCT BARRIER

NOUE		ALERT		SITE AREA EMERGENCY		GENERAL	
FU1	Loss or potential loss of primary containment	FA1	Loss or potential loss of either Fuel Clad or RCS	FS1	Loss or potential loss of any 2 fission product barriers	FG1	Loss of any 2 fission product barriers with loss or potential loss of the third barrier
	Op. Mode: 1, 2, 3		*Op. Mode: 1, 2, 3*		*Op. Mode: 1, 2, 3*		*Op. Mode: 1, 2, 3*
	(page 1)		*(page 2)*		*(page 3)*		*(page 4)*

Primary Containment		Fuel Clad		RCS	
PC1	Primary containment pressure *(page 5)*	FC1	Primary coolant activity level *(page 14)*	RC1	Drywell pressure *(page 20)*
PC2	Reactor vessel water level *(page 7)*	FC2	Reactor vessel water level *(page 15)*	RC2	Reactor vessel water level *(page 21)*
PC3	Primary containment isolation failure or bypassed *(page 8)*	FC3	Primary containment radiation Monitors *(page 16)*	RC3	RCS leak rate *(page 22)*
PC4	Significant radioactive inventory in the primary containment *(page 11)*	FC4	MSL radiation monitors *(page 18)*	RC4	Primary system relief valves *(page 24)*
PC5	Emergency Director judgment *(page 13)*	FC5	Emergency Director judgment *(page 19)*	RC5	Emergency Director judgment *(page 25)*

FU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Loss or potential loss of Primary Containment

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Levels: (1)

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

1. Loss or potential loss of **Primary Containment**.

Basis:

The Fuel Cladding and the Reactor Coolant System are weighted more heavily than the Primary Containment Barrier. NOUE ICs associated with RCS and Fuel Clad Barriers are addressed under System Malfunction ICs.

Loss of the Primary Containment would be a potential degradation in the level of plant safety. The Primary Containment barrier includes the drywell, the wetwell, their respective interconnecting paths, and other connections up to and including the outermost containment isolation valves. Containment barrier EALs are used primarily as discriminators for escalation from an Alert to a Site Area Emergency or a General Emergency.

FA1

Initiating Condition – ALERT

Loss or potential loss of either Fuel Clad or RCS

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Levels: (1)

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

1. Loss or potential loss of **Fuel Clad**.

   OR

   Loss or potential loss of **RCS**

Basis:

The Fuel Cladding and the Reactor Coolant System are weighted more heavily than the Primary Containment Barrier.

Loss of either the Fuel Cladding or the Reactor Coolant System would be a substantial degradation in the level of plant safety.

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

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

FS1

Initiating Condition – SITE AREA EMERGENCY

Loss or potential loss of any 2 fission product barriers

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Levels: (1)

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates **ANY** following:

1. Loss or potential loss of **Fuel Clad and RCS.**

   OR

   Loss or potential loss of **RCS and Primary Containment**

   OR

   Loss or potential loss of **Primary Containment and Fuel Clad**

Basis:

Loss of 2 Fission Product Barriers would be a major failure of plant systems needed for protection of the public.

FG1

Initiating Condition – GENERAL EMERGENCY

Loss of any two fission product barriers with loss or potential loss of the third barrier

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Levels: (1)

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates:

1. Loss of any two fission product barriers

   AND

   Loss or potential loss of third barrier

Basis:

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

PRIMARY CONTAINMENT PC1

Emergency Action Level:

Primary Containment Pressure

EAL threshold:

LOSS: .....Primary Containment pressure response not consistent with LOCA conditions

POTENTIAL LOSS:.....Primary Containment pressure **15 psig** and increasing

OR

Primary Containment Hydrogen in the unsafe zone of the EOP / SAG **HDOL** curve

OR

Drywell Hydrogen Concentration > **9%**

Basis:

LOSS –An unexplained loss of pressure (i.e., not attributable to condensation or restoration of Containment or Drywell unit coolers) following an initial pressure increase indicates a loss of primary containment integrity. Primary Containment pressure should increase as a result of mass and energy release into the containment from a LOCA. Primary Containment pressure not increasing under these conditions indicates a loss of the primary containment. This indicator relies on operator recognition of an unexpected response and therefore does not have a specific value associated. Control room indicators may include ERIS data points, P808 CMS indication, or back-panel CMS pressure indication.

POTENTIAL LOSS - Primary Containment pressure ≥ 15 psig is based on the design pressure of the Primary Containment. If the Primary Containment pressure is exceeded, this represents a condition outside the analyzed conditions. This constitutes a potential loss of the Primary Containment barrier even if a failure to isolate has not occurred.

FISSION PRODUCT BARRIER

The Emergency Procedure Guidelines and Severe Accident Guidelines identify that deflagration could occur if containment hydrogen concentration reaches the HDOL or drywell hydrogen concentration reaches 9%. The deflagration of Hydrogen represents a potential loss of the primary containment. Indication of actual hydrogen concentration in the containment is affected by the environmental conditions (i.e., the presence of water vapor). The RBS hydrogen monitoring system removes water vapor from the sample before hydrogen concentration is measured and, thus, may provide readings that are higher than the actual hydrogen concentration.

References:

PRIMARY CONTAINMENT PC 2

Emergency Action Level:

Reactor Vessel Water Level

EAL Threshold:

LOSS: .....NONE

POTENTIAL LOSS: .....Entry into PC flooding procedures SAP-1 and SAP-2.

Basis:

LOSS – NONE

POTENTIAL LOSS - Entry into Primary Containment flooding as required by the Emergency Operating Procedures (EOPs) is indicative of substantial core degradation and represent imminent core melt sequences which if not corrected could lead to reactor vessel failure and increased potential for containment failure. EOPs direct the operators to enter Containment Flooding when reactor vessel level cannot be restored to greater than the minimum steam cooling value or greater than 2/3 core height. Entry into Containment Flooding procedures is a logical escalation in response to the inability to maintain reactor vessel level.

The conditions in this potential loss EAL represent imminent core melt sequences which, if not corrected, could lead to vessel failure and increased potential for containment failure. Severe accident analysis (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation with the reactor vessel in a significant fraction of the core damage scenarios, and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow emergency operating procedures (EOP) to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within the time provided. The Emergency Director should make the declaration as soon as it is determined that the EOP procedures have been, or will be, ineffective.

In conjunction with and an escalation of the RPV level EALs in the fuel and RCS barrier ICs, this EAL will result in the declaration of a general emergency – loss of 2 barriers and the potential loss of the third.

References:

PRIMARY CONTAINMENT PC3

Emergency Action Level:

Primary Containment Isolation Failure or Bypassed

EAL Threshold:

LOSS: .....Failure of both valves in any one line to close when isolation is required AND downstream pathway to the environment exists.

OR

Intentional venting of the Containment per the EOPs or SAPs to maintain Containment pressure < 30 psig or restore and maintain containment hydrogen concentration below the HDOL.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area temperature ≥ Max Safe Operating Value in **Table F1**.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area radiation level ≥ Max Safe Operating Value in **Table F2**.

POTENTIAL LOSS: .....NONE.

Table F1 -- Area Temperatures PC 3 Loss of Primary Containment	
	Max Safe Operating Value
Main Steam Line Tunnel	200° F
RHR Equipment Area 1 (A)	200° F
RHR Equipment Area 2 (B)	200° F
RCIC Equipment Area	200° F
RWCU Pump Room 1 (A)/ 2(B)	200° F

Table F2 -- Area Radiation Levels PC 3 Loss of Primary Containment		
	DRMS GRID 2	Max Safe Operating Value
HPCS Area	1212	9.5e+03 mR/hr
RHR Equipment Room (A)	1213	9.5e+03 mR/hr
RHR Equipment Room (B)	1214	9.5e+03 mR/hr
RHR Equipment Room (C)	1215	9.5e+03 mR/hr
LPCS Equipment Room	1216	9.5e+03 mR/hr
HPCS Penetration Area	1217	9.5e+03 mR/hr
LPCS Penetration Area	1218	9.5e+03 mR/hr
RCIC Equipment Area	1219	9.5e+03 mR/hr

Basis:

LOSS – Failure to isolate - This EAL is intended to cover the inability to isolate the containment when isolation is required and a downstream pathway to the environment exists. Inability to isolate means the primary containment isolation valve(s) did not fully close after a valid automatic or manual isolation signal and is not isolable from the Main Control Room, or an attempt for isolation from the Main Control Room has been made and was unsuccessful. An attempt for isolation should be made upon identification and prior to the accident classification. If isolated from the Main Control Room upon identification, this Initiating Condition is not applicable.

Except for the enclosures to vent the containment per the SAPs, the bypass of isolation(s) and reopening of containment isolation valves in accordance with other EOP enclosures, as necessary, is not considered a failure to isolate. EOP enclosures have been evaluated and an open pathway to the environment will not exist. The EOP enclosures are used as necessary and the capability to close the valves exist if conditions no longer necessitate the valves open or if conditions indicate an open path to the environment (e.g., EOP enclosures to use MSL and /or MSRs for RPV pressure control) and a release to the environment is occurring.

Primary Containment isolation valves are described in the Technical Specifications bases for Primary Containment, Primary Containment Airlock and Primary Containment Isolation Valves (T.S. 3.6.1.1). The Containment airlock is not considered in this EAL since airlock failure would be a potential failure mode to cause the EAL PC1 threshold.

Containment Venting - An intentional venting of primary containment for pressure or hydrogen control to the secondary containment or to the environment is considered a loss of containment due to the potential for a large radioactivity inventory in the containment. Containment venting for pressure control to maintain containment pressure < 2 psig is not considered since a large radioactivity inventory is not expected. After LOCA isolation, bypass of the isolation is not allowed until necessary to vent as described in this EAL threshold.

Area temperature or radiation – Area radiation and temperature above the maximum safe operating value covers unisolable primary system leakage outside the drywell after containment isolation. These indicators should be confirmed to be caused by RCS leakage. Leakage into a closed system is to be considered a loss of primary containment only if the closed system is breached and thereby creates a path to the environment.

References:

PRIMARY CONTAINMENT PC 4

Emergency Action Level:

Significant radioactive inventory in the Primary Containment

EAL Threshold:

LOSS: .....NONE

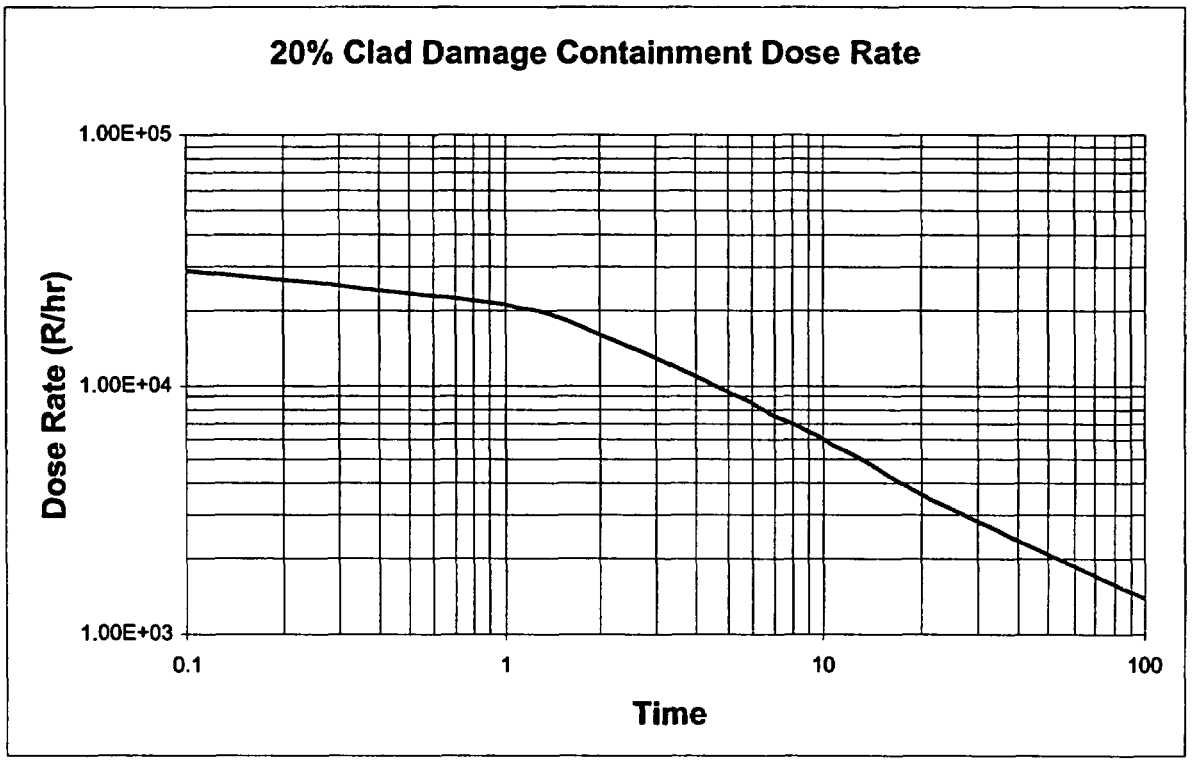
POTENTIAL LOSS: .....Radiation monitor(s) RMS-RE16A and / or RMS-RE16B reading > **10,000 R/hr**

BASIS

LOSS – NONE

POTENTIAL LOSS – As shown on the following graph, containment radiation monitor readings after reactor shutdown indicate a fuel clad damage of 20% and a failure of the primary system allowing the entire inventory to be disbursed inside the containment. The threshold set point of 10,000 R/hr is used conservatively in the transition from NUREG-0654 based EALs. The value is the same as the current NUREG-0654 EAL and is easily recognized. Regardless of whether other reading indicate containment is challenged this amount of activity, if released, could have such severe consequences that it is prudent to treat this as a potential loss of primary containment.

Clad damage assessment is NOT required to be performed by Main Control Room personnel.



References:

Calculation G13.18.9.4-045 Rev. 0

PRIMARY CONTAINMENT PC5

Emergency Action Level:

Emergency Director Judgment

EAL Threshold:

LOSS: .....Any condition in the opinion of the Emergency Director that indicates a loss of the Primary Containment barrier

POTENTIAL LOSS: .....Any condition in the opinion of the Emergency Director that indicates a potential loss of the Primary Containment barrier

Basis:

LOSS or **POTENTIAL LOSS** – This EAL addresses any other factors that can be used by the Emergency Director in determining whether the Primary Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that any barrier may be considered lost or potentially lost.

References:

FUEL CLAD FC 1

Emergency Action Level:

Primary Coolant Activity Level

EAL Threshold:

LOSS: .....Coolant Activity **≥300 µCi/g I-131** dose equivalent.

POTENTIAL LOSS: .....NONE

Basis:

LOSS - Reactor coolant activity provides for the most accurate assessment of the extent of fuel clad degradation. Classifications based on this criterion may be delayed due to the time involved in obtaining and analyzing a coolant sample. This value, 300 µCi/g I-131 dose equivalent, indicates less than 5% fuel clad damage and is indicative of a loss of the fuel clad fission product barrier. This is based on an undiluted reactor coolant sample and the value is well above that expected for iodine spikes. Mixing of the reactor coolant with the Suppression Pool could dilute the sample by a 20:1 ratio.

POTENTIAL LOSS - NONE

References:

FUEL CLAD FC 2

Emergency Action Level:

Reactor Vessel Water Level

EAL Threshold:

LOSS:.....Reactor water level cannot be restored and maintained above **-186 inches.**

POTENTIAL LOSS:.....Reactor water Level cannot be restored and maintained above **-162 inches.**

Basis:

LOSS - Reactor vessel water level less than the minimum steam cooling RPV water level (-186") with injection is the minimum that assures maximum peak cladding temperature will not exceed 1500°F. Corrective actions as described in the Emergency Operating Procedures (EOPs) and Severe Accident Guidelines (SAGs) will be needed to mitigate fuel clad/core damage.

POTENTIAL LOSS – With Reactor vessel water level less than the top of active fuel (-162"), adequate core cooling is still assured but is sufficiently low that any further drop in water level could result in the significant degradation of the cladding. Corrective actions as described in the Emergency Operating Procedures (EOPs) will be needed to mitigate fuel clad/core damage.

References:

FUEL CLAD FC 3

Emergency Action Level:

Primary Containment Radiation Monitors

EAL Threshold:

LOSS: .....Radiation monitor(s) RMS-RE16A and / or RMS-RE16B reading > **3,000 R/hr.**

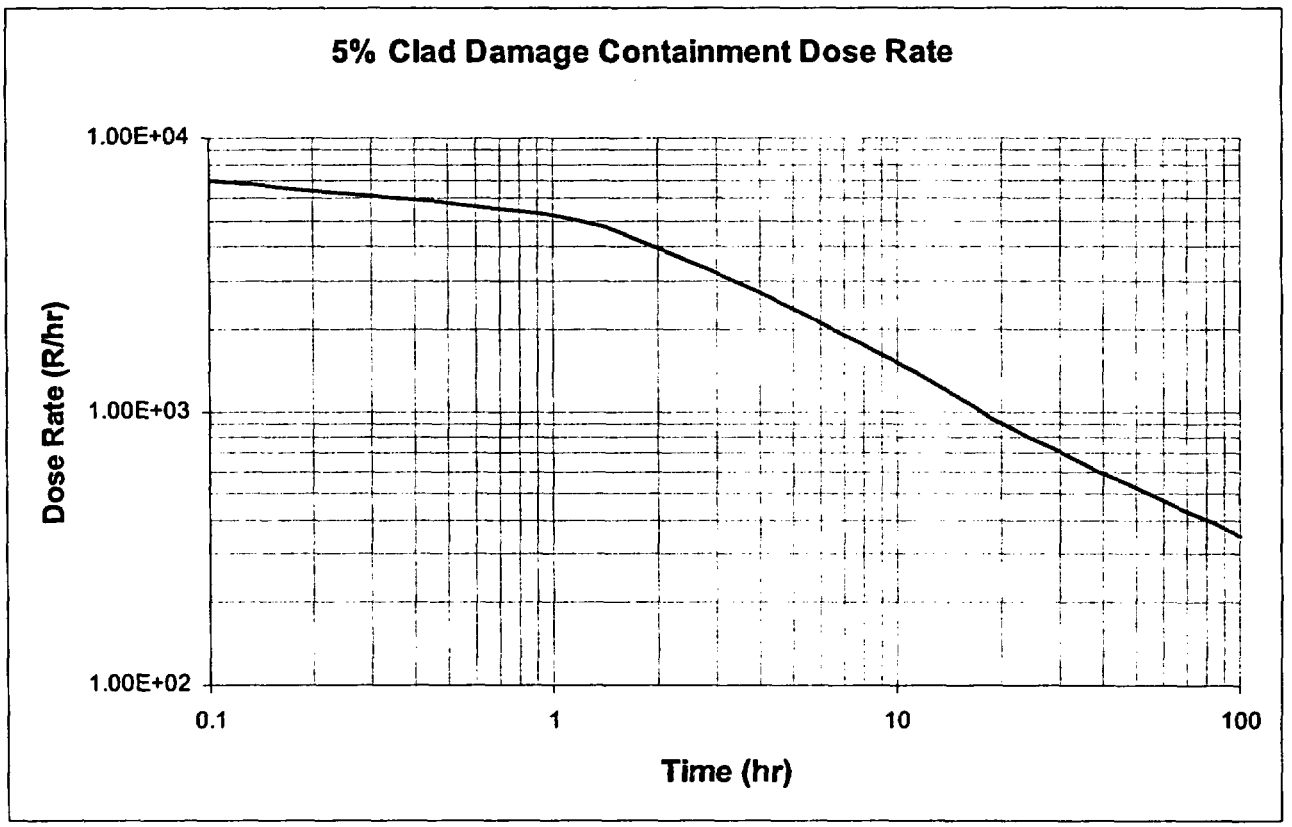
POTENTIAL LOSS: .....NONE

Basis:

LOSS - Containment radiation monitors reading in excess of 3000 R/hr after Reactor Shutdown are indicative of both the loss of the reactor coolant system and 5% clad failure with the instantaneous release and dispersal of the reactor coolant noble gas and Iodine inventory into the drywell and containment atmosphere. Clad damage of 5%, as shown on the following graph, assumes reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed by Technical Specifications. Therefore readings of this level are indicative of a loss of the fuel cladding barrier.

Clad damage assessment is NOT required to be performed by Main Control Room personnel.

POTENTIAL LOSS - NONE



References:
Calculation G13.18.9.4-045 Rev. 0

FUEL CLAD FC 4

Emergency Action Level:

Main Steam Line Radiation

EAL Threshold:

LOSS: .....MSL radiation levels ≥ the Hi Hi Alarm Setpoint.

POTENTIAL LOSS: .....NONE

Basis:

LOSS - The Main Steam Line high-high radiation alarm (H13-P601/19A/C01(C03) setpoint provides an indication of gross fuel failures in accordance with USAR accident scenarios. This is considered to be a loss of the fuel clad fission product barrier. The MSL alarm setpoint value is high enough above background radiation levels to avoid spurious annunciations, yet low enough to promptly detect a gross release of fission products. This EAL is not intended to apply to cases when the alarm is due to spiking caused by resin intrusion, hydrogen injection adjustments, or other known factors.

POTENTIAL - NONE

References:

FUEL CLAD FC5

Emergency Action Level:

Emergency Director Judgment

EAL Threshold:

LOSS: .....Any condition in the opinion of the Emergency Director that indicates loss of the fuel clad barrier

POTENTIAL LOSS: .....Any condition in the opinion of the Emergency Director that indicates potential loss of the fuel clad barrier

Basis:

LOSS or **POTENTIAL LOSS** – This EAL addresses any other factors that can be used by the Emergency Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that any barrier may be considered lost or potentially lost.

References:

REACTOR COOLANT SYSTEM RC 1

Emergency Action Level:

Drywell Pressure

EAL Threshold:

LOSS:.....Drywell pressure **≥1.68 psid**

AND

Pressure increase due to reactor coolant leakage.

POTENTIAL LOSS: .....NONE

Basis:

LOSS - Drywell pressure in excess of the Emergency Core Cooling System (ECCS) initiation setpoint resulting from primary system leakage into the drywell is of such a magnitude indicating a loss of the reactor coolant system boundary. Pressure increases due solely to loss of containment or drywell heat removal capability, testing, etc are not considered for this EAL threshold.

POTENTIAL LOSS - NONE

References:

REACTOR COOLANT SYSTEM RC 2

Emergency Action Level:

Reactor Vessel Water Level

EAL Threshold:

LOSS:.....Reactor vessel level cannot be restored and maintained above ≤ **-162 inches** with indication of a reactor coolant leak.

POTENTIAL LOSS:.....NONE

Basis:

LOSS - The RPV level of -162 inches, top of active fuel, is the same value as the fuel clad barrier potential loss EAL FC 2. The requirement to determine that a leak exists concurrently with the RPV low level assures that this EAL is limited to actual loss of RCS barrier making it consistent with other EALs in this category.

POTENTIAL LOSS – NONE

References:

REACTOR COOLANT SYSTEM RC 3

Emergency Action Level:

RCS Leak Rate

EAL Threshold:

LOSS: .....Unisolable main steam line or RCIC steam line break

POTENTIAL LOSS: .....Unisolable RCS leakage ≥ **50 gpm** inside the drywell

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area temperature alarm in **Table F3.**

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area radiation level alarm in **Table F4.**

TABLE F3 Area Temperature RC 3 Potential Loss of RCS	
	Panel Alarm
Main Steam Tunnel High Ambient Temperature (Isolation)	P601-19A-A1
RHR A Equipment Area High Temperature (isolation)	P601-20A-B4
RHR B Equipment Area High Temperature (isolation)	P601-20A-B4
RCIC Room High Ambient Temperature (isolation)	P601-21A-H2
RWCU Equipment Rooms Ambient High Temperature (isolation)	P680-1A-A5

Table F4 Area Radiation Levels RC 3 Potential loss of RCS		
	DRMS GRID 2	ALARM
RHR Equipment Room (A)	1213	High Alarm
RHR Equipment Room (B)	1214	High Alarm
RHR Equipment Room (C)	1215	High Alarm
RCIC Equipment Area	1219	High Alarm

Basis:

LOSS – An unisolable Main Steam Line break represents a loss of the reactor coolant system barrier. This EAL is included for consistency with the Alert Emergency Classification.

The leak is NOT isolable from the Main Control Room **OR** an attempt for isolation from the Main Control Room has been made and was unsuccessful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification this Initiating Condition is not applicable.

POTENTIAL LOSS - A reactor coolant system leak rate of greater than 50 gallons per minute is at a level indicative of a small breach of the RCS but which is well within makeup capability of normal and emergency high pressure systems. Core uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to a significantly larger loss of inventory is possible. If the leak detection system leak rate information is unavailable (i.e., LOCA isolation, loss of power), other indicators of RCS leakage should be used. A leak of this size is a precursor of the loss of the reactor coolant system integrity and is therefore considered to be a potential loss of this barrier.

A valid indication of area temperature(s) ≥ the system MOV Tech Spec isolation value or area radiation level(s) ≥ the monitor high alarm resulting from a primary system discharging into the Auxiliary Building is indicative of conditions in which significant RCS inventory is being lost. This is therefore considered to be a potential loss of the reactor coolant system boundary. The area radiation values are consistent with the EOP maximum normal operating values. The alarms for the high area ambient temperature are associated with the TS 3.3.6.1 allowable values for primary containment isolation. The T.S allowable high ambient temperature setpoints are set low enough to detect a leak equivalent to 25 gpm. Since these values for area radiation and temperature alarms are subject to change over the life of the plant, specific values are not given here and the receipt of a valid alarm is consistent with the Alert emergency classification for potential loss of the RCS barrier.

References:

REACTOR COOLANT SYSTEM RC 4

Emergency Action Level:

Primary System Relief Valves

EAL Threshold:

LOSS: .....Safety relief valve stuck open

POTENTIAL LOSS: .....NONE

Basis:

LOSS – The SRV stuck open EAL identifies a SRV failure mode that results in a loss of the RCS barrier. Determination that the valve is stuck open is made using the Abnormal Operating Procedure, AOP-0035. The SRV status should be determined upon identification and prior to the accident classification.

POTENTIAL LOSS - NONE

References:

REACTOR COOLANT SYSTEM RC 5

Emergency Action Level:

Emergency Director Judgment

EAL Threshold:

LOSS: Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

POTENTIAL LOSS: Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

Basis:

LOSS or **POTENTIAL LOSS** – This EAL addresses any other factors that can be used by the Emergency Director in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that any barrier may be considered lost or potentially lost.

RIVER BEND STATION

ENTERGY NUCLEAR SOUTH

[redacted]

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

BASES MATRIX

NOUE	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
HU1 Confirmed security event which indicates a potential degradation in the level of safety of the plant *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 1)	**HA1** Confirmed security event in the plant protected area *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 10)	**HS1** Confirmed security event in a plant vital area *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 20)	**HG1** Security event resulting in loss Of physical control of the facility *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 22)
HU2 Fire within protected area boundary not extinguished within 15 minutes of detection *Op. Modes: All* (page 3)	**HA2** Control room evacuation has been initiated *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 11)	**HS2** Control room evacuation has been initiated and plant control cannot be established *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 21)	
HU3 Release of toxic or flammable gases deemed detrimental to normal operation of the plant *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 5)	**HA3** Fire affecting the operability of plant safety systems required to establish or maintain safe shutdown *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 12)		
HU4 Natural and destructive phenomena affecting the protected area *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 6)	**HA4** Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of systems required to maintain safe operation or establish or maintain safe shutdown *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 14)		
	HA5 Natural and destructive phenomena affecting the plant vital area *Op. Modes: 1, 2, 3, 4, 5, Defueled* (page 16)		

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

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

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Notification of a definite or perceived RBS specific security threat or possibility of sabotage and assessment by security shift supervision determines that the threat is credible

2. Security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision.

Basis:

Reference is made to RBS security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is controlled due to the strict controls placed on the RBS Safeguards Contingency Plan.

The intent of EAL 1 is to ensure that appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made through use of information found in the RBS Safeguards Contingency Plan. A credible threat notification may be received from, or validated by, a trustworthy source such as the FBI, NRC, West Feliciana Parish Sheriff's Office, Louisiana State Police, Plant Management, Site Security, etc. Examples of security threats that may be considered by the RBS security supervision may include credible bomb threats, Homeland Security notification of RBS specific terrorist threat, or unauthorized attempted entry into the security controlled site access points by a hostile force. Security will determine if a threat or event is credible based on the RBS Safeguards Contingency Plan.

EAL 2 is based on RBS Site Security Plans. Examples of security events that may indicate potential degradation in the level of safety of the plant, e.g. sabotage, hostage / extortion, civil disturbance, strike action, or unauthorized attempted entry into the RBS protected area with malevolent intent. Security will determine if a threat or event is credible based on the RBS Safeguards Contingency Plan.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Intrusion into the plant protected area by a hostile force would result in EAL escalation to an Alert. A higher initial classification could be made based upon the nature and timing of the threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification in accordance with the RBS Safeguards Contingency Plan and Emergency Plans.

References:

HU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Fire within protected area boundary not extinguished within 15 Minutes of detection.

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

1. Fire in buildings or areas contiguous to any vital area not extinguished within 15 minutes of control room notification or verification of a control room alarm. :

   Reactor Building
   Auxiliary Building
   Control Building
   Diesel Generator Building
   Fuel Building
   Standby Cooling Tower
   Tunnels
   Turbine Building
   Normal Switchgear Building

Basis:

The purpose of this IC is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. As used here, *Detection is* visual observation and report by plant personnel or sensor alarm indication. The 15 minute time period begins with a credible notification that a fire is occurring, or indication of a valid fire detection system alarm. Verification of a fire detection system alarm includes actions that can be taken within the control room or other nearby site-specific location to ensure that the alarm is not spurious. A verified alarm is assumed to be an indication of a fire unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the fire and to discriminate against small fires that are readily extinguished (e.g., smoldering waste paper basket). The list is limited and applies to buildings and areas contiguous (in actual contact with or immediately adjacent) to plant vital areas or other significant buildings or areas. The intent of this IC is not to include buildings (i.e., warehouses) or areas that are not contiguous (in actual contact with or immediately adjacent) to plant vital areas. This excludes fires within

administration buildings, waste-basket fires, and other small fires of no safety consequence.

Escalation to a higher emergency class is by HA3, Fire affecting the operability of Plant safety systems required to establish or maintain safe shutdown.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU3

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

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

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Report or detection of toxic or flammable gases that have or could enter normally occupied areas of the site in amounts that can affect normal plant operations.

2. Report by Local Parish or State Officials for evacuation or sheltering of site personnel based on an offsite toxic gas release event in amounts that are expected to enter normally occupied areas of the site that can affect normal plant operations.

Basis:

This IC is based on the existence of uncontrolled releases of toxic or flammable gas that may enter the site boundary and affect normal plant operations. The use of the term *site boundary* for the purpose of emergency classification is considered to be a boundary of approximately 3000 ft from the reactor centerline. It is intended that releases of toxic or flammable gases are of sufficient quantity, and the release point of such gases is such that normal plant operations would be affected. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation. The EALs are intended to not require significant assessment or quantification. The IC assumes an uncontrolled process that has the potential to affect plant operations, or personnel safety.

Normally occupied areas include the control room, CAS, auxiliary control room and administrative buildings.

This EAL does not address hydrogen concentrations in the drywell or containment as a result of LOCA. The Fuel Clad Barrier category addresses hydrogen generated from clad damage.

Escalation of this EAL is via HA4, which involves a quantified release of toxic or flammable gas affecting vital areas.

References:

1. USAR section 2. Nearby Industrial, Transportation, and
2. USAR section 6. Habitability Systems
3. RBNP-0035

HU4

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Natural and destructive phenomena affecting the protected area

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2 or 3 or 4 or 5 or 6 or 7)

1. Valid indication of a felt earthquake:

   Vibratory ground motion felt in the protected area and recognized as an earthquake.

   AND

   Activated seismic Operating Basis Earthquake (OBE) switches as indicated by receipt of Annunciators "Seismic Event High" (P680-02A-C06) **AND** "Seismic Tape Recording SYS Start" (P680-02A-D06)

2. Report by plant personnel of a tornado striking (touching down) within the protected area boundary

3. Vehicle crash into plant structures or systems within the protected area boundary that contain systems or functions required for safe shutdown of the plant

4. Report by plant personnel of an unanticipated explosion within the protected area boundary resulting in visible damage to a permanent structure or equipment

5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals

6. Uncontrolled flooding and water level greater than the Maximum Safe Operating value in Secondary Containment (Table H1) that has the potential to affect safety related equipment needed for the current operating mode

7. Severe weather or hurricane conditions with indication of sustained high winds ≥ 74 mph in the Protected Area

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Basis:

NOUE in this IC are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators. Areas identified in the EALs define the location of the event based on the potential for damage to equipment contained therein. Escalation of the event to an Alert occurs when the magnitude of the event is sufficient to result in damage to equipment contained in the specified location.

EAL #1 Operating Basis Earthquake may cause damage to some portions of the site, but should not affect ability of safety functions to operate. Method of detection is based on plant instrumentation. Guidance for interpretation of indications and determining validity is in the Alarm Response Procedure. As defined in the EPRIsponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a *"felt earthquake" is:*

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

The annunciator "Seismic Tape Recording SYS Start" is indication of acceleration of 0.01g. The annunciator "Seismic Event High" indicates the magnitude of acceleration meets the Operating Basis Earthquake.

> The definition of an OBE per 10CFR100 Appendix A (III)(d) is that earthquake which produces the vibratory ground motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

EAL #2 is based on the assumption that a tornado striking (touching down) within the protected area may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

EAL #3 addresses a crash of vehicle type (e.g. automobile, aircraft, forklift, truck) that may potentially cause significant damage to plant structures within those areas in H-Table 2 containing functions and systems required for safe shutdown of the plant. This does not include vehicle crashes with each other or damage to office or warehouse structures. If the crash is confirmed to cause significant damage to a plant vital area, the event may be escalated to Alert.

For EAL #4 only those explosions of sufficient force to damage permanent structures or equipment within the protected area should be considered. As used here, an explosion is a rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment, that imparts significant energy of sufficient force to potentially damage permanent structures or equipment. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the explosion with reports of evidence of damage is sufficient for declaration. This does not include explosions that involve damage to office or warehouse structures only (e.g. chemistry lab, forklift propane

tank). The Emergency director also needs to consider any security aspects of the explosion, if applicable.

EAL #5 is intended to address main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (lubricating oils, etc) and gases (hydrogen, etc) to the plant environs. Actual fires and flammable gas build up are appropriately classified via HU2 and HU3. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant. This EAL is consistent with the definition of a NOUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or by the radiological releases. This latter event would be classified by the radiological ICs or Fission Product Barrier ICs.

EAL #6 addresses the effect of flooding caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The EAL is only applicable to areas in Table H1 that contain equipment required for the current operating mode. The areas include those areas that contain systems required for safe shutdown of the plant and that are not designed to be wetted or submerged. The EAL is based on valid indication that the area water level is higher than the Maximum Safe Operating Values as identified in EOP-3. Exceeding the Maximum Safe Operating Value is interpreted as a potential degradation in the level of the safety of the plant and is appropriately treated as an Unusual Event. Escalation of the emergency classification may be made under HA5 EAL #6 based on the damage caused or by access restrictions that prevent necessary plant operations or systems monitoring. The Maximum Safe Operating Values are taken from EOP-3 and are shown in the Table H1.

EAL #7 is based on the assumption that high winds within the protected area may have potentially damaged plant structures, listed in H-Table 2, containing functions or systems required for safe shutdown of the plant. The high wind site specific value is based on the wind speed (74 mph) to classify severe weather conditions as a hurricane. FSAR design basis is that all Seismic Category I structures at RBS are designed to withstand 100 mph fastest mile of sustained wind 30 ft above ground, based upon a 100-yr period of recurrence. Methods to measure wind speed in the protected area are not available, therefore a sustained indication of 74 mph on the Meteorological Tower 30' wind speed indication will be used to determine that this EAL is met. The upper scale for the 30' wind speed on the MET Tower is 100 mph. If the MET Tower is not operable, other sources may be considered for estimated wind speed at RBS such as NOAA or Ryan Airport in Baton Rouge. If damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Table H1
AREA WATER LEVELS

Affected Location / Parameter	Maximum Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Pump Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR A Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR B Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RHR C Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
LPCS Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RCIC Room 70'EL	4 inches above floor in. (40%) (P870-51A-G4 alarm)

Table H2
Structures Containing Functions or Systems Required for Safe Shutdown*

Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

*The Fuel Building and associated tunnel may be considered, as necessary, to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g. freshly off-loaded reactor core in pool).

References:

1. RBS USAR Section 3.2 Classification of Structures, Systems, and Components
2. RBS USAR Section 3.3 Wind and Tornado Loadings
3. 10CFR100 Appendix A V
4. EOP Basis Document, EOP-3, Secondary Containment Control
5. AOP-0029, Severe Weather Operations

HA1

Initiating Condition -- ALERT

Confirmed security event in the plant protected area

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Intrusion into the plant protected area by a hostile force.

2. Other security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the NOUE. A confirmed intrusion report is satisfied if physical evidence indicates the presence of a hostile force within the protected area.

The Safeguards Contingency Plan identifies numerous events/conditions that constitute a threat/compromise to a station's security. Only those events that involve actual or potential substantial degradation to the level of safety of the plant need to be considered.

Intrusion into a vital area by a hostile force will escalate this event to a Site Area Emergency.

HA2

Initiating Condition -- ALERT

Control room evacuation has been initiated

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

1. Entry into AOP-0031, SHUTDOWN FROM OUTSIDE THE MAIN CONTROL ROOM, and Control Room evacuation has been initiated.

Basis:

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

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition -- ALERT

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

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

1. Fire in any system or structure containing functions or systems required for safe shutdown:

   AND

   Affected system parameter indications show degraded performance of a safety system or plant personnel report visible damage to permanent structures or equipment within the specified area.

Basis:

Site-specific areas containing functions and systems required for the safe shutdown of the plant is specified in Table H-2. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Radiological Levels / Radiological Effluent, or Emergency Director Judgment ICs.

This EAL addresses a fire and not the degradation in performance of affected systems. System degradation is addressed in the System Malfunction EALs. The reference to damage of systems is used to identify the magnitude of the fire and to discriminate against minor fires. The reference to safety systems is included to discriminate against fires in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the fire was large enough to cause damage to these systems. Thus, the designation of a single train was intentional and is appropriate when the fire is large enough to affect more than one component. In this situation, an Alert classification is warranted.

The inclusion of a "report of visual damage" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform these damage assessments.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Table H-2
Structures Containing Functions or Systems Required for Safe Shutdown*

Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

*The Fuel Building and associated tunnel may be considered, as necessary, to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g. freshly off-loaded reactor core in pool).

References:

HA4

Initiating Condition -- ALERT

Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of systems required to maintain safe operation or establish or maintain safe shutdown

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Report or detection of toxic gases within or contiguous to a vital area in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).

2. Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or contiguous to a vital area.

Basis:
This IC is based on gases that affect the safe operation of the plant. This IC applies to buildings and areas contiguous to plant vital area s in Table H-2. The intent of this IC is not to include buildings (e.g., warehouses) or other areas that are not contiguous or immediately adjacent to plant vital areas. It is appropriate that monitoring be done more frequently to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Radiological Levels / Radioactive Effluent, or Emergency Director Judgment ICs.

EAL #1 is met if measurement of toxic gas concentration results in an atmosphere that is IDLH within a vital area or any area or building contiguous to vital area. Exposure to an IDLH atmosphere will result in immediate harm to unprotected personnel, and would preclude access to any such affected areas. The measurement of toxic gas concentration may not be possible, therefore other indications of life threatening concentrations such as the observation of disorientation, unconsciousness, nausea, etc may be used to determine if the EAL is met. The Emergency Director also needs to consider any security aspects of the presence of toxic gases.

EAL #2 is met when the flammable gas concentration in a vital area or any building or area contiguous to a vital area exceed the LOWER FLAMMABILITY LIMIT. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair

equipment/components (acetylene - used in welding). This EAL addresses concentrations at which gases can ignite/support combustion. An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Once it has been determined that an uncontrolled release is occurring, then sampling must be done to determine if the concentration of the released gas is within this range.

Table H2
Structures Containing Functions or Systems Required for Safe Shutdown*

Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

*The Fuel Building and associated tunnel may be considered, as necessary, to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g. freshly off-loaded reactor core in pool).

References:

HA5

Initiating Condition -- ALERT

Natural and destructive phenomena affecting the plant vital area

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2 or 3 or 4 or 5 or 6 or 7)

1. Valid indication of a Safe Shutdown Earthquake seismic event:

   Receipt of annunciator "Seismic Event High/High" (P680-02A-B06)

   AND

   "Seismic Tape Recording System Start" (P680-02A-D06)

   AND

   Red light(s) on H13-P869 panel NBI-101 lit

2. Tornado striking (touching down) within the protected area boundary and resulting in visible damage to any of the plant structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.

3. Vehicle crash within protected area boundary and resulting in visible damage to any of the structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.

4. Explosion within the protected area affecting the operability of plant safety systems required to establish or maintain safe shutdown.

   AND

   Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment containing those systems or functions required for safe shutdown of the plant.

5. Turbine failure-generated missiles result in any visible damage to or penetration of any of the structures containing those systems or functions required for safe shutdown of the plant.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

6. Uncontrolled flooding in Secondary Containment Table H1 area that results in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment. The EAL is based on valid indication that the area water level is higher than the Maximum Safe Operating Values as identified in EOP-3.

7. Hurricane or high sustained wind conditions ≥ 74 mph within protected area boundary and resulting in visible damage to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

Table H-1
AREA WATER LEVELS

Affected Location / Parameter	Maximum Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Pump Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR A Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR B Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RHR C Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
LPCS Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RCIC Room 70'EL	4 inches above floor in. (40%) (P870-51A-G4 alarm)

Table H-2
Structures Containing Functions or Systems Required for Safe Shutdown*

Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

*The Fuel Building and associated tunnel may be considered, as necessary, to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g. freshly off-loaded reactor core in pool).

Basis:

The EALs in this IC escalate from the NOUE EALs in HU1 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation. Escalation to a higher classification occurs on the basis of other ICs (e.g., System Malfunction).

EAL #1 is based on the RBS FSAR design basis. The Safe Shutdown Earthquake (SSE) is the design basis earthquake. Seismic events of this magnitude can result in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

EAL #2 is based on the RBS design for tornadic winds and missiles. This EAL is based on visible damage to plant structures and/or equipment within the areas of Table H2 containing those systems or functions required for safe shutdown of the plant or control room indication of degraded performance of those systems wind loads of this magnitude can cause damage to safety functions. The Emergency Director may consider the Fuel Building as necessary to address the impact of the event on the loss of spent fuel cooling or spent fuel (e.g. freshly off-loaded reactor core in pool).

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures in Table H2 containing functions and systems required for safe shutdown of the plant. The inclusion of a "resulting in visual damage" should not be interpreted as mandating a lengthy damage assessment prior to classification.

EAL #4 addresses an explosion and not the degradation in performance of affected systems. system degradation is addressed in the System Malfunction EALs. The reference to visible damage of permanent structures or equipment within the areas of Table H2 is used to identify the magnitude of the explosion and to discriminate against minor explosions. The reference to safety systems is included to discriminate against explosions in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the explosion was large enough to cause damage to these systems. Thus, the designation of a single train was intentional and is appropriate when the explosion is large enough to affect more than one component. An explosion is an unplanned activity and, as such, does constitute a substantial degradation in the level of safety of the plant. In this situation, an Alert classification is warranted.

No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the

explosion with reports of evidence of damage is sufficient for declaration. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform these damage assessments. The Emergency Director also needs to consider any security aspects of the explosion, if applicable.

EAL #5 is intended to address the threat to safety related equipment imposed by missiles generated by main turbine rotating component failures. The list of areas in Table H2 includes all areas containing safety-related equipment, their controls, and their power supplies. This EAL is, therefore, consistent with the definition of an Alert in that if missiles have damaged or penetrated areas containing safety-related equipment, the potential exists for substantial degradation of the level of safety of the plant.

EAL #6 addresses the effect of internal flooding that has resulted in degraded performance of systems affected by the flooding, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to operate or monitor safety equipment represents a potential for substantial degradation of the level of safety of the plant. This flooding may have been caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. Table H1 includes those areas that contain systems required for safe shutdown of the plant that are not designed to be wetted or submerged. Indication may be by local verification or in degraded performance of systems affected by the flooding.

EAL #7 is based on visible damage to plant structures and/or equipment within the areas of Table H2 containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems. The inclusion of a "resulting in visible damage" should not be interpreted as mandating a lengthy damage assessment prior to classification. Methods to measure wind speed in the protected area are not available, therefore a sustained indication of 74 mph on the Meteorological Tower 30' wind speed indication will be used to determine that this EAL is met. The upper scale for the 30' wind speed on the MET Tower is 100 mph. If the MET Tower is not operable, other sources may be considered for estimated wind speed at RBS such as NOAA or Ryan Airport in Baton Rouge. If damage is confirmed visually or by other in-plant indications

References:

HS1

Initiating Condition – SITE AREA EMERGENCY

Confirmed security event in a plant vital area

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1 or 2)

1. Intrusion into the plant vital area by a hostile force.

2. Other security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision

Basis:

EAL #1 - This class of security events represents an escalated threat to plant safety above that contained in the Alert IC in that a confirmed hostile force has progressed from the protected area to a vital area.

The Safeguards Contingency Plan identifies numerous events/conditions that constitute a threat/compromise to a Station's security. The Emergency Director will determine if a SAE should be declared based on type and severity of the event reported by RBS security shift supervision. Only those events that involve actual or likely major failures of plant functions needed for protection of the public need to be considered. Reference is made to RBS security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred.

Loss of plant control would escalate this event to a General emergency.

References:

HS2

Initiating Condition – SITE AREA EMERGENCY

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

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

1. Control room evacuation has been initiated

   AND

   Control of the plant from the Remote Shutdown Panels cannot be established per AOP-0031 procedure within 15 minutes.

Basis:

Expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. The 15 minute time for transfer is based on analysis or assessments as to how quickly control must be reestablished without core uncovering and/or core damage. The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment and the guidance of AOP-0031.

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

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Radiological Levels/Radiological Effluent, or Emergency Director Judgment ICs.

References:

HG1

Initiating Condition – GENERAL EMERGENCY

Security event resulting in loss of physical control of the facility

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

1. A hostile force has taken control of any of the following plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions:

   Loss of physical control of the Control Room

   OR

   Loss of physical control of the Remote Shutdown Panel

   OR

   Loss of adequate core cooling or reactivity control capability

Basis:

This IC encompasses conditions under which a hostile force has taken physical control of vital area(s) containing vital equipment or controls of vital equipment required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location. Typically, these safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink). If control of the plant equipment necessary to maintain safety functions can be transferred to and operated from the Remote Shutdown System, then the above initiating condition is not met.

The loss of adequate core cooling or reactivity control capability EAL may be considered for loss of physical control of spent fuel pool cooling systems if in the judgment of the Emergency Director, imminent fuel damage is likely (e.g., freshly off-loaded reactor core in pool).

References:

RIVER BEND STATION

Entergy Nuclear South

SYSTEM MALFUNCTION

BASES MATRIX

NOUE	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
SU1 Loss of all offsite power to essential busses for > 15 minutes *Op. Modes: 1, 2, 3* (page 1)	**SA1** AC power capability to essential busses reduced to a single power source for >15 minutes such that any additional single failure would result in station blackout *Op. Modes: 1, 2, 3* (page 9)	**SS1** Loss of all offsite and onsite AC power to essential busses *Op. Modes: 1, 2, 3* (page 13)	**SG1** Loss of all offsite and onsite AC power to essential busses for > 4 hours *Op. Modes: 1, 2, 3* (page 19)
SU2 RCS Leakage *Op. Mode: 1, 2, 3* (page 2)	**SA2** Failure of Reactor Protection System to complete or initiate an automatic reactor scram once a Reactor Protection System setpoint has been exceeded and manual scram was successful *Op. Modes: 1, 2* (page 10)	**SS2** Loss of all vital DC power *Op. Mode: 1, 2, 3* (page 14)	**SG2** Failure of Reactor Protection System to complete an automatic reactor scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core *Op. Modes: 1, 2* (page 21)
SU3 Unplanned loss of most or all safety system annunciation or indication in the control room for > 15 minutes *Op. Modes: 1, 2, 3* (page 3)	**SA3** Unplanned loss of most or all safety system annunciation or indication in the control room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are not available *Op. Modes: 1, 2, 3* (page 11)	**SS3** Failure of Reactor Protection System to complete or initiate an automatic reactor scram once a Reactor Protection System setpoint has been exceeded and manual scram was not successful *Op. Modes: 1, 2* (page 15)	
SU4 Inadvertent criticality *Op. Modes: 3* (page 4)		**SS4** Complete loss of heat removal capability *Op. Modes: 1, 2, 3* (page 16)	
SU5 Unplanned loss of all onsite or offsite communications capabilities *Op. Modes: Op. Modes: 1, 2, 3* (page 5)		**SS5** Inability to monitor a significant transient in progress *Op. Modes: 1, 2, 3* (page 17)	
SU6 Fuel Clad degradation *Op. Modes: 1, 2, 3* (page 7)			
SU7 Inability to reach required shutdown within technical specification time limits *Op. Modes: 1, 2, 3* (page 8)			

RIVER BEND STATION

Entergy Nuclear South

SYSTEM MALFUNCTION

SU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite power to essential busses for > 15 Minutes

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Loss of power to RTX-XSR1C **and** RTX-XSR1D **and** RTX-XSR1E **and** RTX-XSR1F transformers for **>15 minutes**

Basis:

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (e.g., Station Blackout). This IC is met even if all emergency diesel generators start and provide AC power to ENS-SWG1A and ENS-SWG1B ESF busses. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the event to an Alert, due to subsequent loss of diesel generators such that only one source remains, will occur in accordance with IC SA1, (AC power capability to essential busses reduced to a single power source for >15 minutes such that any additional single failure would result in station blackout).

If this condition is met when defueled, the Emergency Director should consider spent fuel pool conditions and declare a NOUE on discretionary judgment if warranted.

References:

SYSTEM MALFUNCTION

SU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Levels: (1 or 2)

1. Unidentified or pressure boundary leakage **>10 gpm**

2. Identified leakage **>35 gpm**

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected because it is greater than the minimum detectable amount used as the Technical Specification limit and is expected to be observable with normal control room indications without lengthy calculations.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. The 35 gpm value for the identified leakage was selected because it is greater than the Technical Specification limit and is less significant than the unidentified or pressure boundary leakage. Identified leakage is expected to be observable with normal control room indications without lengthy calculations.

The difference between IC SU3 and IC SU4 addresses the different RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will be intact and RCS inventory and level monitoring means are normally available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means.

Escalation of the event to an Alert, in Modes 1, 2, & 3, will occur in accordance with Fission Product Barrier IC FA1 (Loss or potential loss of any two barriers). Escalation of the event to an Alert, due to prolonged loss of RCS inventory in Mode 4, may occur in accordance with either IC SA4 (Loss of RCS inventory) or IC SA5 (Inability to maintain plant in Cold Shutdown with irradiated fuel in the RPV).

References:

SYSTEM MALFUNCTION

SU3

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Unplanned loss of most or all safety system annunciators or indications for >15 minutes

Basis:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

The safety system annunciators and indicators for this EAL include those identified in Abnormal Operating Procedures, Emergency Operating Procedures, and other EALs (e.g. area, process, and/or effluent radiation monitors. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), and P870 safety related annunciators and indicators.

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

Escalation of the event to an Alert, if a transient is in progress during the loss of annunciation or indication, will occur in accordance with IC SA6 (Unplanned loss of most or all safety system annunciation or indication in control room wither either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are unavailable).

References:

SYSTEM MALFUNCTION

SU4

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

OPERATING MODE APPLICABILITY Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. An **unplanned** extended positive period observed on nuclear instrumentation

Basis:

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

This condition can be identified using period monitors. The term "extended" is used in order to allow exclusion of expected short term positive periods from planned control rod movements. (Example: Scram time testing, Control Rod blade manipulations, Control Rod testing))

Escalation of the event to an Alert will occur in accordance with either IC FA1 (Loss of potential loss of any two barriers) or IC HA2 (Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert).

References:

SYSTEM MALFUNCTION

SU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Unplanned loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Levels: (1 or 2)

1. Unplanned loss of all onsite communication equipment:
   - Plant radio system
   - Plant paging system / Gaitronics
   - Sound powered phones
   - In-plant telephones
   - Cell phones

2. Unplanned loss of all offsite communication equipment:
   - ESP-COMM / Hotline
   - All telephone lines (commercial and microwave)
   - ENS
   - HPN
   - Cellular phones
   - Satellite phones
   - Radio

Basis:

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

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

SYSTEM MALFUNCTION

Site-specific list for onsite communications loss must encompass the loss of all means of routine communications (e.g., commercial telephones, sound powered phone systems, page party system (Gaitronics) and radios / walkie talkies).

Site-specific list for offsite communications loss must encompass the loss of all means of communications with offsite authorities. This should include the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems.

There is no escalation above the Notification of Unusual Event for this event.

References:

SYSTEM MALFUNCTION

SU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Fuel clad degradation

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Levels: (1 or 2)

1. Offgas isolation due to valid Offgas Post Treatment monitor signal (1H13-P601-22A-A03)

2. Reactor Coolant sample activity **>4.0** μCi/gm I-131 dose equivalent

Basis:

This IC is included as a NOUE because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. EAL #1 addresses Modes 1, 2, & 3 radiation monitor readings that provide indication of fuel clad integrity. EAL #2 addresses coolant samples exceeding coolant technical specifications for iodine spike.

Though the referenced Technical Specification limit is mode dependent, it is appropriate that the EALs be applicable in all modes, as they indicate a potential degradation in the level of safety of the plant.

Escalation of the event to an Alert in Modes 1, 2, & 3 will occur in accordance with Fission Product Barrier IC (Loss of potential loss of any two barriers)

There is no escalation above the Notification of Unusual Event for this event in Modes 4 & 5.

References:

SYSTEM MALFUNCTION

SU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inability to reach required shutdown within technical specification time limits

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

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

Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications.

An immediate Unusual Event declaration is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.

There is no escalation above the Notification of Unusual Event for this event.

References:

SYSTEM MALFUNCTION

SA1

Initiating Condition -- ALERT

AC power capability to essential busses reduced to a single power source for >15 minutes such that any additional single failure would result in station blackout

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Available onsite or offsite AC power to ENS-SWG1A and ENS-SWG1B busses reduced to a single power source for **>15** minutes

   AND

   Any additional single failure of the power source will result in a station blackout

Basis:

This IC and the associated EALs are intended to provide an escalation from IC SU1, (Loss of All Offsite Power To ESF Busses for > 15 Minutes). The condition indicated by this IC is the degradation of the offsite and onsite power systems such that any additional single failure would result in a station blackout.

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS1, (Loss of all offsite and onsite AC power to Div I&II ESF busses).

References:

SYSTEM MALFUNCTION

SA2

Initiating Condition -- ALERT

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

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup

Emergency Action Level: (1)

1. Automatic scram failed to rapidly insert sufficient control rods to bring the reactor subcritical, and a manual scram was successful

Basis:

This condition indicates failure of the automatic protection system to scram the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded.

An Alert is indicated because conditions exist that lead to potential loss of fuel clad or RCS. Reactor protection system setpoint being exceeded, rather than limiting safety system setpoint being exceeded, is specified here because failure of the automatic protection system is the issue.

Subcritical conditions are indicated by reactor power level below the APRM downscale **and** an extended negative period that will ultimately reduce reactor power to the source range level.

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes sufficient control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., Scram Push Buttons, Reactor Mode Switch, Alternate Rod Insertion).

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS3, (Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful).

References:

SYSTEM MALFUNCTION

SA3

Initiating Condition -- ALERT

Unplanned loss of most or all safety system annunciation or indication in the control room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are not available

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Unplanned loss of most or all safety system annunciators or indications for >15 minutes

AND

Either:

a. A significant transient is in progress

OR

b. Compensatory non-alarming indications are not available

Basis:

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

The safety system annunciators and indicators for this EAL include those identified in Abnormal Operating Procedures, Emergency Operating Procedures, and other EALs (e.g. area, process, and/or effluent radiation monitors. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), and P870 safety related annunciators and indicators.

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

SYSTEM MALFUNCTION

While failure of a large portion of annunciators may be more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions.

"Compensatory non-alarming indications" in this context includes computer based information such as SPDS. This should include any computer systems available for this use. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS6 (Inability to monitor a significant transient in progress).

References:

SYSTEM MALFUNCTION

SS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of all offsite and onsite AC power to essential busses

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Loss of all AC power to ENS-SWG1A **and** ENS-SWG1B busses

AND

Failure to restore power to **either** ENS-SWG1A **or** ENS-SWG1B bus within **15 minutes** from the time of loss of **both** offsite **and** onsite AC power

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will cause core uncovering and loss of containment integrity, thus this event can escalate to a General Emergency. The 15 minute time duration was selected to exclude transient or momentary power losses.

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses. Even though an essential bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus is the only energized bus then a Site Area Emergency per SS1 should be declared.

Escalation of the event to a General Emergency will occur in accordance with IC SG1, (Prolonged loss (>4 hrs) of all offsite and onsite AC power to Div I&II ESF busses).

SYSTEM MALFUNCTION

SS2

Initiating Condition -- SITE AREA EMERGENCY

Loss of all vital DC power

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. ENB-SWG1A **and** ENB-SWG1B $\leq$ **105 VDC** for **>15 minutes**

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power may cause core uncovering or loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. 15 minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the event to a General Emergency will occur in accordance with either Abnormal Rad (Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the actual or projected duration of the release using actual meteorology), Fission Product Barrier (Loss of any two barriers and loss or potential loss of third barrier), or discretionary EAL (Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency).

References:

SYSTEM MALFUNCTION

SS3

Initiating Condition -- SITE AREA EMERGENCY

Failure of Reactor Protection System to complete or initiate an automatic reactor scram once a Reactor Protection System setpoint has been exceeded and manual scram was not successful.

Operating Mode Applicability: Mode 1 .....Power Operation
Mode 2 .....Startup

Emergency Action Level: (1)

1. Automatic scram and manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical

Basis:

Under the conditions of EAL 1, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that could lead to imminent or potential loss of both fuel clad and RCS. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.

The scram function is to initiate a rapid control rod insertion which immediately inserts a step change of negative reactivity into the core to immediately turn reactor power and bring the reactor subcritical. Subcritical conditions are indicated by reactor power level below the APRM downscale and an extended negative period that will ultimately reduce reactor power to the source range level. This function provides the necessary core protection in response to a plant transient and is the criteria used to determine if the automatic and/or manual scram was successful.

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes sufficient control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., Scram Push Buttons, Reactor Mode Switch, Alternate Rod Insertion).

Escalation of the event to a General Emergency will occur in accordance with IC SG2 (Failure of the reactor protection system to complete an automatic scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core.)

References:

SYSTEM MALFUNCTION

SS4

Initiating Condition -- SITE AREA EMERGENCY

Complete loss of heat removal capability

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Inability to maintain Suppression Pool temperature within the EOP Heat Capacity Temperature Limit Safe Zone

Basis:

This EAL addresses complete loss of functions required for hot shutdown with the reactor at pressure and temperature. Reactivity control is addressed in other EALs. The loss of heat removal function is indicated by the Heat Removal Capability Temperature Limit (HCTL) Curve being exceeded.

Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Abnormal Rad Levels / Radiological Effluent, Emergency Director Judgment, or Fission Product Barrier Degradation ICs.

References:

SYSTEM MALFUNCTION

SS5

Initiating Condition -- SITE AREA EMERGENCY

Inability to monitor a significant transient in progress

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Unplanned loss of most or all Control Room annunciators associated with safety systems

AND

Compensatory non-alarming indications for safety systems are not available

AND

Indications needed to monitor criticality **or** core heat removal **or** fission product barrier status are not available

AND

SIGNIFICANT TRANSIENT in progress

Basis:

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

Safety systems' Annunciators for this EAL should be limited to include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs. (e.g., rad monitors, etc.) The panels to consider should include: H13-P601, H13-P680, H13-P808, H13-P863, and P870 safety related annunciators and indicators.

"Compensatory non-alarming indications" in this context includes computer based information such as SPDS. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.

Safety system indications needed to monitor safety functions necessary for protection of the public must include control room indications, computer generated indications and dedicated annunciation capability. The specific indications should be those used to determine such functions as the ability to shut down the

reactor, maintain the core cooled, to maintain the reactor coolant system intact, and to maintain containment intact.

"Planned" and "UNPLANNED" actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not a mitigating factor.

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

References:

SYSTEM MALFUNCTION

SG1

Initiating Condition -- GENERAL EMERGENCY

Loss of all offsite and onsite AC power to essential busses for > 4 hours

Operating Mode Applicability:

Mode 1 .....Power Operation
Mode 2 .....Startup
Mode 3 .....Hot Shutdown

Emergency Action Level: (1)

1. Loss of all AC power to ENS-SWG1A **and** ENS-SWG1B busses

AND

Either:

a. Restoration of AC power to **either** ENS-SWG1A **or** ENS-SWG1B within **4 hours** is **not** likely

OR

b. Conditions are imminent that a Loss of two fission product barriers **and** Loss or Potential Loss of third is expected to occur prior to restoration of AC power to **either** ENS-SWG1A **or** ENS-SWG1B

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will lead to loss of fuel clad, RCS, and containment. The four (4) hours to restore AC power can be based on a site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout," as available. Appropriate allowance for offsite emergency response including evacuation of surrounding areas should be considered. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.
The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Director a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

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

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Emergency Director judgment as it relates to imminent Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers.

References:

SYSTEM MALFUNCTION

SG2

Initiating Condition -- GENERAL EMERGENCY

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

Operating Mode Applicability: Mode 1 .....Power Operation
Mode 2 .....Startup

Emergency Action Level: (1)

1. Indications exist that automatic and manual scrams did not bring the reactor subcritical

AND

Either:

a. RPV level cannot be maintained > **-186** inches

OR

b. Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

Basis:

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

Under the conditions of this IC and associated EAL, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed. Subcritical conditions are indicated by reactor power level below the APRM downscale and an extended negative period that will ultimately reduce reactor power to the source range level. Although there are capabilities away from the reactor control console, such as standby liquid control or EOP contingencies, the continuing parameter degradation indicates that these capabilities are not effective. This situation could be a precursor for a core melt sequence.

The extreme challenge to the ability to cool the core is intended to mean that the reactor vessel water level cannot be restored and maintained above Minimum Steam Cooling RPV Water Level as described in the EOP bases.

SYSTEM MALFUNCTION

Another consideration is the inability to initially remove heat during the early stages of this sequence. Considerations include inability to remove heat via the main condenser, or via the suppression pool. The Containment barrier is challenged if Suppression Pool temperature cannot be maintained in the Safe Zone of the HCTL curve.

In the event either of these challenges exist at a time that the reactor has not been brought below the power associated with the safety system design (APRM Downscale) a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum offsite intervention time.

References:

RIVER BEND STATION

Entergy Nuclear South

EMERGENCY DIRECTOR JUDGEMENT

INITIATING CONDITION MATRIX

NOUE	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
JU1 Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE. *Op. Mode: ALL* *(page 2)*	**JA1** Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert. *Op. Modes: All* *(page 3)*	**JS1** Other conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency. *Op. Modes: All* *(page 4)*	**JG1** Other conditions exist which in the judgment of the Emergency Director warrant declaration of General Emergency. *Op. Modes: All* *(page 5)*

EMERGENCY DIRECTOR JUDGEMENT

JU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an unusual event.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Level: (1)

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. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

Basis:

This EAL is based on the definition of Notification of Unusual Event as defined in NEI-99-01, *Methodology for Development of Emergency Action Levels* Rev. 4 and supported by the River Bend Emergency Plan as follows:

> Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the NOUE emergency class.

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

References:

EMERGENCY DIRECTOR JUDGEMENT

JA1

Initiating Condition -- ALERT

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

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 potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

This EAL is based on the definition of Alert as defined in NEI-99-01, *Methodology for Development of Emergency Action Levels* Rev. 4 and supported by the River Bend Emergency Plan as follows:

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

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency class. EPA Protective Action Guidelines exposure level is 1 Rem TEDE or 5 Rem CDE Thyroid.

References:

EPA 400

EMERGENCY DIRECTOR JUDGEMENT

JS1

Initiating Condition – SITE AREA EMERGENCY

Other conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency

Operating Mode Applicability:	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

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. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

This EAL is based on the definition of Site Area Emergency as defined in NEI-99-01, *Methodology for Development of Emergency Action Levels* Rev. 4 and supported by the River Bend Emergency Plan as follows:

> Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency. EPA Protective Action Guidelines exposure level is 1 Rem TEDE or 5 Rem CDE Thyroid.

References:

EPA-400

EMERGENCY DIRECTOR JUDGEMENT

JG1

Initiating Condition: GENERAL EMERGENCY

Other conditions exist which in the judgment of the Emergency Director warrant declaration of General Emergency.

Operating Mode Applicability:		
	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown
	Mode 4	Cold Shutdown
	Mode 5	Refueling
		Defueled

Emergency Action Levels: (1)

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. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

This EAL is based on the definition of General Emergency as defined in NEI-99-01, *Methodology for Development of Emergency Action Levels* Rev. 4 and supported by the River Bend Emergency Plan as follows:

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

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the General Emergency class. EPA Protective Action Guidelines exposure level is 1 Rem TEDE or 5 Rem CDE Thyroid.

References:

EPA-400

Attachment 5

TO

RBG-46211

NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications

RIVER BEND STATION

NEI 99-01, Rev 4

To

Plant Specific

Correlations,

Differences, Deviations,

and Justifications

General Notes:

NEI 99-01 Operating Modes:	Power Operation Startup Hot Standby Hot Shutdown Cold Shutdown Refueling Defueled

River Bend Operating Modes:	1	Power Operation
	2	Startup
	3	Hot Shutdown
	4	Cold Shutdown
	5	Refueling
	D	Defueled

Abnormal Rad Levels /Radiological Effluent

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the Abnormal Rad Levels / Radiological Effluent Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

NEI 99-01: AU1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent Technical Specifications for 60 Minutes or Longer

Example EAL #1

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

Applicability: All

River Bend: AU1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥ 60 minutes

EAL #1

Liquid release greater than two times the high alarm setpoint of RMS-RE107 and failure of isolation of valve LWS-AOV257 to close lasting for ≥ 60 minutes

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The system is designed for isolation valve LWS-AOV257 to isolate at the high alarm. Failure to isolate is included in the condition to validate the release is occurring. The monitoring instrument, after contaminated, may continue to read high for some period after the release is terminated. Other methods to isolate or stop the release such as a manual valve or stopping the pumps are not included in the EAL. If these confirmed manual termination methods are taken within the 60 minutes, there is no longer a release and the EAL is not met.

Deviations:

None

NEI 99-01: AU1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent Technical Specifications for 60 Minutes or Longer

Example EAL #2

VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 60 minutes or longer (Site specific list)

Applicability: All

River Bend: AU1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥ 60 minutes

EAL #2

1. Unplanned radiological effluent release in excess of **Table R1** "NOUE" for ≥ 60 minutes unless releases can be determined to be below "NOUE" thresholds within 60 minutes by sample

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

To meet NEI EAL #2, the setpoint for each of these release paths in Table R1 is established by the ODCM to alarm at one-third of the TRM Spec. limit of 500 mRem/yr and multiplying by 6 to get the EAL setpoint of 2 X T.S. The specified value for any one of the release pathways provides early warning of a potential radiological release. RBS EAL #2 adds that the EAL is not applicable if sample results are less than the EAL setpoint.

Deviations:

None

NEI 99-01: AU1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent Technical Specifications for 60 Minutes or Longer

Example EAL #3

Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 60 minutes or longer, in excess of two times (site-specific technical specifications).

Applicability: All

River Bend: AU1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥ 60 minutes

EAL #3

Unplanned gaseous or liquid radiological releases exceeding **Table R1** "NOUE" sample threshold for ≥ 60 minutes

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: AU1, Example EAL #4

VALID reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background sustained for 60 minutes or longer [for sites having telemetered perimeter monitors]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have telemetered perimeter monitors.

Deviations:

None

NEI 99-01: AU1, Example EAL #5

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 60 minutes or longer [for sites having such capability]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have automatic dose assessment capability.

Deviations:

None

NEI 99-01: AU2 Initiating Condition

Unexpected Increase in Plant Radiation

Applicability: All

River Bend: AU2, Initiating condition

Unplanned increase in plant area radiation by a factor of 1000

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

RBS EAL uses "unplanned" in place of "unexpected" to be consistent in the use of the terms. The definition of "unplanned" is included in the procedure. Added "area" to be consistent with the EAL specification of area radiation and added "by a factor of 1000" to make it applicable to both EALs to give the Emergency Director a measurable value for recognition and consistency.

Deviations:

None

NEI 99-01: AU2, Unexpected Increase in Plant Radiation

Example EAL #1

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

AND

Unplanned VALID (site-specific) Direct Area Radiation Monitor reading increases

Applicability: All

River Bend: AU2, Unplanned increase in plant area radiation by a factor of 1000

EAL #2

Valid indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer system with all irradiated fuel assemblies remaining covered by water

AND

Valid area radiation monitor reading increase by a factor of 1000 over normal levels

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The threshold of an area radiation monitor increase by a factor of 1000 over normal levels is used to give the Emergency Director a measurable value for recognition and consistency. A factor of 1000 is consistent with NEI EAL 2 (RBS EAL 1)

Deviations:

None

NEI 99-01: AU2, Unexpected Increase in Plant Radiation

Example EAL #2

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

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

Applicability: All

River Bend: AU2, Unplanned increase in plant area radiation by a factor of 1000

EAL #1

Valid Area Radiation Monitor reading(s) or survey results indicate an unplanned increase in plant radiation levels by a factor of 1000 over normal levels

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The note for normal levels is contained in the bases document.

Deviations:

None

NEI 99-01: AA1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Example EAL #1

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

Applicability: All

River Bend: AA1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 x ODCM limit for ≥ 15 minutes

EAL #1

Unplanned liquid release greater than 200 times the high alarm set point of RMS-RE107 and failure of isolation valve LWS-AOV257 to close lasting for ≥ 15 minutes

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The system is designed for isolation valve LWS-AOV257 to isolate at the high alarm. Failure to isolate is included in the condition to validate the release is occurring. Other methods to isolate or stop the release such as a manual valve or stopping the pumps are not included in the EAL. If these confirmed manual termination methods are taken within the 15 minutes, there is no longer a release and the EAL is not met.

Deviations:

None

NEI 99-01: AA1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Example EAL #2

VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 15 minutes or longer:
(site-specific list)

Applicability: All

River Bend: AA1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 x ODCM limit for ≥15 minutes

EAL #2

Unplanned radiological effluent release in excess of **Table R1** "Alert" for ≥ 15 minutes unless releases can be determined to be below "Alert" thresholds within 15 minutes by samples

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

Table R1 contains the site specific instrumentation and setpoint. Table R1 threshold values were determined by taking the low range high alarm setpoint which represents one third of the TRM 3.11.2 limit of 500 mRem/yr and multiplying by 200. Any one monitor exceeding the value in the table satisfies the criteria for Alert.

Deviations:

None

NEI 99-01: AA1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Example EAL #3

Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 times (site-specific technical specifications).

Applicability: All

River Bend: AA1, Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 x ODCM limit for ≥15 minutes

EAL #3

Unplanned gaseous or liquid radiological releases in excess of **Table R1** "Alert" sample or field team survey threshold for ≥ 15 minutes

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

Table R1 is the site specific threshold values for sample analyses or field team survey monitoring for the Alert condition. The field team monitoring threshold was added in addition to the sample but is not included in the NEI EALs.

Deviations:

None

NEI 99-01: AA1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Example EAL #4

VALID reading on perimeter radiation monitoring system greater than 10 mR/hr above normal background sustained for 15 minutes or longer [for sites having telemetered perimeter monitors]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have telemetered perimeter monitors

Deviations:

None

NEI 99-01: AA1, Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Example EAL #5

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 15 minutes or longer [for sites having such capability]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have automatic dose assessment

Deviations:

None

NEI 99-01: AA2, Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

Example EAL #1

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

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

Applicability: All

River Bend: AA3, Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

EAL #1

A valid reading of ≥ 9500 mR/hr on one or more area radiation monitors in an irradiated fuel pool vicinity

AND

a. Valid indication of an uncontrolled water level decrease in the Containment reactor refueling cavity, the Fuel building spent fuel pool, or the fuel transfer tube that has or will result in irradiated fuel assemblies becoming uncovered

OR

b. Observed event that caused damage to irradiated fuel

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

Specific area monitor nomenclature is not used. A valid reading on any of the area monitors in the vicinity of the applicable pool is used for indication.

NEI 99-01 EAL #1 and #2 are combined in RBS EAL #1.

Deviations:

None

NEI 99-01: AA2, Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

Example EAL #2

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

Applicability: All

River Bend: AA3, Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

EAL #1

A valid reading on ≥ 9500 mR/hr on one or more area radiation monitors in the irradiated fuel pool vicinity

AND

a. Valid indication of an uncontrolled water level decrease in the Containment reactor refueling cavity, the Fuel building spent fuel pool, or the fuel transfer tube that has or will result in irradiated fuel assemblies becoming uncovered

OR

b. Observed event that caused damage to irradiated fuel

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

NEI 99-01 EAL #1 and #2 are combined in RBS EAL #1.

Deviations:

None

NEI 99-01: AA3, Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

Example EAL #1

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

Applicability: All

River Bend: AA2, Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

EAL #1

Valid radiation readings $\geq$ 15 mR/hr in any area requiring continuous occupancy to maintain plant safety functions

Main Control Room
Central Alarm Station
Remote Shutdown Panel

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

Site specific instrument nomenclature is not used. Fixed area radiation monitor or survey readings are applicable.

Deviations:

None

NEI 99-01: AA3, Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

Example EAL #2

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

Applicability: All

River Bend: AA2, Release of radioactive material or increases in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown

EAL #2

Valid radiation readings ≥ Max Safe Operating Values in any area requiring infrequent access to maintain plant safety functions:

Areas Requiring Infrequent Access	DRMS Grid 2	Max. SafeOperating Values
HPCS Equipment Room	(1212)	9.5 E + 03 MR/HR
RHR Equipment Room A	(1213)	9.5 E + 03 MR/HR
RHR Equipment Room B	(1214)	9.5 E + 03 MR/HR
RHR Equipment Room C	(1215)	9.5 E + 03 MR/HR
LPCS Equipment Room	(1216)	9.5 E + 03 MR/HR
HPCS Penetration Area	(1217)	9.5 E + 03 MR/HR
LPCS Penetration Area	(1218)	9.5 E + 03 MR/HR
RCIC Equipment Room	(1219)	9.5 E + 03 MR/HR

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

EOP Max Safe Operating values for secondary containment are used as the threshold value.

Deviations:

None

NEI 99-01: AS1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Example EAL #1

VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:
(site-specific list)

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

Applicability: All

River Bend: AS1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology

EAL #1

Radiological effluent release in excess of **Table R1** "Site Area Emergency" unless releases can be determined to be below "Site Area Emergency" thresholds within 15 minutes by dose projection using actual meteorology

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None
Table R1 is the site specific effluent monitors and the setpoint values for a Site Area Emergency using assumptions.

Deviations:

None

NEI 99-01: AS1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Example EAL #2

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

Applicability: All

River Bend: AS1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology

EAL #2

Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** "Site Area Emergency" threshold

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None
Table R1 threshold is the dose values as obtained from computer assisted dose assessment using actual meteorology (≥ 100 mRem TEDE or 500 mRem CDE Thyroid) or field monitoring team surveys (≥100 mR/hr for ≥ 1 hr or 500 mRem CDE Thyroid for ≥ 1 hr).

Deviations:

None

NEI 99-01: AS1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Example EAL #3

A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 100 mR/hr. [for sites having telemetered perimeter monitors]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have telemetered perimeter monitors

Deviations:

None

NEI 99-01: AS1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Example EAL #4

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 500 mR for one hour of inhalation, at or beyond the site boundary.

Applicability: All

River Bend: AS1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology

EAL #2

Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** "Site Area Emergency" threshold

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

NEI AS1 EAL #4 is included in RBS AS1 EAL #2
Table R1 includes threshold dose values as obtained from computer assisted dose assessment using actual meteorology (≥ 100 mRem TEDE or 500 mRem CDE Thyroid) or field monitoring team surveys (≥100 mR/hr for ≥ 1 hr or 500 mRem CDE Thyroid for ≥ 1 hr).

Deviations:

None

NEI 99-01: AG1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology

Example EAL #1

VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:
(site-specific list)

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

Applicability: All

River Bend: AG1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid for the actual or projected duration of the release.

EAL #1

Radiological effluent release in excess of **Table R1** "General Emergency" unless releases can be determined to be below "General Emergency" thresholds within 15 minutes by dose projection using actual meteorology

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None
Table R1 is the site specific effluents and the setpoint value for a General Emergency using assumptions. EAL 1 implements the note of NEI EAL 1 for dose assessment using actual meteorology.

Deviations:

None

NEI 99-01: AG1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology

Example EAL #2

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

Applicability: All

River Bend: AG1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid for the actual or projected duration of the release.

EAL #2

Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** column "General Emergency" threshold

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None
Table R1 includes the threshold dose values as obtained from computer assisted dose assessment using actual meteorology (≥ 1000 mRem TEDE or 5000 mRem CDE Thyroid) or field monitoring team surveys (≥ 1 R/hr for ≥ 1 hr or ≥ 5 Rem CDE Thyroid for ≥ 1 hr).

Deviations:

None

NEI 99-01: AG1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology

Example EAL #3

A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 1000 mR/hr. [for sites having telemetered perimeter monitors]

Applicability: All

River Bend: NA

None

Applicability: N/A

Differences:

River Bend does not have telemetered perimeter monitors

Deviations:

None

NEI 99-01: AG1, Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology

Example EAL #4

Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 5000 mR for one hour of inhalation, at or beyond the site boundary.

Applicability: All

River Bend: AG1, Offsite dose resulting from an actual or imminent release of gaseous radioactivity ≥1000 mRem TEDE or ≥5000 mRem CDE Thyroid for the actual or projected duration of the release.

EAL #2

Radiological dose assessment results using actual meteorology or field team survey exceeds **Table R1** column "General Emergency" threshold

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

NEI AG1 EAL #4 is included in RBS AG1 EAL #2 which includes dose projection and field surveys.

Deviations:

None

Cold Shutdown / Refueling System Malfunction

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the Cold Shutdown / Refueling System Malfunction Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

NEI 99-01: CU1, RCS Leakage

Example EAL #1 and EAL #2

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

Applicability: Cold Shutdown

River Bend: CU1, RCS Leakage

EAL #1

Unplanned loss of RCS inventory and RPV level cannot be restored and maintained >9.7 inches.

Applicability: Operating mode 4

Differences:

None

Deviations:

NEI 99-01 EAL #1 and #2 were not used as written in the River Bend EALS. Reactor coolant leakage monitoring is not required in operating modes 4 and 5 per the River Bend Technical Specifications section 3.4.5 and there is no LCO limit. Leakage propagation is not a concern, as at operating pressure, since the reactor is shut down and depressurized. The Leak Detection System may not be available in Mode 4 due to maintenance activities. An EAL threshold value was established using RPV water level instead of a leakage rate to provide the operator with a valid and available indication of the status of RPV inventory.

RPV level may be monitored on the Narrow Reactor level instrumentation in Cold Shutdown. A water level of 9.7 inches was chosen since this is the level setpoint for shutdown cooling isolation on low RPV level. The term restored and maintained is used to be consistent with the EOP. If level continues to lower and the Primary Containment Isolation Valve setpoint of -42 inches is reached, isolation should occur if the leakage is from a source other that the shutdown cooling system. The use of RPV level is consistent with the Alert, Site Area and General emergencies for RCS leakage. If level cannot be restored, it will be considered a potential degradation of the level of safety of the plant and a NOUE will be declared. This meets the intent of a NOUE as defined in NEI 99-01 and the River Bend Emergency Plan.

NEI 99-01: CU2, Unplanned loss of RCS inventory with irradiated fuel in the RPV

Example EAL #1

Unplanned RCS level decrease below the RPV flange for ≥ 15 minutes

Applicability: Refueling

River Bend: CU2, Unplanned loss of RCS inventory with irradiated fuel in the RPV

EAL #1

Unplanned RCS level decrease below the RPV flange for ≥15 minutes

Applicability: Operating mode 5

Differences:

None

Deviations:

None

NEI 99-01: CU2, Unplanned loss of RCS inventory with irradiated fuel in the RPV

Example EAL #2

Loss of RPV inventory as indicted by unexplained (site specific) sump and tank level increase

AND

RPV level cannot be monitored

Applicability: Refueling

River Bend: CU2, Unplanned loss of RCS inventory with irradiated fuel in the RPV

EAL #2

RPV level cannot be monitored

AND

Loss of RPV inventory as indicted by unexplained floor or equipment sump level increase

Applicability: Operating mode 5

Differences:

None

Deviations:

None

NEI 99-01: CU3, Loss of all offsite power to essential busses for greater than 15 minutes

Example EAL #1

Loss of power to (site specific) transformers for greater than 15 minutes

AND

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

Applicability: Cold Shutdown, Refueling

River Bend: CU4, Loss of all offsite power to essential busses for greater than 15 minutes

EAL #1

Loss of power to RTX-XSR1C and RTX-XSR1D and RTX-XSR1E and RTX-XSR1F for > 15 minutes

Applicability: Operating Mode 4, 5

Differences:

It is implied in this EAL that one or more emergency diesel generators are operating to essential busses. The second part of the NEI 99-01 Example EAL "At least (site-specific) emergency generators are supplying power to emergency busses" is not required because loss of power to the indicated preferred station transformers for >15 minutes requires the declaration of at least an Unusual Event regardless of the condition of the emergency diesel generators.

If the diesel generators are available and supplying either essential ENS bus 15 minutes after the loss of the preferred station transformers, then declaration of an Unusual Event is required. If the diesel generators are not supplying the essential ENS busses 15 minutes after the loss of the preferred station transformers, then the event escalates to an Alert classification per NEI 99-01 CA3 and River Bend CA3.

Deviations:

None

NEI 99-01: CU4, Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

Example EAL #1

An unplanned event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.

Applicability: Refueling

River Bend: CU3, Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

EAL #1

An unplanned event results in RCS temperature > 200°F

Applicability: Operating Mode 5

Differences:

None

Deviations:

None

NEI 99-01: CU4, Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

Example EAL #2

Loss of all RCS temperature and RPV level indication for > 15 minutes

Applicability: Refueling

River Bend: CU3, Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

EAL #2

Loss of all RCS temperature and RPV level indication for > 15 minutes

Applicability: Operating Mode 5

Differences:

None

Deviations:

None

NEI 99-01: CU5, Fuel Clad Degradation

Example EAL #1

(Site Specific) radiation monitor reading indicating fuel clad degradation greater than Technical Specification allowable limits

Applicability: Cold Shutdown, Refueling

River Bend: N/A

EAL

None

Applicability:

Differences:

None

Deviations:

NEI CU5 EAL #1 is not included in the RBS EALs.
The Main Steam Line radiation monitors and Offgas pre-treatment radiation monitors are the available instruments to monitor for fuel clad degradation and would detect abnormal radiation levels in Modes 1, 2, and 3, before reaching Modes 4 or 5. These instruments are not reliable indications of clad damage in Modes 4 and 5 since steam or coolant would normally not be present in the Main Steam Lines outside the Containment, nor in Offgas. Therefore, this EAL is not applicable or necessary.

The Abnormal Radiation / Effluent EALs are applicable in all modes and meet the intent of detection of fuel clad degradation and potential degradation in the level of safety of the plant for this EAL. Abnormal Radiation level EAL AU1 (Any unplanned release of gaseous or liquid radioactivity to the environment exceeds 2 X ODCM limit for ≥ 60 minutes), AU2 (Unplanned release in plant area radiation levels by a factor of 1000) or AA3 (Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel) are precursors to alert personnel of radiological levels of a magnitude to indicate fuel clad damage.

NEI 99-01: CU5, Fuel Clad Degradation

Example EAL #2

(Site Specific) coolant sample activity indicating fuel clad degradation greater than Technical Specification allowable limits

Applicability: Cold Shutdown, Refueling

River Bend: None

Applicability: N/A

Differences:

None

Deviations:

NEI CU5 EAL #2 is not included in the RBS EALs
This EAL addresses coolant samples exceeding coolant technical specifications for iodine spike. The Technical Specification (3.4.8) for RCS activity is not applicable in Modes 4 and 5. The associated action statement for exceeding the TS limit in Modes 1, 2, or 3 is to restore limits within 48 hours or shutdown to Mode 4 if time limit is exceeded or specific activity is >4 μCi/gm dose equivalent I-131. Section 5.2 of NEI 99-01 states that "...the primary threshold for NOUEs as operation outside the safety envelope for the plant as defined by plant technical specifications, including LCOs and Action Statement times. Therefore, the EAL is not applicable or necessary.

The Abnormal Radiation / Effluent EALs are applicable in all modes and meet the intent of detection of fuel clad degradation and potential degradation in the level of safety of the plant for this EAL. Abnormal Radiation level EAL AU1 (Any unplanned release of gaseous or liquid radioactivity to the environment exceeds 2 X ODCM limit for ≥ 60 minutes), AU2 (Unplanned release in plant area radiation levels by a factor of 1000) or AA3 (Damage to irradiated fuel or unplanned loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel) are precursors to alert personnel of radiological levels of a magnitude to indicate fuel clad damage.

Section 3.7 of NEI 99-01 states that an Unusual Event "...indicate a potential degradation of the level of safety of the plant" and that potential degradation of the level of safety is indicated primarily by exceeding plant technical specification Limiting Condition of Operation (LCO) allowable action time for achieving required mode change.

NEI 99-01: CU6, Unplanned loss of all onsite or offsite communications capabilities

Example EAL #1 and EAL #2

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

2. Loss of all (site specific list) offsite communications capability

Applicability: Cold Shutdown, Refueling

River Bend: CU7 Unplanned loss of all onsite or offsite communications capabilities

EAL #1 and #2

1. Unplanned loss of all onsite communications equipment:

   Plant radio system
   Plant paging system / Gaitronics
   Sound powered phones
   In-plant telephones
   Cell phones

2. Unplanned loss of all onsite communications equipment:

   ESP-COMM / Hotline
   All telephone lines (commercial and microwave)
   ENS
   HPN
   Cell Phones
   Satellite phones
   Radio

Applicability: Operating Modes 4, 5

Differences:

Tables contain site specific list of equipment

Deviations:

None

NEI 99-01: CU7, UNPLANNED Loss of Required DC Power for Greater than 15 Minutes

Example EAL #1

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

AND

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

Applicability: Cold Shutdown, Refueling

River Bend: CU5 UNPLANNED Loss of Required DC Power for Greater than 15 Minutes

EAL #1

Unplanned reduction in ENB-SWG1A and ENB-SWG1B voltage to < 105 VDC

AND

Unable to restore power to either ENB-SWG1A or ENB-SWG1B within 15 minutes after reaching 105 VDC

Applicability: Operating Modes 4, 5

Differences:

None

Deviations:

None

NEI 99-01: CU8, Inadvertent Criticality

Example EAL #1 and #2

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

Applicability: Cold Shutdown, Refueling

River Bend: CU6, Inadvertent Criticality

EAL #1

An unplanned extended positive period observed on nuclear instrumentation

Applicability: Operating Modes 4, 5

Differences:

NEI EAL #2 is not applicable to River Bend because it does not have a startup rate indication. This is a PWR EAL.

Deviations:

None

NEI 99-01: CA1, Loss of RCS Inventory

Example EAL #1 and #2

1. Loss of RCS inventory as indicated by RPV level less than (site specific level)
   (low-low ECCS actuation setpoint) (BWR)
   (bottom ID of the RCS loop) (PWR)

2. Loss of RCS inventory as indicated by unexplained (site specific) sump and tank level increase

   AND

   RCS level cannot be monitored for >15 minutes

Applicability: Cold Shutdown

River Bend: CA1, Loss or RCS Inventory with irradiated fuel in the RPV

EAL #1 and #2

1. Unplanned loss of RCS inventory and RPV level cannot be restored and maintained > -143 inches

2. RPV level cannot be monitored for >15 minutes

   AND

   Loss of RPV inventory as indicated by unexplained floor or equipment drain sump level increase

Applicability: Operating Modes 4, 5

Differences:

NEI 99-01 contains two ICs (CA1, "Loss of RCS Inventory" and CA2, "Loss of RCS Inventory with irradiated fuel in the RPV") that deal with loss of RCS inventory. CA1 is applicable in the Cold Shutdown mode whereas CA2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CA1 & CA2 deals with different means available for monitoring RCS inventory and level. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. Therefore both NEI CA1 & CA2 are implemented in River Bend EAL CA1.

NEI CA1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CA2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore inclusion of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CA1.

Since ECCS will not automatically initiate and inject until the low-low ECCS setpoint is reached, use of "unable to restore and maintain" in the River Bend EAL allows ECCS to perform its design function following actuation and injection. Depending on the rate of level decrease, RPV level could decrease below the setpoint while ECCS is initiating and

establishing injection. Use of the term "restore and maintain" is consistent with the EOP RPV level terms.

Deviations:

None

NEI 99-01: CA2, Loss of RCS Inventory With Irradiated Fuel in the RPV

Example EAL #1 and #2

1. Loss of RCS inventory as indicated by RPV level less than (site specific level)
   (low-low ECCS actuation setpoint) (BWR)
   (bottom ID of the RCS loop) (PWR)

2. Loss of RCS inventory as indicated by unexplained (site specific) sump and tank level increase

   AND

   RCS level cannot be monitored for >15 minutes

Applicability: Refueling

River Bend: CA1

EAL

None See differences

Differences:

NEI 99-01 contains two ICs (CA1 & CA2) that deal with "Loss of RCS inventory". CA1 is applicable in the Cold Shutdown mode whereas CA2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CA1 & CA2 deals with different means available for monitoring RCS inventory and level. The monitoring methods are the same for both operating modes: sump levels, area radiation levels, or erratic source range monitor indication. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. NEI CA1 for cold shutdown and CA2 for refueling are combined in RBS CA1 EAL #1 and EAL #2.

NEI CA1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CA2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore inclusion of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CA1.

Deviations:

None

NEI 99-01: CA3, Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses

Example EAL #1

Loss of power to (site specific) transformers

AND

Failure of (site specific) emergency diesel generators to supply power to emergency busses

AND

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

Applicability: Cold Shutdown, Refueling, Defueled

River Bend: CA3, Loss of all offsite and onsite AC power to essential busses

EAL #1

1. Unplanned loss of AC power to ENS-SWG1A **and** ENS-SWG1B busses

   AND

   Failure to restore power to **either** ENS-SWG1A **or** ENS-SWG1B bus within **15 minutes** from the time of loss of both offsite and onsite AC power

Applicability: Operating Modes 4, 5, Defueled

Differences:

The River Bend EAL utilizes the words "Unplanned loss of AC power to" in lieu of the NEI Example EAL "Loss of power to (site specific) transformers and Failure of (site-specific) emergency generators to supply power to emergency busses in order to simplify this EAL.

Deviations:

None

NEI 99-01: CA4, Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV

Example EAL #1, #2, #3

1. With Containment Closure and RCS integrity not established an unplanned event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.

2. With Containment Closure established and RCS integrity not established or RCS inventory reduced an unplanned event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 20 minutes.

3. An unplanned event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 60 minutes[1] or results in an RCS pressure increase of greater than (site specific) psig.

   [1]Note: if an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

Applicability: Cold Shutdown, Refueling

River Bend: CA2, Inability to maintain plant in cold shutdown with irradiated fuel in the RPV

EAL #1, #2, #3

1. An unplanned event results in RCS temperature **>200 °F**

   AND

   Containment Closure **and** RCS integrity **not** established.

2. An unplanned event results in RCS temperature **>200 °F** for **>20 minutes** See Note

   AND

   Containment Closure established

   AND

   either RCS integrity not established **or** RCS inventory reduced.

3. An unplanned event results in RCS temperature **>200 °F** for **>60 minutes** See Note
   OR results in RPV pressure increase **> 10 psig.**

Note: If a decay heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable

Applicability: Operating Modes 4, 5

Differences:

EAL #2 – The NEI wording "or RCS inventory reduced" is not included in the River Bend EAL #2. This event is applicable to PWRs.

Deviations:

None

NEI 99-01: CS1, Loss of RPV Inventory Affecting Core Decay Heat Removal Capability

Example EAL #1

1. With Containment closure not established:

   a. RPV inventory as indicated by RPV level less than (site specific level) (6" below the low-low ECCS actuation setpoint) (BWR)

   OR

   b. RPV level cannot be monitored for >30 minutes with a loss of RPV inventory as indicated by unexplained (site specific) sump and tank level increases.

Applicability: Cold Shutdown

River Bend: CS1, Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV

EAL #1

1. With Containment closure not established:
   a. loss of RCS inventory as indicated by RPV level < -149 inches

   OR

   b. IN MODE 4 – RPV level cannot be monitored for >30 minutes with loss of inventory as indicated by unexplained floor or equipment sump level increase

   OR

   c. IN MODE 5 - RPV level cannot be monitored and core uncovery is evidenced by other indication

Applicability: Operating Modes 4, 5

Differences:

NEI 99-01 contains two ICs (CS1 & CS2) that deal with "Loss of RCS inventory". CS1 is applicable in the Cold Shutdown mode whereas CS2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CS1 & CS2 deals with different means available for monitoring RCS inventory and level. The monitoring methods are the same for both operating modes: sump levels, area radiation levels, or erratic source range monitor indication. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. NEI CS1 EAL #1 for cold shutdown and CS2 EAL #1 for refueling are combined in RBS CS1 EAL #1. The bases document provides the Emergency Director with suggested

methods of determining if the core is uncovered and specific indications are not listed in the EAL

NEI CS1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CS2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore inclusion of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CS1.

Deviations:

None

NEI 99-01: CS1, Loss of RPV Inventory Affecting Core Decay Heat Removal Capability

Example EAL #2

2. With Containment closure established;

   a. RPV inventory as indicated by RPV level less than TOAF

   OR

   b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by either:
   - Unexplained (site-specific) sump and tank level increase
   - Erratic Source Range Monitor indication

Applicability: Cold Shutdown

River Bend: CS1, Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV

EAL #2

2. With Containment closure established:
   a. Loss of RCS inventory as indicated by RPV level < -162 inches

   OR

   b. IN MODE 4 – RPV level cannot be monitored for >30 minutes with a loss or RPV inventory as evidenced by other indication

   OR

   c. IN MODE 5 - RPV level cannot be monitored and core uncovery as evidenced by other indication

Applicability: Operating Modes 4, 5

Differences:

NEI 99-01 contains two ICs (CS1 & CS2) that deal with "Loss of RCS inventory". CS1 is applicable in the Cold Shutdown mode whereas CS2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CS1 & CS2 deals with different means available for monitoring RCS inventory and level. The monitoring methods are the same for both operating modes: sump levels, area radiation levels, or erratic source range monitor indication. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. NEI CS1 EAL #2 for cold shutdown and CS2 EAL #2 for refueling are combined in RBS CS1 EAL #2. The bases document provides the Emergency Director with suggested

methods of determining if the core is uncovered and specific indications are not listed in the EAL

NEI CS1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CS2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore inclusion of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CS1.

Deviations:

None

NEI 99-01: CS2, Loss of RPV Inventory Affecting Core Decay Heat Removal Capability

Example EAL #1

With CONTAINMENT CLOSURE established:

a. RPV inventory as indicated by RPV level less than (site-specific level) (6" below the low-low ECCS actuation setpoint) BWR

OR

b. RPV level cannot be monitored with indication of core uncovery as evidenced by one or more of the following:

- Containment High Range Radiation Monitor reading > (site-specific) setpoint
- Erratic Source Range Monitor indication
- Other (site-specific) indications

Applicability: Refueling

River Bend: CS2, Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV

EAL #1

N/A

Applicability: N/A

Differences:

NEI CS2 is integrated into RBS CS1. See RBS CS1.

Deviations:

None

NEI 99-01: CS2, Loss of RPV Inventory Affecting Core Decay Heat Removal Capability

Example EAL #2

With CONTAINMENT CLOSURE established:

a. RPV inventory as indicated by RPV level less than TOAF

OR

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

Applicability: Refueling

River Bend: CS2, Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV

EAL #2

N/A

Applicability: N/A

Differences:

NEI CS2 is integrated into RBS CS1. See RBS CS1.

Deviations:

None

NEI 99-01: CG1, Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged with Irradiated Fuel in the RPV

Example EAL #1 and #2 and #3

1. Loss of RPV inventory as indicated by unexplained (site specific) sump and tank level increase
2. RPV level:
   a. Less than TOAF for > 30 minutes
      OR
   b. Cannot be monitored with indication of core uncovery for > 30 minutes as evidenced by one or more of the following:
      - Containment High Range Radiation Monitor reading > (site specific) setpoint
      - Erratic source range monitoring indication
      - Other (site specific) indications
3. (site specific) indication of Containment challenged as indicated by one or more of the following:
   - Explosive mixture inside containment
   - Pressure above (site specific) value
   - Containment closure not established
   - Secondary Containment radiation monitors above (site specific) value (BWR only)

Applicability: Cold Shutdown, Refueling

River Bend: CG1, Loss of RPV inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the RPV

EAL 1

1. RPV level **< -162** inches for **> 30** minutes **OR** RPV level cannot be monitored with core uncovery indicated for **> 30** minutes,

   AND

   Containment is challenged as indicated by:

   Containment hydrogen concentration in the unsafe zone of the HDOL

   OR

   Containment pressure is **≥ 15** psig

   OR

   Containment closure is not established

   OR

Secondary Containment area radiation monitor above the EOP Max Safe Operating Value in one or more areas.

Applicability: Operating Modes 4, 5

Differences:

NEI Example EAL #1 is not included in the RBS EAL #1. The NEI Example EAL #1 is redundant to the conditions described in NEI Example EALs #2 & #3 and does not add value to the EAL scheme. Loss of inventory as unidentified by an increase in sump levels is thresholds for NOUE and Alert EALs and would be classified as necessary. In a General emergency, the concern is fuel clad damage due to a loss of RCS. RPV level < than Top of Active Fuel (TAF) or the inability to monitor RPV level, with indication of core uncovery, for > 30 minutes are indicative of loss of RPV inventory regardless of how it is determined.

Deviations:

None

Permanently Defueled

Station Malfunction

This section is not applicable to or implemented at River Bend.

Events Related to ISFSI Malfunction

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the Independent Spent Fuel Storage Installation Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation

NEI 99-01: E-HU1, Damage to loaded cask confinement boundary

Example EAL #1

1. Natural phenomena events affecting a loaded cask confinement boundary

(site-specific list)

Applicability: Not Applicable

River Bend: EU1 Damage to loaded cask confinement boundary

EAL #1.

1. Natural phenomena events affecting a loaded cask confinement boundary
   Any one or more of the following:
   a. Tornado
   b. Hurricane force winds
   c. Seismic event
   d. Flood
   e. Lightning
   f. Extreme Environmental Temperature

Operating Mode Applicability: **Not Applicable**

Differences:

None

Deviations

None

NEI 99-01: E-HU1, Damage to loaded cask confinement boundary

Example EAL #2

2. Accident conditions affecting a loaded cask confinement boundary

(site-specific list)

Applicability: Not Applicable

River Bend: EU1 Damage to loaded cask confinement boundary

EAL #2.

Accident conditions affecting a loaded cask confinement boundary.
Any one or more of the following:

a. Dropped cask
b. Cask Tip-over
c. Explosive Overpressure
d. Damage by Missile generated by Natural Phenomena
e. Fire Damage
f. Blockage of air vents

Operating Mode Applicability: **Not Applicable**

Differences:

None

Deviations

None

NEI 99-01: E-HU1, Damage to loaded cask confinement boundary

Example EAL #3

Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary

Applicability: Not Applicable

River Bend: EU1 Damage to loaded cask confinement boundary

EAL #3.

Any condition in the opinion of the Emergency Director that indicates loss of loaded fuel storage cask confinement boundary

Operating Mode Applicability: **Not Applicable**

Differences:

None

Deviations

None

NEI 99-01: E-HU2, Confirmed security event with potential loss of level of safety of the ISFSI.

Example EAL #1

Security event as determined from (site-specific) Security Plan and reported by the (site-specific) security shift supervision

Applicability: Not Applicable

River Bend: EU2 Damage to loaded cask confinement boundary

EAL #1.

Security event as determined from the RBS Security Plan for ISFSI and reported by the RBS Security Shift Supervision

Operating Mode Applicability: Not Applicable

Differences:

None

Deviations

None

Fission Product Barrier Degradation

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the Fission Product Barrier Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation

NEI 99-01: FU1

ANY Loss or ANY Potential Loss of Containment

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: FU1

Loss or Potential Loss of Primary Containment

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: FA1

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: FA1

Loss or Potential Loss of either Fuel Clad or RCS

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: FS1

Loss or Potential Loss of ANY Two Barriers

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: FS1

Loss or Potential Loss of any two Fission Product Barriers

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: FG1

Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: FG1

Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Fuel Clad Barrier

Example EAL #1

Primary Coolant Activity Level

Loss: Coolant Activity greater than (site-specific) value

Potential Loss Not applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Fuel Clad Barrier

EAL #FC1

Primary Coolant Activity Level

Loss: Coolant activity >300 $\mu Ci/gm\ I_{131}$ dose equivalent

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Fuel Clad Barrier

Example EAL #2

Reactor Vessel Water Level

Loss:	Level less than (site-specific) value
Potential Loss	Level less than (site specific) value

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Fuel Clad Barrier

EAL #FC2

Reactor Vessel Water Level

Loss: RPV water level cannot be restored and maintained above -186 inches.

Potential Loss: RPV water level cannot be restored and maintained above -162 inches.

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Fuel Clad Barrier

Example EAL #3

Drywell Radiation Monitoring

Loss: Drywell radiation monitor reading > (site-specific) R/hr

Potential Loss: Not applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Fuel Clad Barrier

EAL #FC3

Primary Containment Radiation Monitors

Loss: Radiation monitor(s) RMS-RE16A and / or RMS-RE16B reading > 3,000 R/hr

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

Primary Containment monitors are used instead of Drywell monitors which are subject to shine from the RPV and the RCS piping. Containment radiation monitors reading in excess of 3000 R/hr after Reactor Shutdown are indicative of both the loss of the reactor coolant system and 5% clad failure with the instantaneous release and dispersal of the reactor coolant noble gas and Iodine inventory into the drywell and containment atmosphere.

Deviations:

None

NEI 99-01: Fuel Clad Barrier

Example EAL #4

Other (Site-Specific) Indications

Loss: (site-specific) as applicable

Potential Loss (site-specific) as applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Fuel Clad Barrier

EAL #FC4

Main Steam Line Radiation Monitoring

Loss: Main Stem Line Radiation level > the Hi Hi Alarm Setpoint (P601-19A-C01, P601-19A-C03)

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

The Main Steam Line Radiation Monitoring system function is to detect increased MSL radiation level caused by core damage.

Deviations:

None

NEI 99-01: Fuel Clad Barrier

Example EAL #5

Emergency Director Judgment

Loss or Potential Loss: Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Fuel Clad Barrier

EAL #FC5

Emergency Director Judgment

Loss: Any condition in the opinion of the Emergency Director that indicates loss of the fuel clad barrier

Potential Loss: Any condition in the opinion of the Emergency Director that indicates potential loss of the fuel clad barrier

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: RCS Barrier

Example EAL #1

Drywell Pressure

Loss: Drywell pressure greater than (site-specific) psig

Potential Loss: Not applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: RCS Barrier

EAL #RC1

Drywell Pressure

Loss: Drywell pressure >1.68 psid and pressure increase due to reactor coolant leakage

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: RCS Barrier

Example EAL #2

Reactor Vessel Water Level

Loss: Level less than (site-specific value)

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: RCS Barrier

EAL #RC2

Reactor Vessel Water Level

Loss: RPV water level cannot be restored and maintained above -162 inches with indications of a leak in the drywell

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

The top of active fuel value is used in the River Bend EAL to ensure consistency with the Fuel Clad Barrier EAL #FC2. The words "with indications of a leak in the drywell" were added to provide consistency with RCS Barrier EAL #1.

Deviations:

None

NEI 99-01: RCS Barrier

Example EAL #3

RCS Leak Rate

Loss: (site-specific) indication of an unisolable steam line break

Potential Loss:RCS leakage greater than 50 gpm inside the drywell

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: RCS Barrier

EAL #RC3

RCS Leak Rate

Loss: Unisolable main steam line or RCIC steam line break

Potential Loss: Unisolable RCS leakage ≥ **50 gpm** in the drywell.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area temperature alarm in **Table F3**.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area radiation level alarm in **Table F4.**

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: RCS Barrier

Example EAL #4

Drywell Radiation Monitoring

Loss: Drywell radiation monitor reading greater than (site-specific) R/hr

Potential Loss:Not applicable

The (site-specific) reading is a value which indicates the release of reactor coolant to the drywell. The reading should be calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i.e., within T/S) into the drywell atmosphere. This reading will be less than that specified for Fuel Clad Barrier EAL #3. Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier EAL #3, fuel damage would also be indicated.

However, if the site specific physical location of the drywell radiation monitor is such that radiation from a cloud of released RCS gases could not be distinguished from radiation from adjacent piping and components containing elevated reactor coolant activity, this EAL should be omitted and other site specific indications of RCS leakage substituted.

There is no "Potential Loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: N/A

Applicability: N/A

Differences:

Deviations:

The physical location of the River Bend drywell radiation monitor exposes it to shine from the reactor vessel and RCS piping and prevents it from distinguishing the radiation source. This EAL is therefore omitted from the River Bend implementation in accordance with the NEI guidance. Other indication of leakage is not substituted since RBS EALs RC1, RC2, and RC3 are indications of leakage.

NEI 99-01: RCS Barrier Example EAL #5

Other (Site-Specific) Indications

Loss: (site-specific) as applicable

Potential loss: (site-specific) as applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: RCS Barrier

EAL #RC4

Primary System Relief Valves

Loss: Safety Relief Valve stuck open

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: RCS Barrier

Example EAL #6

Emergency Director Judgment

Loss: Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

Potential loss: Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: RCS Barrier

EAL #RC5

Emergency Director Judgment

Loss: Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

Potential loss: Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Primary Containment Barrier

Example EAL #1

Drywell Pressure

Loss: Rapid unexplained decrease following initial increases **OR**
Drywell pressure response not consistent with LOCA conditions

Potential Loss:(site-specific) psig and increasing **OR**
Explosive mixture exists

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Primary Containment Barrier

EAL #PC1

Primary Containment Pressure

Loss: PC pressure response not consistent with LOCA conditions

Potential Loss: Primary Containment pressure **15 psig** and increasing.

OR

Primary Containment Hydrogen in the unsafe zone of the EOP / SAG **HDOL** curve.

OR

Drywell Hydrogen Concentration > **9%.**

Applicability: Operating Modes 1, 2, 3

Differences:

River Bend has a Mark III containment design. In the Mark III containment design the Primary Containment is referred to as the Primary Containment not the Drywell as in the Mark I & II containment designs.

The River Bend EAL #2 adds hydrogen concentration as a Drywell Pressure potential loss EAL.

Deviations:

None

NEI 99-01: Primary Containment Barrier

Example EAL #2

Reactor Vessel Water Level

Loss: Not applicable

Potential Loss: Primary Containment flooding required

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Primary Containment Barrier

EAL #PC2

RPV Water Level

Loss: None

Potential Loss: Entry into PC flooding procedures SAP-1 and SAP-2

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Primary Containment Barrier

Example EAL #3

Containment Isolation Failure or Bypass

Loss: Failure of both valves in any one line to close AND downstream pathway to the environment exists
OR
Intentional venting per EOPs
OR
Unisolable primary system leakage outside drywell as indicated by area temperature or area radiation alarm

Potential Loss:Not applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Primary Containment Barrier

EAL #PC3

Primary Containment Isolation Failure or Bypass

Loss: Failure of both valves in any one line to close when isolation is required AND downstream pathway to the environment exists.

OR

Intentional venting of the Containment per the EOPs or SAPs to maintain Containment pressure < 30 psig or restore and maintain containment hydrogen concentration below the HDOL.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area temperature ≥ Max Safe Operating Value in **Table F1**.

OR

Unisolable primary system leak outside the Primary Containment as indicated by any area radiation level ≥ Max Safe Operating Value in **Table F2**.

Potential Loss: None

Applicability: Operating Modes 1, 2, 3

Differences:

The River Bend EAL references primary containment venting required by the Severe Accident Procedures or the Emergency Operating Procedures. This implements the concept described in the last sentence of the NEI Primary Containment Barrier Example EAL #3 discussion.

Deviations:

None

NEI 99-01: Primary Containment Barrier

Example EAL #4

Significant Radioactive Inventory in Containment

Loss: Not applicable

Potential Loss:Drywell radiation monitor reading greater than (site-specific) R/hr

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Primary Containment Barrier

EAL #PC4

Significant radioactive inventory in the Primary Containment

Loss: None

Potential Loss: Radiation monitor(s) RMS-RE16A and / or RMS-RE16B reading > 10,000 R/hr

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: Primary Containment Barrier

Example EAL #5

Other (Site-Specific) Indications

Loss: (site-specific) as applicable

Potential Loss:(site-specific) as applicable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: N/A

Applicability: N/A

Differences:

Additional conditions not specified.

Deviations:

None

NEI 99-01: Primary Containment Barrier Example

EAL #6

Emergency Director Judgment

Loss: Any condition in the opinion of the Emergency Director that indicates a loss of the Primary Containment barrier

Potential Loss: Any condition in the opinion of the Emergency Director that indicates a potential loss of the Primary Containment barrier

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost. (See also IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: Primary Containment Barrier

EAL #PC5

Emergency Director Judgment

Loss: Any condition in the opinion of the Emergency Director that indicates a loss of the Primary Containment barrier

Potential Loss: Any condition in the opinion of the Emergency Director that indicates a potential loss of the Primary Containment barrier

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

Hazards and Other Conditions Affecting Plant Safety

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the Hazards and Other Conditions Affecting Plant Safety Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #1

(Site-Specific) method indicates felt earthquake.

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #1

Valid indication of a felt earthquake:

Vibratory ground motion felt in the protected area and recognized as an earthquake.

AND

Activated seismic Operating Basis Earthquake (OBE) switches as indicated by receipt of Annunciators "Seismic Event High" (P680-02A-C06) **AND** "Seismic Tape Recording SYS Start" (P680-02A-D06)

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

The RBS EAL uses the Operating Basis Earthquake to meet the intent of the EAL of a felt earthquake and the NEI basis that some damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. These conditions meet the definition of an OBE. The definition of an OBE per 10CFR100 Appendix A(III)(d) is that earthquake which produces the vibratory ground motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional. The OBE meets the conditions of an Unusual Event – events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur. Plant alarm response procedures provide guidance to the operator if the instrument minimum setpoint of 0.01g acceleration is received and is not included in the plant abnormal procedures.

The seismic instrumentation requirement is part of the Technical Requirements Manual. If an event indicates an acceleration of 0.01g, the TRM required action is to submit a report within 10 days. This supports RBS decision that the Unusual Event should be based on the OBE and not the activation of switches at 0.01g.

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #2

Report by plant personnel of tornado or high winds greater than (site-specific) mph striking within PROTECTED AREA boundary

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #2

Report by plant personnel of a tornado striking (touching down) within the protected area boundary

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

High winds condition in NEI HU1 EAL #2 is contained in RBS HU4 EAL #7.

Deviations:

None

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #3

Vehicle crash into plant structures or systems within PROTECTED AREA boundary

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #3

Vehicle crash into plant structures or systems within the protected area boundary that contain systems or functions required for safe shutdown of the plant

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

"...that contain systems or functions required for safe shutdown of the plant" is added for clarification to implement the intent described in the NEI basis that describes the applicability. Table 2 is included in the Hazards category to list structures containing functions or systems required for safe shutdown. The facilities or structures not included are the administrative buildings, the normal switchgear buildings and transformers, and the radwaste building.

Deviations:

None

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #4

Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #4

Report by plant personnel of an unanticipated explosion within the protected area boundary resulting in visible damage to a permanent structure or equipment

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #5

Report of turbine failure resulting in casing penetration or damage to turbine or generator seals

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #5

Report of turbine failure resulting in casing penetration or damage to turbine or generator seals

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #6

Uncontrolled flooding in (site-specific) areas of the plant that has the potential to affect safety related equipment needed for the current operating mode.

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #6

Uncontrolled flooding and water level greater than the Maximum Safe Operating value in Secondary Containment (Table H1) that has the potential to affect safety related equipment needed for the current operating mode

Table H-1
AREA WATER LEVELS

Affected Location / Parameter	Maximum Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Pump Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR A Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR B Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RHR C Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
LPCS Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RCIC Room 70'EL	4 inches above floor in. (40%) (P870-51A-G4 alarm)

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU1, Natural and Destructive Phenomena Affecting the PROTECTED AREA

Example EAL #7

(Site-Specific) occurrences affecting the PROTECTED AREA

Applicability: All

River Bend: HU4, Natural and destructive phenomena affecting the protected area

EAL #7

Severe weather or hurricane conditions with indication of sustained high winds ≥ 74 mph in the Protected Area.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

High winds condition in NEI HU1 EAL #2 is contained in RBS HU4 EAL #7.

Deviations:

None

NEI 99-01: HU2, FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection

Example EAL #1

Fire in buildings or areas contiguous to any of the following (site-specific) areas not extinguished within 15 minutes of control room notification or verification of control room alarm:

(site-specific) list

Applicability: All

River Bend: HU2, Fire within protected area boundary not extinguished within 15 Minutes of detection

EAL #1

Fire in buildings or areas contiguous to any vital area not extinguished within 15 minutes of control room notification or verification of a control room alarm.

Reactor Building
Auxiliary Building
Control Building
Diesel Generator Building
Fuel Building
Standby Cooling Tower
Tunnels
Turbine Building
Normal Switchgear Building

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU3, Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant

Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS

Applicability: All

River Bend: HU3, Release of toxic or flammable gases deemed detrimental to normal operation of the plant

EAL #1

Report or detection of toxic or flammable gases that have or could enter normally occupied areas of the site in amounts that can affect normal plant operations

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU3, Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant

Example EAL #2

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

Applicability: All

River Bend: HU5, Release of toxic or flammable gases deemed detrimental to normal operation of the plant

EAL #2

Report by Local Parish or State Officials for evacuation or sheltering of site personnel based on an offsite toxic gas release event in amounts that are expected to enter normally occupied areas of the site that can affect normal plant operations.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU4, Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

Example EAL #1

Security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

River Bend: HU1, Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

EAL #2

Security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU4, Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

Example EAL #2

A credible site specific security threat notification

Applicability: All

River Bend: HU1, Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

EAL #1

Notification of a definite or perceived RBS specific security threat or possibility of sabotage and assessment by the security shift supervision determines that the threat is credible

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HU5, Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of a NOUE.

Example EAL #1

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

Applicability: All

River Bend: JU1, Other conditions exist which in the judgment of the emergency director warrant declaration of a NOUE

EAL #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. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The Emergency Director judgment EAL is taken out of the Hazard category and made an independent Judgment category in the RBS EALs based on human factors considerations. This was done to clarify to the Emergency Directors that this EAL may be used, as necessary, in all operating modes and categories. By including the discretionary EAL in the Hazards category only, the use of the EAL may be unclear and may be excluded if the Emergency Director is reviewing other categories.

The Emergency Director judgment EAL for the Fission Product Barrier category was left in the category since the FPB EAL applies to judgment on the status of the three barriers.

Deviations:

None

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #1

(Site-Specific) method indicates Seismic Event greater than Operating Basis Earthquake (OBE).

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #1

Valid indication of a Safe Shutdown Earthquake seismic event:

Receipt of annunciator "Seismic Event High/High" (P680-02A-B06)

AND

"Seismic Tape Recording System Start" (P680-02A-D06)

AND

Red light(s) on H13-P869 panel NBI-101 lit

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

The RBS EAL uses the Safe Shutdown Earthquake (SSE) to meet the intent of the EAL instead of the OBE. The NEI basis for the EAL is that seismic events of this magnitude can result in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. The SSE is the Design Bases Earthquake (DBE). The NEI bases of forces beyond design limits and assumed damage are beyond the conditions defined in a SSE. The definition of an SSE per 10CFR100 Appendix A(III)(d) is "that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. Those structures, systems and components are those necessary to assure (1) the integrity of the RCS boundary, (2) the capability to shutdown and maintain cold shutdown conditions, or (3) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part." The SSE meets the conditions of an Alert – events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure level.

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #2

Tornado or high winds greater than (site-specific) mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment or Control Room indication of degraded performance of those systems

- Reactor Building
- Intake Building
- Ultimate Heat Sink
- Refueling Water Storage Tank
- Diesel Generator Building
- Turbine Building
- Condensate Storage Tank
- Control Room
- Other (site-specific) Structures

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #2

Tornado striking (touching down) within the protected area boundary and resulting in visible damage to any of the plant structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The site specific EAL to address high winds is implemented in HA5 EAL # 7 to address hurricanes and high winds.

Deviations:

None

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #3

Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or control indication of degraded performance of those systems:

- Reactor Building
- Intake Building
- Ultimate Heat Sink
- Refueling Water Storage Tank
- Diesel Generator Building
- Turbine Building
- Condensate Storage Tank
- Control Room
- Other (Site-Specific) Structures.

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #3

Vehicle crash within protected area boundary and resulting in visible damage to any of the structures and/or equipment containing those systems or functions required for Safe Shutdown of the plant or Control Room indication of degraded performance of those systems.

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA2,

Example EAL #

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #4

Explosion within the protected area affecting the operability of plant safety systems required to establish or maintain safe shutdown

AND

Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment containing those systems or functions required for safe shutdown of the plant

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The Alert level NEI EAL HA2 is for fire and explosion. Explosion is implemented in the natural and destructive phenomena EAL #4 to be consistent with the Unusual Event EALs for fire and explosion.

Deviations:

None

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #4

Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas: (site-specific) list.

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #5

Turbine failure-generated missiles result in any visible damage to or penetration of any of the structures containing those systems or functions required for safe shutdown of the plant.

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #5

Uncontrolled flooding in (site-specific) areas of the plant that results in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #6

Uncontrolled flooding in Secondary Containment Table H1 area that result in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

Table H-1
AREA WATER LEVELS

Affected Location / Parameter	Maximum Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Pump Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR A Room 70'EL	4 inches above floor (40%) (P870-51A-G4 alarm)
RHR B Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RHR C Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
LPCS Room 70'EL	4 inches above floor. (40%) (P870-51A-G4 alarm)
RCIC Room 70'EL	4 inches above floor in. (40%) (P870-51A-G4 alarm)

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA1, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Example EAL #6

(Site-Specific) occurrences within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

Applicability: All

River Bend: HA5, Natural and destructive phenomena affecting the plant vital area

EAL #7

Hurricane or high sustained wind conditions ≥ 74 mph within protected area boundary and resulting in visible damage to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Main Steam Tunnel
Control Building	Tunnels B, D, E, F, and G
Diesel Generator Building	Condensate Storage Tank

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA2, FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

Example EAL #1

FIRE or EXPLOSION in any of the following (site-specific) areas:

(Site-specific) list

AND

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

Applicability: All

River Bend: HA3, Fire affecting the operability of plant safety systems required to establish or maintain safe shutdown

EAL #1

Fire in any system or structure containing functions or systems required for safe shutdown:

AND

Affected system parameter indications show degraded performance of a safety system or plant personnel report visible damage to permanent structures or equipment within the specified area.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

This EAL only applies to Fire. Explosion was separated from this EAL and included in River Bend HA5, EAL #4 to provide consistency with NEI HU1, Example EAL #4. See the following page.

Deviations:

None

NEI 99-01: HA2, FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

Example EAL #1

FIRE or EXPLOSION in any of the following (site-specific) areas:

(Site-specific) list

AND

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

Applicability: All

River Bend: HA5, Natural and Destructive Phenomena Affecting the Plant VITAL AREA

EAL #4

Explosion within the protected area affecting the operability of plant safety systems required to establish or maintain safe shutdown.

AND

Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment containing those systems or functions required for safe shutdown of the plant.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

Explosion was separated from NEI HA2 EAL and included in River Bend HA5, EAL #4 to provide consistency with NEI HU1, Example EAL #4 for explosion.

Deviations:

None

NEI 99-01: HA3, Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown

Example EAL #1

Report or detection of toxic gases within or contiguous to a VITAL AREA in concentrations that may result in an atmosphere Immediately Dangerous to Life and Health (IDLH)

Applicability: All

River Bend: HA4, Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of systems required to maintain safe operations or establish or maintain safe shutdown

EAL # 1

Report or detection of toxic gases within or contiguous to a vital area in concentrations that may result in an atmosphere immediately dangerous to life and health (IDLH)

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA3, Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown

Example EAL #2

Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or contiguous to a VITAL AREA

Applicability: All

River Bend: HA4, Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of systems required to establish or maintain safe shutdown

EAL # 2

Report or detection of gases in concentration greater than the lower flammability limit within or contiguous to a vital area

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA4, Confirmed Security Event in a Plant PROTECTED AREA.

Example EAL #1

INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE

Applicability: All

River Bend: HA1, Confirmed security event in a plant protected area

EAL #1

Intrusion into the plant protected area by a hostile force

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA4, Confirmed Security Event in a Plant PROTECTED AREA.

Example EAL #2

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

River Bend: HA1, Confirmed security event in a plant protected area

EAL #2

Other security events as determined from RBS Safeguards Contingency Plan and reported by the RBS security shift supervision

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

- None

NEI 99-01: HA5, Control Room Evacuation Has Been Initiated

Example EAL #1

Entry into (site-specific) procedure for control room evacuation

Applicability: All

River Bend: HA2, Control room evacuation has been initiated.

EAL #1

Entry into AOP-0031, SHUTDOWN FROM OUTSIDE THE MAIN CONTROL ROOM, and Control Room evacuation has been initiated

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HA6, Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert.

Example EAL #1

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

Applicability: All

River Bend: JA1, Conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert

EAL #1

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

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The Emergency Director judgment EAL is taken out of the Hazard category and made an independent Judgment category in the RBS EALs based on human factors considerations. This was done to clarify to the Emergency Directors that this EAL may be used, as necessary, in all operating modes and categories. By including the discretionary EAL in the Hazards category only, the use of the EAL may be unclear and may be excluded if the Emergency Director is reviewing other categories.

The Emergency Director judgment EAL for the Fission Product Barrier category was left in the category since the FPB EAL applies to judgment on the status of the three barriers

Deviations:

None

NEI 99-01: HS1, Confirmed Security Event in a Plant VITAL AREA

Example EAL #1

INTRUSION into the plant VITAL AREA by a HOSTILE FORCE

Applicability: All

River Bend: HS1, Confirmed security event in a plant Vital Area

EAL #1

Intrusion into the plant vital area by a hostile force

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HS1, Confirmed Security Event in a Plant VITAL AREA

Example EAL #2

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

River Bend: HS1, Confirmed Security Event in a Plant VITAL AREA

EAL #2

Other security events as determined from the RBS Safeguards Contingency Plan and reported by the RBS security shift supervision

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HS2, Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established

Example EAL #1

Control room evacuation has been initiated

AND

Control of the plant cannot be established per (site-specific) procedure within (site-specific) minutes.

Applicability: All

River Bend: HS2, Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established

EAL #1

Control room evacuation has been initiated

AND

Control of the plant from the Remote Shutdown Panels cannot be established per AOP-0031 procedure within 15 minutes.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HS3, Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of Site Area Emergency

Example EAL #1

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

Applicability: All

River Bend: JS1, Other conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency

EAL #1

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

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The Emergency Director judgment EAL is taken out of the Hazard category and made an independent Judgment category in the RBS EALs based on human factors considerations. This was done to clarify to the Emergency Directors that this EAL may be used, as necessary, in all operating modes and categories. By including the discretionary EAL in the Hazards category only, the use of the EAL may be unclear and may be excluded if the Emergency Director is reviewing other categories.

The Emergency Director judgment EAL for the Fission Product Barrier category was left in the category since the FPB EAL applies to judgment on the status of the three barriers

Deviations:

None

NEI 99-01: HG1, Security Event Resulting in Loss Of Physical Control of the Facility.

Example EAL #1

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

Applicability: All

River Bend: HG1, Security event resulting in loss of physical control of the facility

EAL #1

A hostile force has taken control of any of the following plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions:

Loss of physical control of the Control Room

OR

Loss of physical control of the Remote Shutdown Panel

OR

Loss of adequate core cooling or reactivity control capability

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

None

Deviations:

None

NEI 99-01: HG2, Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency.

Example EAL #1

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Applicability: All

River Bend: JG1, Other conditions exist which in the judgment of the Emergency Director warrant declaration of General Emergency

EAL #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. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Applicability: Operating Modes 1, 2, 3, 4, 5, Defueled

Differences:

The Emergency Director judgment EAL is taken out of the Hazard category and made an independent Judgment category in the RBS EALs based on human factors considerations. This was done to clarify to the Emergency Directors that this EAL may be used, as necessary, in all operating modes and categories. By including the discretionary EAL in the Hazards category only, the use of the EAL may be unclear and may be excluded if the Emergency Director is reviewing other categories.

The Emergency Director judgment EAL for the Fission Product Barrier category was left in the category since the FPB EAL applies to judgment on the status of the three barriers

Deviations:

None

System Malfunction

This section contains the correlation between NEI 99-01 and River Bend ICs and EALs in the System Malfunction Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding River Bend IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

NEI 99-01: SU1, Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes

Example EAL #1

Loss of power to (site specific) transformers for greater than 15 minutes

AND

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

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU1, Loss of all offsite power to essential busses for > 15 Minutes

EAL #1

1. Loss of power to RTX-XSR1C **and** RTX-XSR1D **and** RTX-XSR1E **and** RTX-XSR1F transformers for **>15 minutes**

Applicability: Operating Modes 1, 2, 3,

Differences:

It is implied in this EAL that one or more emergency diesel generators are operating to essential busses. The second part of the NEI 99-01 Example EAL "At least (site-specific) emergency generators are supplying power to emergency busses" is not required because loss of power to the indicated preferred station transformers for >15 minutes requires the declaration of at least an Unusual Event regardless of the condition to the emergency diesel generators.

Deviations:

None

NEI 99-01: SU2, Inability to Reach Required Shutdown Within Technical Specification Limits

Example EAL#1

Plant is not brought to required operating mode within (site specific) Technical Specifications LCO action statement time

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU7, Inability to reach required shutdown within technical specification time limits

EAL #1

Plant is not brought to required operating mode with technical specification LCO action statement time

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SU3, Unplanned Loss of Most or All Safety System Annunciation or Indication in The Control Room for Greater Than 15 Minutes

Example EAL #1

Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU3, Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

EAL #1

Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SU4, Fuel Clad Degradation

Example EAL #1 and EAL#2

1. (Site specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.

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

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU6, Fuel clad degradation

EAL #1 and #2

1. Offgas isolation due to valid Offgas Post Treatment monitor signal. (1H13-P601-22A-A03)

2. Reactor coolant sample activity >4 μCi/gm I-131 dose equivalent

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SU5, RCS Leakage

Example EAL #1 and #2

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

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU2, RCS leakage

EAL #1 and #2

1. Unidentified or pressure boundary leakage > 10 gpm
2. Identified leakage > 35 gpm

Applicability: Operating Modes 1, 2, 3

Differences:

The River Bend Technical Specification limit is 5 gpm for unidentified leakage and 30 gpm total leakage averaged over the previous 24 hours. NEI EAL is less than the allowable TS, therefore the RBS EAL value for EAL #2 is 35 gpm to be above allowable limits.

Deviations:

None

NEI 99-01: SU6, UNPLANNED Loss of All Onsite or Offsite Communications Capabilities

Example EAL #1 and #2

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

2. Loss of all (site specific) offsite communications capability.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SU5, Unplanned loss of all onsite or offsite communications capabilities

EAL #1 and #2

1. Unplanned loss of all onsite communication equipment:
   Plant radio system
   Plant paging system / Gaitronics
   Sound powered phones
   In-plant telephones
   Cell phones

2. Unplanned loss of all offsite communication equipment:
   ESP-COMM / Hotline
   All telephone lines (commercial and microwave)
   ENS
   HPN
   Cellular phones
   Satellite phones
   Radio

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SU8, Inadvertent Criticality

Example EAL #1 and #2

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

Applicability: Hot Shutdown

River Bend: SU4, Inadvertent criticality

EAL #1

1. An unplanned extended positive period observed on nuclear instrumentation.

Applicability: Operating Modes 3

Differences:

NEI EAL # 2 is not applicable to BWRs. River Bend does not have instrumentation for startup rate.

Deviations:

None

NEI 99-01: SA2, Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful.

Example EAL #1:

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

Applicability: Power Operation, Startup

River Bend: SA2, Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was successful.

EAL #1

Automatic scram failed to rapidly insert sufficient control rods to bring the reactor subcritical and a manual scram was successful.

Applicability: Operating Modes 1, 2

Differences:

Work "instrumentation" not included in RBS EAL

Deviations:

None

NEI 99-01: SA4, UNPLANNED Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a SIGNIFICANT TRANSIENT in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable.

Example EAL #1

Unplanned loss of most or all (site specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

AND

Either of the following (a or b)

a. A significant transient is in progress
   OR
b. Compensatory non-alarming indications are unavailable

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SA3, Unplanned loss of most or all safety system annunciation or indication in control room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are not available

EAL #1

Unplanned loss of most or all safety system annunciators or indications associated for > 15 minutes.

AND

Either:

a. A significant transient is in progress
   OR
b. Compensatory non-alarming indications are unavailable

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SA5, AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout.

Example EAL #1

AC power capability to site-specific essential busses reduced to a single power source for greater than 15 minutes.

AND

Any additional failure will result in station blackout.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SA1, AC power capability to essential busses reduced to a single power source for >15 minutes such that any additional single failure would result in station blackout.

EAL #1

Available onsite or offsite AC power to ENS-SWG1A and ENS-SWG1B busses reduced to a single power source or > 15 minutes

AND

Any additional single failure of the power source will result in a station blackout.

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SS1, Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses

Example EAL #1

Loss of power to (site specific) transformers.

AND

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

AND

Failure to restore power to at least one emergency bus within (site specific) minutes from the time of loss of both offsite and onsite AC power.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SS1, Loss of all offsite and onsite AC power to essential busses

EAL #1

Loss of all AC power to ENS-SWG1A and ENS-SWG1B busses

AND

Failure to restore power to either ENS-SWG1A or ENS-SWG1B bus within 15 minutes from the time of loss of both offsite and onsite AC power.

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SS2, Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful.

Example EAL #1

Indication(s) exist that automatic and manual scram were not successful.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SS3, Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful.

EAL #1

Automatic scram and manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical.

Applicability: Operating Modes 1, 2

Differences:

Added "to bring the reactor subcritical" to implement the NEI bases that this EAL applies to conditions where the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed.

Deviations:

None

NEI 99-01: SS3, Loss of All Vital DC Power

Example EAL #1

Loss of all vital DC power based on (site specific) bus voltage indications for greater than 15 minutes

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SS2, Loss of all vital DC power

EAL #1

ENB-SWG1A and ENB-SWG1B ≤ 105 VDC for > 15 minutes.

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SS4, Complete Loss of Heat Removal Capability

Example EAL #1

Heat capacity temperature limit curve exceeded (BWR).

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SS4, Complete loss of heat removal capability.

EAL #1

Inability to maintain Suppression Pool temperature with the EOP Heat Capacity Temperature Limit Safe Zone

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SS6, Inability to Monitor a SIGNIFICANT TRANSIENT in Progress

Example EAL #1

Loss of most or all (site specific) annunciators associated with safety systems

AND

Compensatory non-alarming indications are unavailable

AND

Indications needed to monitor (site specific) safety functions are unavailable

AND

SIGNIFICANT TRANSIENT in progress

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SS5, Inability to monitor a significant transient in progress

EAL #1

Unplanned loss of most or all control room annunciators associated with safety systems.

AND

Compensatory non-alarming indications for safety systems are not available.

AND

Indications needed to monitor criticality or core heat removal or fission product barrier status are not available.

AND

Significant transient in progress

Applicability: Operating Modes 1, 2, 3

Differences:

None

Deviations:

None

NEI 99-01: SG1, Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power to Essential Busses

Example EAL #1

Loss of power to (site specific) transformers

AND

Failure of (site specific) emergency diesel generators to supply power to emergency busses

AND

Either of the following: (a or b)

a. Restoration of at least one emergency bus within (site specific) hours is not likely

OR

b. (Site specific) Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

Applicability: Power Operation, Startup, Hot Shutdown

River Bend: SG1, Loss of all offsite and onsite AC power to essential busses for > 4 hours.

EAL #1

Loss of all AC power to ENS-SWG1A and ENS-SWG-1B

AND

Either:

a. Restoration of AC power to either ENS-SWG1A or ENS-SWG1B within 4 hours is not likely

OR

b. Conditions are imminent that a loss of two fission product barriers and loss or potential loss of the third (FG1) is expected to occur prior to restoration of AC power to either ENS-SWG1A or ENS-SWG1B.

Applicability: Operating Modes 1, 2, 3

Differences:

1. River Bend has a 4 hour Station Blackout coping analysis. NEI conditions loss of power to transformers and failure of the diesel generators are combined in the River

Bend EAL to read "Loss of all AC power to ENS-SWG1A and ENS-SWG-1B." This condition occurs on loss of power from both transformers and diesel generators.

Deviations:

None

NEI 99-01: SG2, Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

Example EAL #1

Indications exist that automatic and manual scram were not successful.

AND

Either of the following: (a or b)

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

OR

b. Indication(s) exists that heat removal is extremely challenged.

Applicability: Power Operation, Startup

River Bend: SG2, Failure of Reactor Protection System to complete an automatic reactor scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core

EAL #1

Indications exist that automatic and manual scrams did not bring the reactor subcritical

AND

Either:

a. RPV level cannot be restored and maintained > -186 inches

OR

b. Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone.

Applicability: Operating Modes 1, 2,

Differences:

None

Deviations:

None