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

RBG-47165
RBF1-11-0108

Subject: Proposed Emergency Action Levels Using NEI 99-01 Revision 5 Scheme
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

Reference: Letter from Christopher G. Miller (U.S. Nuclear Regulatory Commission) to
Alan Nelson (Nuclear Energy Institute) – “U.S. Nuclear Regulatory
Commission Review and Endorsement of NEI 99-01, Revision 5, dated
February 2008”, dated February 22, 2008 (ML080430535)

Dear Sir or Madam:

Pursuant to 10 CFR 50, Appendix E, Section IV.B(1), Entergy Operations Incorporated (Entergy) hereby requests NRC review and approval of the River Bend Station proposed revision to the Emergency Plan (EP) Emergency Action Levels (EALs). The proposed changes involve revisions to River Bend's currently approved EP EAL scheme which is based on Nuclear Energy Institute (NEI) 99-01, Revision 4, "Methodology for Development of Emergency Action Levels" guidance. Entergy is proposing to adopt the EAL scheme based on the guidance provided in NEI 99-01, Revision 5, which has been endorsed by the NRC (Reference 1).

In this submittal, Entergy uses two values for RC3 Loss 1.a and Table F2 for main steam tunnel temperature. The current value is 144°F; however, Entergy has submitted a Technical Specification change to the NRC in letter RBG-47146 dated 7/27/11 to change this value to 173°F. Further information is provided in Attachment 1, NEI 99-01 Revision 5 Deviation-Differences Document.

These changes have been reviewed by the Onsite Safety Review Committee and discussed with the applicable State of Louisiana and local government authorities.

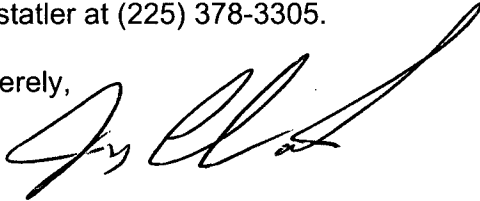
AX45
MLR

Upon NRC approval of the EAL change, the revision will be implemented no later than December 5, 2012. This implementation period will allow for flexibility in the schedule for operator training which will be conducted following annual exams.

This letter contains no new commitments.

If you have any questions or require additional information, please contact Kristi Huffstatler at (225) 378-3305.

Sincerely,

A handwritten signature in black ink, appearing to be 'JAC/krh', written over a horizontal line.

JAC/krh

- Attachments:
1. NEI 99-01 Revision 5 Deviation-Differences Document
 2. Proposed Technical Basis Document (Markup)
 3. Proposed Technical Basis Document (Clean)
 4. Proposed EAL Matrix Chart and Review Table (For Information)
 5. Supporting Referenced Document Pages

Submittal of Emergency Implementing Procedure
RBG-47165
RBF1-11-0108
Page 3 of 3

cc: Mr. Elmo E. Collins, Jr.
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NRC Senior Resident Inspector
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Mr. Alan Wang, Project Manager
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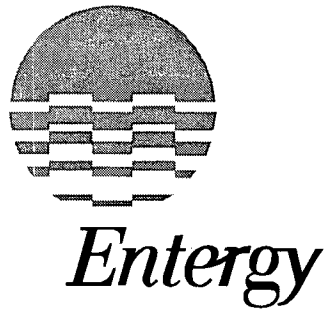
Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
JiYoung Wiley
P. O. Box 4312
Baton Rouge, LA 70821-4312

Attachment 1

To

RBG-47165

NEI 99-01 Revision 5 Deviation-Differences Document



**RIVERBEND NUCLEAR STATION (RBS)
DEVIATIONS AND DIFFERENCES
FROM
NEI 99-01, REV 5
EMERGENCY ACTION LEVELS**

Introduction

This document presents the RBS site-specific deviations and differences from the NEI 99-01, Revision 5 Emergency Action Levels (EALs).

RBS used the following definitions from Supplements 1 and 2 to RIS 2003-18 when determining the categorization of differences between the NEI 99-01, Revision 5 Initiating Conditions (ICs) and Example EALs and the proposed RBS ICs and EALs:

Deviation: An EAL change where the basis scheme guidance (NUREG, NUMARC, NEI) differs in wording and is altered in meaning or intent, such that the classification of the event could be different between the basis scheme guidance and the site-specific proposed EAL. Examples of deviations include the use of altered mode applicability, altering key words or time limits, or changing words of physical reference (protected area, safety-related equipment, etc.).

There are no deviations in the RBS proposed EAL scheme.

Difference: A difference is an EAL change where the basis scheme guidance differs in wording but agrees in meaning and intent, such that classification of an event would be the same, whether using the basis scheme guidance or the site-specific proposed EAL. Examples of differences include the use of site-specific terminology or administrative re-formatting of site-specific EALs.

Administrative changes that do not actually change the text are neither differences nor deviations. Likewise, any format change that does not alter the wording of the IC or EAL is considered neither a difference nor a deviation.

RBS uses formatting such as ALL CAPS, **bold** and underline to aid the user in applying these EALs; particularly to set apart units, time frames or quality of a value or data (such as the term "valid"). Such formatting is neither a deviation nor a difference in accordance with the definitions provided above because it does not alter the wording of the IC or EAL.

RBS NEI Revision 5 EAL Deviation-Differences Document

The following differences are generic in nature and apply throughout the proposed RBS EALs:

1. In general, NEI 99-01, Revision 5 bases developer notes are not included in the RBS bases, but were used in their development. NEI 99-01, Revision 5 developer note basis information was selectively provided in the RBS bases where it was viewed that the developer notes would provide useful training information or aid the decision maker in evaluating the event. In some cases, these developer notes are reworded from the NEI 99-01 EALs, but the intent is retained.
2. Formatting choices may also involve minor grammatical differences between the RBS EALs and NEI 99-01 such as "that exceeds" vice "exceeding", use of "If, then" statements for conditional statements, or the use of symbols (>, <). Such formatting differences between the RBS EALs and NEI 99-01 will not be noted in this document as differences or deviations when they represent format choices alone and do not change the intent or materially change the content of NEI 99-01 Initiating Conditions or EALs.
3. At RBS, the emergency classification of Notification of Unusual Event is indicated by "Notification of Unusual Event," "NOUE" or "Unusual Event."
4. At RBS, all Radiological Effluent Technical Specifications are included in the ODCM, thus "ODCM" is used in place of references to Radiological Effluent Technical Specifications.
5. RBS does not always use the term "RCS/RPV" in the Cold Shutdown EALs. In general, the term "RCS" is used alone except when referring to a specific component of the RPV (i.e., flange).
6. "Safeguards Contingency Plan" is the term used to encompass all security plans/documents.
7. In the Fission Product Barrier EALs, the EAL numbers are preceded by "FC" for the Fuel Clad barrier EALs, "RC" for the RCS barrier EALs and "PC" for the Containment barrier EALs.
8. The term "threshold" is not used in every case as it is used in NEI 99-01. Replacement terms such as "EAL" or "EAL threshold" are used as necessary based on context.

NEI 99-01: AU1

Any release of gaseous or liquid radioactivity to the environment greater than 2 times the Radiological Effluent Technical Specifications/ODCM for 60 minutes or longer.

Operating Mode Applicability: All

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

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

1. VALID reading on **ANY** of the following radiation monitors greater than the reading shown for 60 minutes or longer:

(site specific monitor list and threshold values)

2. VALID reading on any effluent monitor reading greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.
3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates greater than 2 times (site specific RETS values) for 60 minutes or longer.
4. VALID reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal* background for 60 minutes or longer. [for sites having telemetered perimeter monitors]
5. VALID indication on automatic real-time dose assessment capability indicating greater than (site-specific value) for 60 minutes or longer. [for sites having such capability]

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

RBS: AU1

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes.

Table R1 EAL THRESHOLD			
Method		NOUE DRMS Grid 6 Threshold	
Main Plant Vent	Primary	4GE125	3.06E+05 $\mu\text{Ci/sec}$
	Secondary	1GE126	5.26E-03 $\mu\text{Ci/ml}$
Fuel Building Vent	Primary	4GE005	2.19E+04 $\mu\text{Ci/sec}$
	Secondary	5GE005	4.65E-03 $\mu\text{Ci/ml}$
Radwaste Building Vent	Primary	4GE006	2.58E+04 $\mu\text{Ci/sec}$
	Secondary	5GE006	6.84E-04 $\mu\text{Ci/ml}$

RBS: AU1 (Cont'd)

Deviations:

None

Differences:

RBS uses a table to list the applicable radiation monitors and threshold values for EAL #1, referencing the values to the classification level, creating a minor difference in EAL language.

RBS differs from NEI 99-01 Revision 5 in the description for EAL #2 and the associated bases. Discharge permits are normally written for liquid radioactive releases. RBS does not have a normal gaseous release path that requires a batch discharge permit. Therefore, the EAL is specific to the liquid release pathway monitored by RMS-IRE107.

The second (superfluous) "reading" is deleted in the RBS EAL #2.

NEI 99-01 Revision 5 AU1 EAL #4 is not included in the RBS proposed EAL scheme. RBS does not have a telemetered perimeter radiation monitoring system. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having telemetered perimeter monitors," therefore not applicable to RBS.

NEI 99-01 Revision 5 AU1 EAL #5 is not included in the RBS proposed EAL scheme. RBS does not have an automatic real-time dose assessment capability. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having such capability," therefore not applicable to RBS.

RBS provides parenthetical reference to the ODCM in the 3rd paragraph of the bases.

RBS provides additional information in the bases regarding "non-routine" releases and the protocol for the use of the radiation monitors in RBS Table R1.

NEI 99-01: AU2

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by (site specific level or indication).

AND

- b. VALID Area Radiation Monitor reading rise on (site specific list).
2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels.

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

RBS: AU2

UNPLANNED rise in plant radiation levels

Operating Mode Applicability: All

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

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:
 - Water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal indication on Control Room Panel 870
 - Personnel observation by visual or remote means

AND

- b. UNPLANNED VALID area radiation monitor alarm on any of the following:

RMS-RE140
RMS-RE141
RMS-RE192
RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

NOTE: For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.

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

Deviations:

None

RBS: AU2 (Cont'd)

Differences:

RBS adds the term "UNPLANNED" to EAL 1.b. This maintains the NEI intent as expressed in the IC and EAL 1.a.

RBS uses an alarm to indicate a rise in radiation monitor readings in EAL 1.b because of monitor location and sensitivity.

A note is added to EAL #2 to address the condition where 1,000 times normal levels may provide a value beyond the upper range of the applicable area radiation monitor.

RBS provides the radiation monitor locations in the bases information.

NEI 99-01: AA1

Any release of gaseous or liquid radioactivity to the environment greater than 200 times the Radiological Effluent Technical Specifications/ODCM for 15 minutes or longer.

Operating Mode Applicability: All

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

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

1. VALID reading on **ANY** of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site specific monitor list and threshold values)
2. VALID reading on any effluent monitor reading greater than 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer.
3. Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates greater than 200 times (site specific RETS values) for 15 minutes or longer.
4. VALID reading on perimeter radiation monitoring system reading greater than 10.0 mR/hr above normal* background for 15 minutes or longer. [for sites having telemetered perimeter monitors]
5. VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 15 minutes or longer. [for sites having such capability]

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

RBS: AA1

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 > the ALERT reading for ≥ 15 minutes

OR

2. For RMS-RE107 effluent monitor:

EITHER

VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes

OR

VALID reading > $1.27\text{E-}01 \mu\text{Ci/ml}$ for ≥ 15 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes

Table R1 EAL THRESHOLD			
Method		ALERT DRMS Grid 6 Threshold	
Main Plant Vent	Primary	4GE125	$3.06\text{E}+07 \mu\text{Ci/sec}$
	Secondary	1GE126	$2.82\text{E-}01 \mu\text{Ci/ml}$
Fuel Building Vent	Primary	4GE005	$2.19\text{E}+06 \mu\text{Ci/sec}$
	Secondary	5GE005	$2.82\text{E-}01 \mu\text{Ci/ml}$
Radwaste Building Vent	Primary	4GE006	$2.58\text{E}+06 \mu\text{Ci/sec}$
	Secondary	5GE006	$6.84\text{E-}02 \mu\text{Ci/ml}$

Deviations:

None

Differences:

RBS uses a table to list the applicable radiation monitors and threshold values, referencing the values to the classification level, creating a minor difference in EAL language.

RBS differs from NEI 99-01 Revision 5 in the description for EAL #2 and the associated bases. Discharge permits are normally written for liquid radioactive releases. RBS does not have a normal gaseous release path that requires a batch discharge permit. Therefore, the EAL is specific to the liquid release pathway monitored by RMS-RE107.

The second (superfluous) "reading" is deleted in the RBS EAL #2.

EAL #2 and its associated basis information are revised to provide site specific information for effluent monitor RMS-RE107 that may not be capable of providing values within the monitor's calibrated range at or above the 200 multiple for an alarm setpoint established by a radioactivity discharge permit.

NEI 99-01 Revision 5 AA1 EAL #4 is not included in the RBS proposed EAL scheme. RBS does not have a telemetered perimeter radiation monitoring system. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having telemetered perimeter monitors," therefore not applicable to RBS.

NEI 99-01 Revision 5 AA1 EAL #5 is not included in the RBS proposed EAL scheme. RBS does not have an automatic real-time dose assessment capability. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having such capability," therefore not applicable to RBS.

RBS provides additional information in the bases regarding "non-routine" releases and the protocol for the use of the radiation monitors in RBS Table R1.

NEI 99-01: AA2

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

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered.
2. A VALID alarm or (site specific elevated reading) on **ANY** of the following due to damage to irradiated fuel or loss of water level.

(site specific radiation monitors)

RBS: AA2

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

Operating Mode Applicability: All

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

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

OR

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:

RMS-RE140 2000 mR/hr
RMS-RE141 2000 mR/hr
RMS-RE192 2000 mR/hr
RMS-RE193 2000 mR/hr
RMS-RE5A $1.64\text{E}+03 \mu\text{Ci/sec}$
RMS-RE5B (GE) $5.29\text{E}-04 \mu\text{Ci/ml}$

Deviations:

None

Differences:

RBS provides the radiation monitor locations in the bases information.

RBS provides clarifying information in the bases regarding AOP entry and stored control rod blades.

NEI 99-01: AA3

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

Operating Mode Applicability: All

Example Emergency Action Levels:

1. Dose rate greater than 15 mR/hr in **ANY** of the following areas requiring continuous occupancy to maintain plant safety functions:

(site specific area list)

RBS: AA3

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Operating Mode Applicability: All

Emergency Action Level(s):

1. Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:

Main Control Room
CAS

Deviations:

None.

Differences:

RBS provides information in the bases regarding RP survey activities and the Control Room area radiation monitor when rising radiation levels are detected outside the RCA.

NEI 99-01: AS1

Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mrem TEDE or 500 mrem Thyroid CDE for the actual or projected duration of the release.

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on **ANY** of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site specific monitor list and threshold values)
2. Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the site boundary.
3. VALID perimeter radiation monitoring system reading greater than 100 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]
4. Field survey results indicate closed window dose rates greater than 100 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation, at or beyond the site boundary.

RBS: AS1

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

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD			
Method		SITE AREA EMERGENCY DRMS Grid 6 Threshold	
Main Plant Vent	Primary	4GE125	4.70E+07 μ Ci/sec
	Secondary	N/A	
Fuel Building Vent	Primary	4GE005	6.70E+06 μ Ci/sec
	Secondary	N/A	
Radwaste Building Vent		N/A	

RBS: AS1 (Cont'd)

Deviations:

None

Differences:

The references to dose assessment and plant monitoring data are replaced in the EAL section NOTE with the corresponding specific EAL numbers. This change is provided for ease of use only and does not change the intent of the NOTE.

RBS uses a table to list the applicable radiation monitors and threshold values, referencing the values to the classification level, creating a minor difference in EAL language.

NEI 99-01 Revision 5 AS1 EAL #3 is not included in the RBS proposed EAL scheme. RBS does not have a telemetered perimeter radiation monitoring system. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having telemetered perimeter monitors," therefore not applicable to RBS.

NEI 99-01: AG1

Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mrem TEDE or 5000 mrem Thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.

1. VALID reading on **ANY** of the following radiation monitors greater than the reading shown for 15 minutes or longer:

(site specific monitor list and threshold values)
2. Dose assessment using actual meteorology indicates doses greater than 1000 mrem TEDE or 5000 mrem thyroid CDE at or beyond the site boundary.
3. VALID perimeter radiation monitoring system reading greater than 1000 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]
4. Field survey results indicate closed window dose rates greater than 1000 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 5000 mrem for one hour of inhalation, at or beyond site boundary.

RBS: AG1

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD		
Method		GENERAL EMERGENCY DRMS Grid 6 Threshold
Main Plant Vent	Primary Secondary	4GE125 4.70E+08 $\mu\text{Ci/sec}$ N/A
Fuel Building Vent	Primary Secondary	4GE005 6.70E+07 $\mu\text{Ci/sec}$ N/A
Radwaste Building Vent		N/A

Deviations:

None

RBS: AG1 (Cont'd)

Differences:

The references to dose assessment and plant monitoring data are replaced with the corresponding specific EAL numbers in the EAL section NOTE. This change is provided for ease of use only and does not change the intent of the NOTE.

RBS uses a table to list the applicable radiation monitors and threshold values, referencing the values to the classification level, creating a minor difference in EAL language.

NEI 99-01 Revision 5 AG1 EAL #3 is not included in the RBS proposed EAL scheme. RBS does not have a telemetered perimeter radiation monitoring system. This is an acceptable difference under NEI 99-01 because the document indicates this EAL is applicable "for sites having telemetered perimeter monitors," therefore not applicable to RBS.

NEI 99-01: CU1

RCS leakage.

Operating Mode Applicability: Cold Shutdown

Example Emergency Action Levels:

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

1. RCS leakage results in the inability to maintain or restore RPV level greater than (site specific low level RPS actuation setpoint) for 15 minutes or longer. [*BWR*]
1. RCS leakage results in the inability to maintain or restore level within (site specific pressurizer or RCS/RPV level target band) for 15 minutes or longer. [*PWR*]

RBS: CU1

RCS leakage

Operating Mode Applicability:

Cold Shutdown (Mode 4)

Emergency Action Level(s):

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

1. RCS leakage results in the inability to maintain or restore RPV level $> +9.7$ inches (Level 3) for ≥ 15 minutes

Deviations

None

Differences

None other than previously noted.

NEI 99-01: CU2

UNPLANNED loss of RCS/RPV inventory.

Operating Mode Applicability: Refueling

Example Emergency Action Levels: (1 or 2)

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

1. UNPLANNED RCS/RPV level drop as indicated by either of the following:

- RCS/RPV water level drop below the RPV flange for 15 minutes or longer when the RCS/RPV level band is established above the RPV flange.
- RCS/RPV water level drop below the RCS level band for 15 minutes or longer when the RCS/RPV level band is established below the RPV flange.

2. RCS/RPV level cannot be monitored with a loss of RCS/RPV inventory as indicated by an unexplained level rise in (site specific sump or tank).

RBS: CU2

UNPLANNED loss of RCS/RPV inventory

Operating Mode Applicability: Refueling (Mode 5)

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

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

1. UNPLANNED RCS level drop as indicated by either of the following:
 - a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange.
 - OR**
 - b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange
- OR**
2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Deviations:

None

Differences:

None other than previously noted.

NEI 99-01: CU4

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

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Levels: (1 or 2)

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

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

RBS: CU3

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

Operating Mode Applicability: Cold Shutdown (Mode 4)
Refueling (Mode 5)

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

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

1. UNPLANNED event results in RCS temperature exceeding 200 °F.

OR

2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes.

Deviations:

None

Differences:

RBS substitutes the actual value for Cold Shutdown temperature limit in EAL #1.

NEI 99-01 **CU4** is renumbered to RBS **CU3** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: CU3

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level:

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

1. a. AC power capability to (site specific emergency busses) reduced to a single power source for 15 minutes or longer.

AND

-
- b. Any additional single power source failure will result in station blackout.

RBS: CU5

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

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)

Emergency Action Level(s):

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

1. a. AC power capability to Div I & Div II ENS busses reduced to a single power source for ≥ 15 minutes

AND

- b. Any additional single power source failure will result in station blackout

Deviations:

None

Differences:

NEI 99-01 **CU3** is renumbered to RBS **CU5** for formatting purposes based on site preference for order of ICs alone.

RBS provides site specific information in the bases for preferred transformers.

RBS provides additional clarifying information in the bases for applicable loss of power conditions similar to that provided in NEI SA5.

RBS provides site specific information in the bases for the Div III Diesel Generator and Bus E22-S004 and how they are not to be credited for EAL entry.

NEI 99-01: CU7

Loss of required DC power for 15 minutes or longer.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level:

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

1. Less than (site specific bus voltage indication) on required (site specific Vital DC busses) for 15 minutes or longer.

RBS: CU6

Loss of required DC power for ≥ 15 minutes

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)

Emergency Action Level(s):

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

1. < 105 VDC on required Vital DC busses for ≥ 15 minutes

Deviations:

None

Differences:

NEI 99-01 **CU7** is renumbered to RBS **CU6** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: CU8

Inadvertent criticality.

Operating Mode Applicability:

Cold Shutdown, Refueling

Example Emergency Action Levels:

1. UNPLANNED sustained positive period observed on nuclear instrumentation.
(BWR)
1. UNPLANNED sustained positive startup rate observed on nuclear
instrumentation. (PWR)

RBS: CU7

Inadvertent criticality

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Deviations:

None

Differences:

NEI 99-01 **CU8** is renumbered to RBS **CU7** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: CU6

Loss of all On-site or Off-site communications capabilities.

Operating Mode Applicability: Cold Shutdown
Refueling
Defueled

Example Emergency Action Levels: (1 or 2)

1. Loss of all of the following on-site communication methods affecting the ability to perform routine operations:

(site specific list of communications methods)

2. Loss of all of the following off-site communication methods affecting the ability to perform offsite notifications:

(site specific list of communications methods)

RBS: CU8

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability: Cold Shutdown (Mode 4)
Refueling (Mode 5)
Defueled (Mode D)

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

1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations:

- Plant radio system
- Plant paging system
- Sound powered phones
- In-plant telephones

OR

2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications:

- All telephones
- NRC phones
- State of Louisiana Radio
- Offsite notification system and hotline

Deviations:

None

Differences:

NEI 99-01 **CU6** is renumbered to RBS **CU8** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: CA1

Loss of RCS/RPV inventory.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Levels: (1 or 2)

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

1. Loss of RCS/RPV inventory as indicated by level less than (site specific level).

[Low-Low ECCS actuation setpoint / Level 2 (BWR)]

[Bottom ID of the RCS loop (PWR)]

2. RCS/RPV level cannot be monitored for 15 minutes or longer with a loss of RCS/RPV inventory as indicated by an unexplained level rise in (site specific sump or tank).

RBS: CA1

Loss of RCS/RPV inventory

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)

Emergency Action Level(s):

(1 or 2)

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

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Deviations:

None

Differences:

RBS uses the term "UNPLANNED" in EAL #1. This does not change the NEI intent as the term "loss" implies that the reduction in RCS inventory is unplanned.

RBS includes vessel make-up rate and the observation of leakage or inventory loss as indications other than "level rise in site specific sump or tank" for loss of RCS inventory in EAL #2.

RBS adds information in the bases to further emphasize that the EALs are not applicable when the reactor is defueled.

NEI 99-01: CA4

Inability to maintain plant in cold shutdown.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Levels: (1 or 2)

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

Table: RCS Reheat Duration Thresholds		
RCS	Containment Closure	Duration
Intact (but not RCS Reduced Inventory [PWR])	N/A	60 minutes*
Not intact or RCS Reduced Inventory (PWR)	Established	20 minutes*
	Not Established	0 minutes
* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.		

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

RBS: CA3

Inability to maintain plant in Cold Shutdown

Operating Mode Applicability: Cold Shutdown (Mode 4)
Refueling (Mode 5)

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

1. An UNPLANNED event results in RCS temperature > 200 °F for > the specified duration in Table C2

OR

2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling

Table C2: RCS Reheat Duration Thresholds		
RCS	Containment Closure	Duration
Intact	N/A	60 minutes*
Not intact	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then the EAL is not applicable.		

Deviations:

None

Differences:

NEI 99-01 **CA4** is renumbered to RBS **CA3** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: CA3

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability: Cold Shutdown, Refueling, Defueled

Example Emergency Action Level:

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

1. Loss of all Off-Site and all On-Site AC Power to (site specific emergency busses) for 15 minutes or longer.

RBS: CA5

Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)
Defueled (Mode D)

Emergency Action Level(s):

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

1. Loss of all offsite and all on-site AC power to Div I & Div II ENS busses for ≥ 15 minutes

Deviations:

None

Differences:

NEI 99-01 **CA3** is renumbered to RBS **CA5** for formatting purposes based on site preference for order of ICs alone.

RBS provides site specific information in the bases for preferred transformers.

RBS provides additional bases information for the condition where power to the bus may be restored, but necessary loads are not functional on the energized bus.

NEI 99-01: CS1

Loss of RCS/RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability: Cold Shutdown, Refueling

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

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

1. With CONTAINMENT CLOSURE not established, RCS/RPV level less than (site specific level).

[6" below the bottom ID of the RCS loop (PWR)]

[6" below the low-low ECCS actuation setpoint (BWR)]

OR

2. With CONTAINMENT CLOSURE established, RCS/RPV level less than (site specific level for TOAF).

OR

3. RCS/RPV level cannot be monitored for 30 minutes or longer with a loss of RCS/RPV inventory as indicated by **ANY** of the following:

- (Site specific radiation monitor) reading greater than (site specific value).
- Erratic Source Range Monitor Indication.
- Unexplained level rise in (site specific sump or tank).

RBS: CS1

Loss of RCS/RPV inventory affecting core decay heat removal capability

Operating Mode Applicability: Cold Shutdown (Mode 4)
Refueling (Mode 5)

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

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

1. With CONTAINMENT CLOSURE not established, RPV level < -49 inches

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:

- RMS-RE16 reading > 100 R/hr
- Erratic Source Range Monitor indication
- Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Deviations:

None

Differences:

RBS includes vessel make-up rate and the observation of leakage or inventory loss as indications other than "level rise in site specific sump or tank" for loss of RCS inventory in EAL #3.

RBS adds information in the bases to further emphasize that the EALs are not applicable when the reactor is defueled.

NEI 99-01: CG1

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

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level: (1 or 2)

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

1. a. RCS/RPV level less than (site specific level for TOAF) for 30 minutes or longer.

AND

- b. **ANY** containment challenge indication (see Table):

2. a. RCS/RPV level cannot be monitored with core uncover indicated by **ANY** of the following for 30 minutes or longer.

- (Site specific radiation monitor) reading greater than (site specific setpoint).
- Erratic source range monitor indication
- UNPLANNED level rise in (site specific sump or tank).
- *[Other site specific indications]*

AND

- b. **ANY** containment challenge indication (see Table):

Table: Containment Challenge Indications
<ul style="list-style-type: none"> • CONTAINMENT CLOSURE not established. • (Site specific explosive mixture) inside containment. • UNPLANNED rise in containment pressure. • Secondary containment radiation monitor reading above (site specific value). <i>[BWR only]</i>

RBS: CG1

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

Operating Mode Applicability:

Cold Shutdown (Mode 4)
Refueling (Mode 5)

Emergency Action Level(s):

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

1. a. RPV level < - 162 inches (TAF) for ≥ 30 minutes

AND

- b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncover indicated by any of the following for ≥ 30 minutes:
 - RMS-RE16 reading > 100 R/hr
 - Erratic Source Range Monitor indication
 - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

AND

- b. Any containment challenge indication in Table C1

RBS: CG1 (Cont'd)

Table C1		
Containment Challenge Indications		
<ul style="list-style-type: none"> • CONTAINMENT CLOSURE <u>not</u> established • Explosive mixture inside containment • UNPLANNED rise in containment pressure • Secondary containment area radiation monitor above EOP Max Safe Operating Value below: 		
Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

Deviations:

None

Differences:

RBS includes vessel make-up rate and the observation of leakage or inventory loss as indications other than "level rise in site specific sump or tank" for loss of RCS inventory in EAL #2.

RBS includes reference to the EOP Max Safe Operating Value for area radiation monitor readings in the EAL containment challenge indications table. This is consistent with the associated developer note provided in the NEI document.

RBS uses the term "unexplained" instead of "UNPLANNED" for the level rise indication in the 3rd bullet of EAL 2.a. This is the same term used by NEI 99-01 for the SAE condition. If level rise cannot be explained, then it encompasses the term "UNPLANNED" and therefore meets the NEI intent.

RBS adds information in the bases to further emphasize that the EALs are not applicable when the reactor is defueled.

NEI 99-01: E-HU1

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability: Not applicable

Example Emergency Action Level:

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

RBS: E-HU1

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability: All

Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY

Deviations:

None

Differences:

RBS uses an operating mode applicability of "all" vice the NEI designation of "N/A." The net effect is that this event is applicable regardless of operating mode, therefore the same as the NEI intent.

NEI 99-01: FU1

ANY Loss or ANY Potential Loss of Containment

Operating Mode Applicability:

Power Operations
Startup
Hot Standby
Hot Shutdown

RBS: FU1

ANY loss or ANY potential loss of containment

Operating Mode Applicability:

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

Emergency Action Level(s):

1. Any loss or any potential loss of containment

Deviations:

None

Differences:

RBS adds EAL descriptions in some documentation (e.g., matrix user aid) for the barrier status for consistency in format.

NEI 99-01: FA1

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS

Operating Mode Applicability:

Power Operations
Startup
Hot Standby
Hot Shutdown

RBS: FA1

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

Operating Mode Applicability:

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

Emergency Action Level(s):

1. Any loss or any potential loss of fuel clad

OR

Any loss or any potential loss of RCS

Deviations:

None

Differences:

RBS adds EAL descriptions in some documentation (e.g., matrix user aid) for the barrier status for consistency in format.

NEI 99-01: FS1

Loss or Potential Loss of ANY Two Barriers

Operating Mode Applicability:

Power Operations
Startup
Hot Standby
Hot Shutdown

RBS: FS1

Loss or potential loss of ANY two barriers

Operating Mode Applicability:

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

Emergency Action Level(s):

1. Loss or potential loss of any two barriers

Deviations:

None

Differences:

RBS adds EAL descriptions in some documentation (e.g., matrix user aid) for the barrier status for consistency in format.

NEI 99-01: FG1

Loss of ANY Two Barriers AND Loss or Potential Loss of the third barrier

Operating Mode Applicability:

Power Operations
Startup
Hot Standby
Hot Shutdown

RBS: FG1

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

Operating Mode Applicability:

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

Emergency Action Level(s):

1. Loss of any two barriers

AND

Loss or potential loss of the third barrier

Deviations:

None

Differences:

RBS adds EAL descriptions and relevant bases information for the barrier status for consistency in format.

NEI 99-01: FUEL CLAD BARRIER

<u>Fuel Clad Barrier Thresholds</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<u>1. Primary Coolant Activity Level</u>	
A. Primary coolant activity greater than (site specific value).	Not Applicable
OR	
<u>2. Reactor Vessel Water Level</u>	
A. RPV water level cannot be restored and maintained above (site specific RPV water level corresponding to the requirement for primary containment flooding).	A. RPV water level cannot be restored and maintained above (site specific RPV water level corresponding to the top of active fuel) or cannot be determined.
OR	
<u>3. Not Applicable</u>	
Not Applicable	Not Applicable
OR	
<u>4. Primary Containment Radiation Monitoring</u>	
A. Primary containment radiation monitor reading greater than (site specific value).	Not Applicable
OR	
<u>5. Other Site Specific Indications</u>	
A. (site specific) as applicable.	A. (site specific) as applicable.
OR	
<u>8. Emergency Director Judgment</u>	
A. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.

RBS: FUEL CLAD BARRIER

Fuel Clad Barrier EAL Thresholds	
LOSS	POTENTIAL LOSS
1. Primary Coolant Activity Level (FC1)	
Coolant activity > 300 $\mu\text{Ci/gm}$ dose equivalent I-131	None
2. Reactor Vessel Water Level (FC2)	
RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches or cannot be determined
3. Primary Containment Radiation Monitors (FC3)	
Containment radiation monitor RMS-RE16 reading > 3,000 R/hr	None
4. Emergency Director Judgment (FC4)	
Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier.	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier.

Deviations:

None

Differences:

Reactor Vessel Water Level Category:

RBS provides additional bases information for both the loss and potential loss thresholds to describe the RPV level used for the EAL threshold and associated corrective actions for EAL threshold #2.

Primary Containment Radiation Monitoring Category:

RBS changes the NEI title of "Primary Containment Radiation Monitoring" to "Primary Containment Radiation Monitors" – a minor difference in terminology.

RBS: FUEL CLAD BARRIER (Cont'd)

Differences (Cont'd):

Other Site Specific Indications Category:

Additional EALs that represent a loss or potential loss of the Fuel Clad barrier were not identified for inclusion in the EAL scheme for this IC. A review of Emergency Operating Procedures and station procedures was performed to ensure additional EAL thresholds should not be considered in the "Other" category. This conforms to NEI guidance because an appropriately diverse mix of EALs is provided and the NEI 99-01 guidance does not specify that any particular additional EALs be provided, but specifies "as applicable."

NEI 99-01: RCS BARRIER

<u>RCS Barrier Example Thresholds</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<u>1. Primary Containment Pressure</u>	
A. Primary containment pressure greater than (site specific value) due to RCS leakage.	Not Applicable
OR	
<u>2. Reactor Vessel Water Level</u>	
A. RPV water level cannot be restored and maintained above (site specific RPV water level corresponding to the top of active fuel) or cannot be determined.	Not Applicable
OR	
<u>3. RCS Leak Rate</u>	
A. (site specific indication of an UNISOLABLE Main Steamline, HPCI, Feedwater, RWCU, or RCIC break) OR B. Emergency RPV Depressurization is required.	A. RCS leakage greater than 50 gpm inside the drywell. OR B. UNISOLABLE primary system leakage outside primary containment as indicated by exceeding EITHER of the following: a. Max Normal Operating Temperature. OR b. Max Normal Area Radiation.
OR	
<u>4. Primary Containment Radiation Monitoring</u>	
A. Primary containment radiation monitor reading greater than (site specific value)	Not Applicable
OR	
<u>5. Other Site Specific Indications</u>	
A. (site specific) as applicable.	A. (site specific) as applicable.
OR	
<u>6. Emergency Director Judgment</u>	
A. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.

RBS: RCS BARRIER

RCS Barrier EAL Thresholds	
LOSS	POTENTIAL LOSS
<u>1. Drywell Pressure (RC1)</u>	
Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell	None
<u>2. Reactor Vessel Water Level (RC2)</u>	
RPV water level cannot be restored and maintained above -162 inches or cannot be determined	None
<u>3. RCS Leak Rate (RC3)</u>	
1. a. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close <u>AND</u> High MSL flow annunciator (P601-19A-A2) <u>AND</u> Main Steam Tunnel Temperature > 144°F [173°F NRC TS submittal change] <u>OR</u> b. Indication of an UNISOLABLE HPCS, feedwater, RWCU or RCIC break <u>OR</u> 2. Emergency RPV depressurization is required	1. RCS leakage > 50 gpm inside the drywell <u>OR</u> 2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Normal Operating Temperature (Table F2) <u>OR</u> b. Max Normal Area Radiation (Table F2)
<u>4. Drywell Radiation (RC4)</u>	
Drywell radiation monitor RMS-RE20 reading > 100 R/hr due to reactor coolant leakage	None
<u>5. Emergency Director Judgment (RC5)</u>	
Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier.	Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier.

Deviations:

None

RBS: RCS BARRIER (Cont'd)

Differences:

Primary Containment Pressure Category:

RBS uses drywell pressure for the EAL threshold indication and renames the parameter as "drywell pressure." This is consistent with the NEI basis that indicates use of the drywell high pressure setpoint for this threshold/parameter. RBS also changes "...due to RCS leakage" in the EAL threshold to "...with indications of reactor coolant leak in drywell."

RBS adds information in the bases that excludes the applicability of certain causes for the rise in drywell pressure.

RCS Leak Rate Category:

RBS breaks the first loss EAL threshold into two thresholds – one for MSL break and one for other high energy line breaks such as feedwater, RWCU, etc. The NEI intent is retained. RBS also changes the NEI term "HPCI" to the site specific term "HPCS" for the same system.

RBS provides two values for Main Steam Line Tunnel Max Normal temperature. The first value of 144°F reflects the existing Technical Specification information. RBS has requested NRC approval in RBS letter RBG-47146 dated 7/26/11 for a Technical Specification revision to change this value to 173°F. RBS intends to use the NRC-approved Technical Specification value (either 144 or 173) that is current at the time of EAL implementation for the EAL value. This applies to the MSL Tunnel Temperature in Table F2.

RBS uses a table to present the conditions for the second potential loss threshold resulting in a minor difference in EAL wording and format.

RBS provides additional site specific bases information on leakage isolation attempts and quantification of leakage.

Primary Containment Radiation Monitoring Category:

RBS changes the title of this category to "drywell radiation." RBS does not use the same radiation monitor(s) for the Fuel Clad, RCS and Containment barriers. The RBS RCS barrier EAL threshold refers to a drywell radiation monitor. The Fuel Clad and Containment barrier EAL thresholds use the Primary Containment high range radiation monitor. Although NEI 99-01 Revision 4 and NEI 99-01 Revision 5 refer to the use of different monitors between the two revisions, both revisions show the same monitor used for all three barriers. The drywell post

RBS: RCS BARRIER (Cont'd)

Differences (Cont'd):

accident radiation monitor was selected in lieu of the containment post accident radiation monitor due to the physical layout of RCS piping and the location of the monitors. The drywell contains the RPV with the majority of RCS piping and its respective containment isolation valves. The RCS piping continues through the enclosed containment steam tunnel (accessed via pull plugs) to the annulus and then to the auxiliary building steam tunnel. Therefore, the drywell radiation monitors are the most likely monitors to initially detect an RCS leak within the containment building. The RBS difference where the same monitor was not used for the Fuel Clad, RCS and Containment barriers was previously approved (NRC letter dated October 25, 2005 ADAMS Accession No. ML053010184) for the RBS application of the NEI 99-01 Revision 4 based EAL scheme. The site specific reasons for this difference remain the same as for that previously approved.

RBS also adds "...due to reactor coolant leakage" to this threshold.

Other Site Specific Indications Category:

Additional EALs that represent a loss or potential loss of the RCS barrier were not identified for inclusion in the EAL scheme for this IC. A review of Emergency Operating Procedures and station procedures was performed to ensure additional EAL thresholds should not be considered in the "Other" category. This conforms to NEI guidance because an appropriately diverse mix of EALs is provided and the NEI 99-01 guidance does not specify that any particular additional EALs be provided, but specifies "as applicable."

NEI 99-01: CONTAINMENT BARRIER

<u>Containment Barrier Example Thresholds</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<u>1. Primary Containment Conditions</u>	
<p>A. Primary containment pressure rise followed by a rapid unexplained drop in primary containment pressure.</p> <p>OR</p> <p>B. Primary containment pressure response not consistent with LOCA conditions.</p>	<p>A. Primary containment pressure greater than (site specific value) and rising.</p> <p>OR</p> <p>B. Explosive mixture exists inside primary containment.</p> <p>OR</p> <p>C. RPV pressure and suppression pool temperature cannot be maintained below the HCTL.</p>
OR	
<u>2. Reactor Vessel Water Level</u>	
Not Applicable	A. Primary containment flooding required.
OR	
<u>3. Primary Containment Isolation Failure or Bypass</u>	
<p>A. Failure of all valves in any one line to close.</p> <p>AND</p> <p>Direct downstream pathway to the environment exists after primary containment isolation signal.</p> <p>OR</p> <p>B. Intentional primary containment venting per EOPs.</p> <p>OR</p> <p>C. UNISOLABLE primary system leakage outside primary containment as indicated by exceeding EITHER of the following:</p> <p>a. Max Safe Operating Temperature.</p> <p>OR</p> <p>b. Max Safe Area Radiation.</p>	Not Applicable
OR	

NEI 99-01: CONTAINMENT BARRIER

(Cont'd)

<u>Containment Barrier Example Thresholds</u>	
4. Primary Containment Radiation Monitoring	
Not Applicable	A. Primary containment radiation monitor reading greater than (site specific value).
OR	
5. Other Site Specific Indications	
A. (site specific) as applicable.	A. (site specific) as applicable.
OR	
6. Emergency Director Judgment	
A. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	B. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.

RBS: CONTAINMENT BARRIER

Containment Barrier EAL Thresholds	
LOSS	POTENTIAL LOSS
<u>1. Primary Containment Conditions (PC1)</u>	
1. Rapid unexplained loss of PC pressure following an initial pressure rise <u>OR</u> 2. PC pressure response not consistent with LOCA conditions	1. PC pressure > 15 psig and rising <u>OR</u> 2.a. PC hydrogen in the unsafe zone of HDOL curve <u>OR</u> b. DW hydrogen concentration > 9% <u>OR</u> 3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL
<u>2. Reactor Vessel Water Level (PC2)</u>	
None	Entry into PC flooding procedures SAP-1 and SAP-2
<u>3. Primary Containment Isolation Failure or Bypass (PC3)</u>	
1. a. Failure of all valves in any one line to close <u>AND</u> b. Direct downstream pathway to the environment exists after PC isolation signal <u>OR</u> 2. Intentional PC venting per EOPs or SAPs <u>OR</u> 3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Safe Operating Temperature (Table F1) <u>OR</u> b. Max Safe Area Radiation (Table F1)	None
<u>4. Primary Containment Radiation Monitoring (PC4)</u>	
None	Containment radiation monitor RMS-RE16 reading > 10,000 R/hr
<u>5. Emergency Director Judgment (PC5)</u>	
Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier.	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier.

RBS: CONTAINMENT BARRIER (Cont'd)

Deviations:

None

Differences:

Primary Containment Conditions Category:

RBS uses the wording “rapid unexplained loss of PC pressure following initial pressure rise” vice the NEI (inverse) wording of “primary containment pressure rise followed by a rapid unexplained drop in primary containment pressure” for the loss EAL threshold. This revised wording is provided for clarity and has the same meaning as the NEI wording.

RBS removes reference to drywell spray in the bases for site specific reasons. RBS does not have a drywell spray system.

RBS provides additional site specific bases information for the loss EAL threshold to further describe conditions that do not meet the EAL threshold and to clarify indications that may be used.

RBS provides additional site specific bases information for the primary containment pressure potential loss EAL threshold.

RBS provides site specific explosive mixture information for the explosive mixture potential loss EAL threshold and in the associated bases.

Reactor Vessel Water Level Category:

RBS changes the EAL threshold and bases to refer to the site specific procedures for containment flooding resulting in no change to the NEI intent.

Primary Containment Isolation Failure or Bypass

RBS provides additional site specific bases information defining an “inability to isolate” and clarifying isolation attempts as they relate to the first EAL threshold. RBS also provides site specific information in the bases on primary containment isolation valves and the application of the containment airlock to this EAL threshold.

RBS refers to site specific procedure designations (SAP) in the second EAL threshold and associated bases.

RBS uses a table to present the conditions for the third EAL threshold resulting in a minor difference in EAL wording and format. RBS also provides information on leakage into a closed system in bases for this EAL threshold.

RBS: CONTAINMENT BARRIER (Cont'd)

Differences (Cont'd):

Primary Containment Radiation Monitoring Category:

RBS changes the NEI title of "Primary Containment Radiation Monitoring" to "Primary Containment Radiation Monitors" – a minor difference in terminology.

Other Site Specific Indications Category:

Additional EALs that represent a loss or potential loss of the Containment barrier were not identified for inclusion in the EAL scheme for this IC. A review of Emergency Operating Procedures and station procedures was performed to ensure additional EAL thresholds should not be considered in the "Other" category. This conforms to NEI guidance because an appropriately diverse mix of EALs is provided and the NEI 99-01 guidance does not specify that any particular additional EALs be provided, but specifies "as applicable."

NEI 99-01: HU4

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability: All

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

1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the (site specific security shift supervision).
2. A credible site specific security threat notification.
3. A validated notification from NRC providing information of an aircraft threat.

RBS: HU1

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

Operating Mode Applicability: All

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

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the RBS security shift supervision

OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Deviations:

None

Differences:

NEI 99-01 **HU4** is renumbered to RBS **HU1** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HU5

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

Operating Mode Applicability: All

Example Emergency Action Level:

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

RBS: HU2

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE

Operating Mode Applicability: All

Emergency Action Level(s):

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

Deviations:

None

Differences:

NEI 99-01 **HU5** is renumbered to RBS **HU2** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HU2

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

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

1. FIRE not extinguished within 15 minutes of control room notification or verification of a control room FIRE alarm in **ANY** of the following areas:

(site specific area list)
2. EXPLOSION within the PROTECTED AREA.

RBS: HU4

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

Operating Mode Applicability: All

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

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

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

OR

2. EXPLOSION within the PROTECTED AREA

Deviations:

None

Differences:

NEI 99-01 **HU2** is renumbered to RBS **HU4** for formatting purposes based on site preference for order of ICs alone.

RBS provides a table for the list of areas for EAL #1 and therefore differs from the NEI EAL terminology.

NEI 99-01: HU3

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.
2. Report by local, county or state officials for evacuation or sheltering of site personnel based on an off-site event.

RBS: HU5

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS

Operating Mode Applicability: All

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

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

OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an offsite event

Deviations:

None

Differences:

NEI 99-01 **HU3** is renumbered to RBS **HU5** for formatting purposes based on site preference for order of ICs alone. In an attempt to group “families” of emergency classes together with the same last digit Arabic numeral designation (such as HU1, AU1, AS1, etc.), RBS does not provide an IC labeled HU3. All NEI 99-01 NOUE ICs for the Hazards and Other Conditions Affecting Plant Safety category are still addressed in the RBS EALs.

RBS uses the term “Parish” in EAL #2. The term “parish” is synonymous with both “local” and “county” for the state of Louisiana.

NEI 99-01: HU1

Natural or destructive phenomena affecting the PROTECTED AREA

Operating Mode Applicability: All

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

1. Seismic event identified by **ANY** 2 of the following:
Seismic event confirmed by (site specific indication or method)
Earthquake felt in plant
National Earthquake Center
2. Tornado striking within PROTECTED AREA boundary or high winds greater than (site specific mph)
3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in **ANY** of the following areas:

(site specific area list)
4. Turbine failure resulting in casing penetration or damage to turbine or generator seals.
5. (Site specific occurrences affecting the PROTECTED AREA).

RBS: HU6

Natural or destructive phenomena affecting the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:
 - Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
 - a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)
 - b. Event Indicator on ERS-NBI-102 is white
 - Earthquake felt in plant
 - National Earthquake Center

OR

2. Tornado striking within the PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

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

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary

RBS: HU6 (Cont'd)

Table H1 Uncontrolled Flooding Threshold Area Water Level	
<u>Affected Location / Parameter</u>	<u>Max Safe Operating Value / Indicator</u>
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Room 70' EL	4 inches above floor (P870-51A-G4)
RHR A Room 70' EL	4 inches above floor (P870-51A-G4)
RHR B Room 70' EL	4 inches above floor (P870-51A-G4)
RHR C Room 70' EL	4 inches above floor (P870-51A-G4)
LPCS Room 70' EL	4 inches above floor (P870-51A-G4)
RCIC Room 70' EL	4 inches above floor (P870-51A-G4)

Deviations:

None

Differences:

NEI 99-01 **HU1** is renumbered to RBS **HU6** for formatting purposes based on site preference for order of ICs alone.

RBS adds bases information relating the station alarm response procedure for EAL #1.

There is no site-specific value used for high winds in the RBS EAL #2. RBS provides a separate EAL (EAL #5) that addresses high (hurricane force) winds. 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 lower elevation average wind speed indication will be used to determine that this EAL (#5) is met.

RBS: HU6 (Cont'd)

Differences (Cont'd):

RBS presents site specific areas for EAL #3 in a table and references the table causing a minor difference in EAL language from that in NEI 99-01. Information is also added to the bases for this EAL, the associated table and its relationship to station Emergency Operating Procedures.

The reference to VISIBLE DAMAGE is removed from the bases for EAL #3 for escalation information because NEI 99-01 does not refer to VISIBLE DAMAGE for the corresponding Alert classification in HA1 EAL #3.

NEI 99-01: HA4

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site specific security shift supervision).
2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

RBS: HA1

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

Operating Mode Applicability: All

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

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision

OR

2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site

Deviations:

None

Differences:

NEI 99-01 **HA4** is renumbered to RBS **HA1** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HA6

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

Operating Mode Applicability: All

Example Emergency Action Level:

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

RBS: HA2

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Deviations:

None

Differences:

NEI 99-01 **HA6** is renumbered to RBS **HA2** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HA5

Control room evacuation has been initiated.

Operating Mode Applicability: All

Example Emergency Action Level:

1. (Site-specific procedure) requires control room evacuation.

RBS: HA3

Control Room evacuation has been initiated

Operating Mode Applicability: All

Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation

Deviations:

None

Differences:

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

NEI 99-01: HA2

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

Operating Mode Applicability: All

Example Emergency Action Level:

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to **ANY** of the following structures containing safety systems or components **OR** control room indication of degraded performance of those safety systems:

(site specific structure list)

RBS: HA4

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Deviations:

None

Differences:

NEI 99-01 **HA2** is renumbered to RBS **HA4** for formatting purposes based on site preference for order of ICs alone.

RBS provides a table for the list of areas for EAL #1 and therefore differs from the NEI EAL terminology.

NEI 99-01: HA3

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

Operating Mode Applicability: All

Example Emergency Action Levels:

Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

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

RBS: HA5

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

Operating Mode Applicability: All

Emergency Action Level(s):

***Note:** If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to a VITAL AREA (Table H2) is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor

Deviations:

None

Differences:

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

RBS uses a table in the EAL for a list of Vital Areas.

NEI 99-01: HA1

Natural or Destructive Phenomena Affecting VITAL AREAs.

Operating Mode Applicability: All

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

1. a. Seismic event greater than Operating Basis Earthquake (OBE) as indicated by (site specific seismic instrumentation) reading (site specific OBE limit).

AND

- b. Earthquake confirmed by **ANY** of the following:
 - Earthquake felt in plant
 - National Earthquake Center
 - Control Room indication of degraded performance of systems required for the safe shutdown of the plant.
2. Tornado striking or high winds greater than (site specific mph) resulting in **VISIBLE DAMAGE** to **ANY** of the following structures containing safety systems or components **OR** control room indication of degraded performance of those safety systems:

(site specific structure list)
3. Internal flooding in **ANY** of the following areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment **OR** control room indication of degraded performance of those safety systems:

(site specific area list)
4. Turbine failure-generated **PROJECTILES** resulting in **VISIBLE DAMAGE** to or penetration of **ANY** of the following structures containing safety systems or components **OR** control room indication of degraded performance of those safety systems:

(site specific structure list)
5. Vehicle crash resulting in **VISIBLE DAMAGE** to **ANY** of the following structures containing safety systems or components **OR** control room indication of degraded performance of those safety systems:

(site specific structure list)

NEI 99-01: HA1 (Cont'd)

Example Emergency Action Levels (Cont'd):

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

RBS: HA6

Natural or destructive phenomena affecting VITAL AREAS

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by:

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

AND

Event Indicator on ERS-NBI-102 is white

AND

Receipt of EITHER 1 OR 2:

1. Annunciator "Seismic Event High" (P680-02A-C06)
2. Annunciator "Seismic Event High-High" (P680-02A-B06) AND
amber light(s) on panel NBI-101

AND

- b. Earthquake confirmed by any of the following:

- Earthquake felt in plant
- National Earthquake Center
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

RBS: HA6 (Cont'd)**Emergency Action Level(s) (Cont'd)**

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

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems.

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Deviations:

None

Differences:

NEI 99-01 **HA1** is renumbered to RBS **HA6** for formatting purposes based on site preference for order of ICs alone.

There is no site-specific value used for high winds in the RBS EAL #2. RBS provides a separate EAL (EAL #6) that addresses high (hurricane force) winds. 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

RBS: HA6 (Cont'd)

Differences (Cont'd):

on the Meteorological Tower lower elevation average wind speed indication will be used to determine that this EAL (#6) is met.

RBS presents site specific areas for EALs #2, #4, #5 and #6 in a table and references the table in each EAL (and bases as applicable) causing a minor difference in EAL language from that in NEI 99-01.

RBS adds information in the bases for Emergency Director consideration of the Fuel Building as necessary to address the impact of the event on the loss of spent fuel cooling or spent fuel.

RBS adds information in the bases for EAL #3 relating EAL areas of concern to Emergency Operating Procedure information and clarifying indication of the condition.

RBS adds clarifying information in the bases for EAL #4 regarding the selection of areas of concern.

NEI 99-01: HS4

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability: All

Example Emergency Action Level:

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site security shift supervision).

RBS: HS1

HOSTILE ACTION within the PROTECTED AREA

Operating Mode Applicability: All

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

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision

Deviations:

None

Differences:

NEI 99-01 **HS4** is renumbered to RBS **HS1** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HS3

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

Operating Mode Applicability: All

Example Emergency Action Level:

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

RBS: HS2

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Deviations:

None

Differences:

NEI 99-01 **HS3** is renumbered to RBS **HS2** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: HS2

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

Operating Mode Applicability: All

Example Emergency Action Level:

1. a. Control room evacuation has been initiated.

AND

b. Control of the plant cannot be established within (site specific minutes).

RBS: HS3

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. a. Control Room evacuation has been initiated

AND

- b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes

Deviations:

None

Differences:

NEI 99-01 **HS2** is renumbered to RBS **HS3** for formatting purposes based on site preference for order of ICs alone.

RBS includes the procedural reference in the EAL for consistency with HA3.

NEI 99-01: HG1

HOSTILE ACTION resulting in loss of physical control of the facility.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.
2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.

RBS: HG1

HOSTILE ACTION resulting in loss of physical control of the facility

Operating Mode Applicability: All

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

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool

Deviations:

None

Differences:

None other than previously noted.

NEI 99-01: HG2

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

Operating Mode Applicability: All

Example Emergency Action Level:

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

RBS: HG2

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

Operating Mode Applicability:

All

Emergency Action Level(s):

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

Deviations:

None

Differences:

None other than previously noted.

NEI 99-01: SU1

Loss of all Off-site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. Loss of all off-site AC power to (site specific emergency busses) for 15 minutes or longer.

RBS: SU1

Loss of all offsite AC power to emergency busses for ≥ 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. Loss of all offsite AC power to Div I & II ENS busses for ≥ 15 minutes

Deviations:

None

Differences:

RBS provides site specific information in the bases for preferred transformers.

NEI 99-01: SU3

UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. UNPLANNED Loss of greater than approximately 75% of the following for 15 minutes or longer:
 - a. (Site specific control room safety system annunciation)
 - OR**
 - b. (Site specific control room safety system indication)

RBS: SU6

UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:

a. Control Room safety system annunciation

OR

b. Control Room safety system indication

Deviations:

None

Differences:

NEI 99-01 **SU3** is renumbered to RBS **SU6** for formatting purposes based on site preference for order of ICs alone. In an attempt to group "families" of emergency classes together with the same last digit Arabic numeral designation (such as SU1, SA1, SS1, etc.), RBS does not provide ICs labeled SU2, SU3, SU4 and SU5. All NEI 99-01 NOUE ICs for the System Malfunction category are still addressed in the RBS EALs.

RBS provides additional information in the bases to define those systems associated with safety system indication and the related Control Room panels.

NEI 99-01: SU5

RCS leakage.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels:

(1 or 2)

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

RBS: SU7

RCS leakage

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

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

1. Unidentified or pressure boundary leakage > 10 gpm

OR

2. Identified leakage > 35 gpm

Deviations:

None

Differences:

NEI 99-01 **SU5** is renumbered to RBS **SU7** for formatting purposes based on site preference for order of ICs alone.

RBS uses 35 gpm as the value for identified leakage. The RBS Technical Specification limit is 5 gpm for unidentified leakage and 30 gpm total leakage averaged over the previous 24 hours. The NEI EAL is less than the allowable TS, therefore the RBS value for EAL #2 was set at 35 gpm to be above allowable limits. This difference was previously approved (NRC letter dated October 25, 2005 ADAMS Accession No. ML053010184) for the RBS application of the NEI 99-01 Revision 4 based EAL scheme. The site specific reasons for this difference remain the same as for that previously approved.

NEI 99-07: SU6

Loss of All On-site or Off-site communications capabilities.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels:

(1 or 2)

1. Loss of all of the following on-site communication methods affecting the ability to perform routine operations.

(site specific list of communications methods)

1. Loss of all of the following off-site communication methods affecting the ability to perform offsite notifications.

(site specific list of communications methods)

RBS: SU8

Loss of all onsite or offsite communications capabilities

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

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

1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:

- Plant radio system
- Plant paging system
- Sound powered phones
- In-plant telephones

OR

2. Loss of all of the following communications methods affecting the ability to perform offsite notifications:

- All telephones
- NRC phones
- State of Louisiana Radio
- Offsite notification system and hotline

Deviations:

None

Differences:

NEI 99-01 **SU6** is renumbered to RBS **SU8** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: SU4

Fuel clad degradation.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Levels: (1 or 2)

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

RBS: SU9

Fuel clad degradation

Operating Mode Applicability:

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

Emergency Action Level(s):

1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits

OR

2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits

- >4.0 $\mu\text{Ci/gm}$ dose equivalent I-131

OR

- >0.2 $\mu\text{Ci/gm}$ dose equivalent I-131 for > 48 hours

Table S1				
FLOW (cfm)	Dose Rate Limit (mR/hr)		FLOW (cfm)	Dose Rate Limit (mR/hr)
15	9579		70	1865
17.875	8064		80	1671
20	7219		90	1510
25	5788		100	1376
30	4829		110	1262
32.83	2849		120	1165
35	2810		130	1082
40	2680		140	1009
45	2529		150	945
50	2377		175	815
60	2098		200	716

RBS: SU9 (Cont'd)

Deviations:

None

Differences:

NEI 99-01 **SU4** is renumbered to RBS **SU9** for formatting purposes based on site preference for order of ICs alone.

RBS provides an "or" to separate EALs 1 and 2.

RBS provides an EAL value and associated basis information for the nominal operating limit for dose equivalent I-131 for RCS activity in addition to the transient iodine spiking limit described in NEI 99-01.

RBS provides a table and additional clarifying information in the bases for applying offgas pre-treatment radiation monitor readings for EAL #1.

NEI 99-01: SU8

Inadvertent criticality.

OPERATING MODE APPLICABILITY

Hot Standby
Hot Shutdown

Example Emergency Action Level:

(1 or 2)

1. UNPLANNED sustained positive period observed on nuclear instrumentation. *[BWR]*
2. UNPLANNED sustained positive startup rate observed on nuclear instrumentation. *[PWR]*

RBS: SU10

Inadvertent criticality

Operating Mode Applicability: Hot Shutdown (Mode 3)

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Deviations:

None

Differences:

NEI 99-01 **SU8** is renumbered to RBS **SU10** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: SU2

Inability to reach required shutdown within Technical Specification limits.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

RBS: SU11

Inability to reach required operating mode within Technical Specification limits

Operating Mode Applicability:

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

Emergency Action Level(s):

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

Deviations:

None

Differences:

NEI 99-01 **SU2** is renumbered to RBS **SU11** for formatting purposes based on site preference for order of ICs alone.

RBS changes the NEI Initiating Condition to refer to required "operating mode" vice "shutdown" to provide clarity and agreement with the associated NEI EAL and bases. This change does not alter the meaning or intent of the Initiating Condition.

NEI 99-01: SA5

AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. a. AC power capability to (site-specific emergency busses) reduced to a single power source for 15 minutes or longer.

AND

-
- b. Any additional single power source failure will result in station blackout.

RBS: SA1

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

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. a. AC power capability to Div I and II ENS busses reduced to a single power source for ≥ 15 minutes

AND

- b. Any additional single power source failure will result in station blackout

Deviations:

None

Differences:

NEI 99-01 **SA5** is renumbered to RBS **SA1** for formatting purposes based on site preference for order of ICs alone.

RBS provides site specific information in the bases for preferred transformers.

RBS provides site specific information in the bases for the Div III Diesel Generator and Bus E22-S004 and how they are not to be credited for EAL entry.

NEI 99-01: SA2

Automatic Scram (Trip) fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

Power Operation
Startup

Example Emergency Action Level:

1. a. An automatic scram (trip) failed to shutdown the reactor.

AND

- b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by (site specific indications of plant shutdown).

RBS: SA3

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

Operating Mode Applicability: Power Operation (Mode 1)
Startup (Mode 2)

Emergency Action Level(s):

1. a. An automatic trip failed to shutdown the reactor

AND

- b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%.

Deviations:

None

Differences:

NEI 99-01 **SA2** is renumbered to RBS **SA3** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: SA4

UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. a. UNPLANNED loss of greater than approximately 75% of the following for 15 minutes or longer:
 - (Site specific control room safety system annunciation)

OR

 - (Site specific control room safety system indication)
- b. **EITHER** of the following:
 - A SIGNIFICANT TRANSIENT is in progress.
 - Compensatory indications are unavailable.

RBS: SA6

UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

Operating Mode Applicability:

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

Emergency Action Levels(s):

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

1. a. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:

- Control Room safety system annunciation

OR

- Control Room safety system indication

AND

- b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress

OR

- Compensatory indications are unavailable

Deviations:

None

Differences:

NEI 99-01 **SA4** is renumbered to RBS **SA6** for formatting purposes based on site preference for order of ICs alone.

RBS: SA6 (Cont'd)

Differences (cont'd):

RBS uses an “and” and an additional “or” in the EAL for clarity.

RBS provides additional information in the bases to define those systems associated with safety system indication and the related Control Room panels.

NEI 99-01: SS1

Loss of all Off-site and all On-Site AC power to emergency busses for 15 minutes or longer.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. Loss of all Off-Site and all On-Site AC power to (site specific emergency busses) for 15 minutes or longer.

RBS: SS1

Loss of all offsite and all onsite AC power to emergency busses for
≥ 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for
≥ 15 minutes

Deviations:

None

Differences:

RBS provides site specific information in the bases for preferred transformers.

RBS provides additional bases information for the condition where power to the bus may be restored, but necessary loads are not functional on the energized bus.

NEI 99-01: SS2

Automatic Scram (Trip) fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

Operating Mode Applicability:

Power Operation
Startup

Example Emergency Action Level:

1. a. An automatic scram (trip) failed to shutdown the reactor.

AND

- b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by (site specific indications of reactor not shutdown).

RBS: SS3

Automatic scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

- b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power $\geq 5\%$

Deviations:

None

Differences:

NEI 99-01 **SS2** is renumbered to RBS **SS3** for formatting purposes based on site preference for order of ICs alone.

RBS adds additional information to the bases regarding manual scram actions taken away from the reactor control console and not crediting these actions for a successful scram.

NEI 99-01: SS3

Loss of all vital DC power for 15 minutes or longer.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. Less than (site specific bus voltage indication) on all (site specific Vital DC busses) for 15 minutes or longer.

RBS: SS4

Loss of all vital DC power \geq 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. < 105 VDC on all vital DC busses for ≥ 15 minutes

Deviations:

None

Differences:

NEI 99-01 **SS3** is renumbered to RBS **SS4** for formatting purposes based on site preference for order of ICs alone.

NEI 99-01: SS6

Inability to Monitor a SIGNIFICANT TRANSIENT in Progress.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

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

1. a. Loss of greater than approximately 75% of the following for 15 minutes or longer:

- (Site specific control room safety system annunciation)

OR

- (Site specific control room safety system indication)

AND

- b. A SIGNIFICANT TRANSIENT is in progress.

AND

- c. Compensatory indications are unavailable.

RBS: SS6

Inability to monitor a SIGNIFICANT TRANSIENT in progress

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. a. Loss of > approximately 75% of the following for ≥ 15 minutes:

- Control Room safety system annunciation

OR

- Control Room safety system indication

AND

b. A SIGNIFICANT TRANSIENT is in progress

AND

c. Compensatory indications are unavailable

Deviations:

None

Differences:

RBS provides additional information in the bases to define those systems associated with safety system indication and the related Control Room panels.

NEI 99-01: SG1

Prolonged loss of all Off-site and all On-Site AC power to emergency busses.

Operating Mode Applicability:

Power Operation
Startup
Hot Standby
Hot Shutdown

Example Emergency Action Level:

1. a. Loss of all off-site and all on-site AC power to (site specific emergency busses).

AND

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

- Restoration of at least one emergency bus in less than (site specific hours) is not likely.
- (Site specific indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.)

RBS: SG1

Prolonged loss of all offsite and all onsite AC power to emergency busses

Operating Mode Applicability:

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

Emergency Action Level(s):

1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses

AND

- b. Either or the following:

- Restoration of at least one emergency bus in < 4 hours is not likely

OR

- RPV level can not be maintained > -162 inches

Deviations:

None

Differences:

RBS uses an "or" in the EAL for clarity.

RBS provides site specific information in the bases for preferred transformers.

NEI 99-01: SG2

Automatic Scram (Trip) and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

Power Operation
Startup

Example Emergency Action Level:

1. a. An automatic scram (trip) failed to shutdown the reactor.

AND

- b. All manual actions do not shutdown the reactor as indicated by (site specific indications of reactor not shutdown).

AND

- c. **EITHER** of the following exist or have occurred due to continued power generation:
 - (Site specific indication that core cooling is extremely challenged.)
 - (Site specific indication that heat removal is extremely challenged.)

RBS: SG3

Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

Operating Mode Applicability:

Power Operation (Mode 1)
Startup (Mode 2)

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

- b. All manual actions do not shutdown the reactor as indicated by reactor power $\geq 5\%$

AND

- c. Either of the following exist or have occurred due to continued power generation:
 - Core cooling is extremely challenged as indicated by RPV level can not be maintained > -186 inches

OR

- Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

Deviations:

None

Differences:

SG2 is renumbered to RBS IC **SG3** for formatting purposes based on site preference for order of ICs alone.

RBS uses an "or" in the EAL for clarity.

Attachment 2

To

RBG-47165

Proposed Technical Basis Document (Markup)

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Any release of gaseous or liquid radioactivity to the environment, ≥ 2 times the ODCM limit for ≥ 60 minutes,

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 > 2 times the NOUE reading for ≥ 60 minutes,

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes,

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates ≥ 2 times the ODCM limit for ≥ 60 minutes,

Table R1 EAL THRESHOLD			
Method		NOUE	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	3.06E+05 $\mu\text{Ci/sec}$
	Secondary	1GE126	5.26E-03 $\mu\text{Ci/ml}$
Fuel Building Vent	Primary	4GE005	2.19E+04 $\mu\text{Ci/sec}$
	Secondary	5GE005	4.65E-03 $\mu\text{Ci/ml}$
Radwaste Building Vent	Primary	4GE006	2.58E+04 $\mu\text{Ci/sec}$
	Secondary	5GE006	6.84E-04 $\mu\text{Ci/ml}$

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU1

Basis:

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

This IC addresses a potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases (Offsite Dose Calculation Manual - ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

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

Releases should not be prorated or averaged over 60 minutes. For example, a release exceeding 4 X the ODCM limit for 30 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

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Deleted: 4. VALID reading on perimeter radiation monitoring system reading greater than 0.10 mR/hr above normal* background for 60 minutes or longer. [for sites having telemetered perimeter monitors] ¶
5. VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 60 minutes or longer. [for sites having such capability] ¶
*Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value. ¶

Deleted: [Refer to Appendix A for a detailed basis of the radiological effluent IC/EALs.]

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Deleted: [Some sites may find it advantageous to address gaseous and liquid releases with separate EALs.]

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU1

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors' EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

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EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value is associated with a planned batch release.

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

Deleted: [The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default source terms and, for gaseous releases, prescribes the use of pre-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. This EAL should be determined using this methodology.]

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Deleted: [In either case, the value is established by the ODCM to warn of a release that is not in compliance with the RETS. Indexing the EAL to the ODCM setpoints in this manner insures that the EAL will never be less than the setpoint established by a specific discharge permit.]

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References:

T.R. 3.11

RSP-0008, Offsite Dose Calculation Manual (ODCM)

G.13.18.9.6*012 Rev 0, Effect of Core Up-rate on the DRMS Process Safety Limit / Conversion Factors / PR-C-495 Rev 2 p 4

ESK-RMS05

ESK-RMS25

Deleted: EALs #4 and #5 ¶
The 0.10 mR/hr value in EAL #4, and the site specific value for EAL #5, is based on a release rate not exceeding 500 mrem per year. ¶
[As provided in the ODCM / RETS, prorated over 8766 hours, multiplied by two, and rounded. $(500 \div 8766 \times 2 = 0.114)$.] ¶
EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints. EALs #4 and #5 are a function of actual meteorology, which will likely be different from the limiting annual average value. Thus, there will likely be a numerical inconsistency. ¶
The underlying basis of this EAL involves the degradation in the level of safety of the plant implied by the uncontrolled release. Exceeding EAL #4 or #5 is an indication of an uncontrolled release

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED rise in plant radiation levels,

Operating Mode Applicability: All

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

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:

- Water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal indication on Control Room Panel 870.
- Personnel observation by visual or remote means.

AND

- b. UNPLANNED VALID area radiation monitor alarm on any of the following:

RMS-RE140
RMS-RE141
RMS-RE192
RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels.

NOTE: For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.

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

Basis:

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

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EAL #1

The locations of the EAL specific area radiation monitors are:

Containment RMS-RE140, North Refueling Floor
RMS-RE141, South Refueling Floor

Fuel Building RMS-RE192, South Operating Floor
RMS-RE193, North Operating Floor

The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

For refueling events where the water level drops below the RPV flange classification would be via CU2. This event escalates to an Alert per AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating modes 1-3.

EAL #2

This EAL addresses risers in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level risers that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the Threshold. The intent is to identify loss of control of radioactive material in any monitored area.

References:

Deleted: [Site specific indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate or decrease in water storage tank level.]

Deleted: ¶
 [In light of Reactor Cavity Seal failure incidents at two different PWRs and loss of water in the Spent Fuel Pit/Fuel Transfer Canal at a BWR, explicit coverage of these types of events via threshold #1 is appropriate given their potential for increased doses to plant staff.]

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Deleted: [Application of this EAL 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 EALs.]

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

Initiating Condition - ALERT

Any release of gaseous or liquid radioactivity to the environment ≥ 200 times the ODCM limit for ≥ 15 minutes

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 ≥ the ALERT reading for ≥ 15 minutes

OR

2. For RMS-RE107 effluent monitor:

EITHER

VALID reading ≥ 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes

OR

VALID reading > 1.27E-01 μCi/ml for > 15 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

Table R1 EAL THRESHOLD			
Method		ALERT	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	3.06E+07 μ Ci/sec
	Secondary	1GE126	2.82E-01 μ Ci/ml
Fuel Building Vent	Primary	4GE005	2.19E+06 μ Ci/sec
	Secondary	5GE005	2.82E-01 μ Ci/ml
Radwaste Building Vent	Primary	4GE006	2.58E+06 μ Ci/sec
	Secondary	5GE006	6.84E-02 μ Ci/ml

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Basis:

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

This IC addresses an actual or substantial potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

Deleted: 4. VALID reading on perimeter radiation monitoring system reading greater than 10.0 mR/hr above normal* background for 15 minutes or longer. [for sites having telemetered perimeter monitors] ¶
5. VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 15 minutes or longer. [for sites having such capability] ¶
*Normal can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

Deleted: [Refer to Appendix A for a detailed basis of the radiological effluent IC/EALs.] ¶

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

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

Deleted: [Some sites may find it advantageous to address gaseous and liquid releases with separate EALs.]

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Releases should not be prorated or averaged. For example, a release exceeding 600 times the ODCM limit for 5 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors' EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

Deleted: [To ensure a realistic near-linear escalation path, a value should be selected roughly half-way between the AU1 value and the value calculated for AS1 value. The value will be based on radiation monitor readings to exceed 200 times the Technical Specification limit and releases are not terminated within 15 minutes. The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default source terms and, for gaseous releases, prescribes the use of pre-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. This EAL can be determined using this methodology if appropriate.]

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EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value is associated with a planned batch release.

Historical release permits indicate that the Alert value of 200 times the radiation monitor setpoint established by the current permit may exceed the operating range of the RMS-RE107 effluent monitor in some instances. This potentially affected monitor is listed in EAL #2 with a corresponding value for the top of its indicating range.

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Deleted: insures that the EAL will never be less than the setpoint established by a specific discharge permit.]

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

References:

T.R. 3.11

RSP-0008, Offsite Dose Calculation Manual (ODCM)

G.13.18.9.6*012 Rev 0, Effect of Core Uprate on the DRMS Process Safety Limit / Conversion Factors / PR-C-495 Rev 2 p 4

ESK-RMS05

ESK-RMS25

Deleted: EALs #4 and #5 ¶

The 10.0 mR/hr value in EAL #4 , and the site specific value for EAL #5, is based on a release rate not exceeding 500 mrem per year. ¶ [As provided in the ODCM / RETS; prorated over 8766 hours, multiplied by 200, and rounded. $(500 \times 8766 \times 200 = 11.4)$. ¶

EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints. EALs #4 and #5 are a function of actual meteorology, which will likely be different from the limiting annual average value. Thus, there will likely be a numerical inconsistency. ¶ The underlying basis of this EAL involves the degradation in the level of safety of the plant implied by the uncontrolled release. Exceeding EAL #4 or #5 is an indication of an uncontrolled release.

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA2

Initiating Condition - ALERT

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

Operating Mode Applicability: All

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

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

OR

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level;

RMS-RE140 2000 mR/hr
RMS-RE141 2000 mR/hr
RMS-RE192 2000 mR/hr
RMS-RE193 2000 mR/hr
RMS-RE5A 1.64E+03 μ Ci/sec
RMS-RE5B (GE) 5.29E-04 μ Ci/ml

Basis:

This IC addresses rises in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

The locations of the EAL specific area radiation monitors are:

Containment	RMS-RE140	North Refueling Floor
	RMS-RE141	South Refueling Floor
Fuel Building	RMS-RE192	South Operating Floor
	RMS-RE193	North Operating Floor
	RMS-RE5A (B)	Fuel Building Ventilation Exhaust

EAL #1

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level indication, the declaration may be based on indications of water makeup rate or

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA2

decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level.

EAL #2

This EAL addresses radiation monitor indications of fuel uncover and/or fuel damage.

Elevated ventilation monitor readings may be an indication of a radioactivity release from the fuel, confirming that damage has occurred. Elevated background at the ventilation monitor due to water level drop may mask elevated ventilation exhaust airborne activity and needs to be considered.

While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

The Abnormal Operating Procedure (AOP) provides a table for guidance on pool level and of potential scenarios and the expected pool level assuming no operator action. The AOP is also entered for UNPLANNED lowering of refueling cavity or lower fuel pool water level during refueling operations. When control rod blades are stored in the Spent Fuel Pool, dose rate rise in the area may be attributed to the stored items instead of uncovered fuel assemblies.

Escalation of this emergency classification level, if appropriate, would be based on AS1 or AG1.

References:

TS Table 3.3.6.2-1
Calculation G13.18.9.4*10

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Initiating Condition - ALERT

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

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Operating Mode Applicability:

All

Emergency Action Level(s):

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Dose rate ≥ 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:

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Main Control Room
CAS

Basis:

This IC addresses elevated radiation levels that impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

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The cause and/or magnitude of the rise in radiation levels is not a concern of this IC. The Emergency Director must consider the source or cause of the elevated radiation levels and determine if any other IC may be involved.

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Deleted: [At multiple-unit sites, the EALs could result in declaration of an Alert at one unit due to a radioactivity release or radiation shine resulting from a major accident at the other unit. This is appropriate if the increase impairs operations at the operating unit.]

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 EALs.

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RP surveys should be performed in the CAS area if radiation above the program limit is detected outside the RCA. The Control Room area radiation monitor should be observed for EAL conditions if rising radiation levels are detected outside the RCA.

Deleted: [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.]

The Main Control Room and CAS are the areas at RBS requiring continuous occupancy.

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Deleted: and, as appropriate to the site, any other control stations that are staffed continuously, such as a radwaste control room, or a

Deleted: security alarm station.

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References:

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release,

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes.

OR

2. Dose assessment using actual meteorology indicates doses ≥ 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY.

OR

3. Field survey results indicate closed window dose rates ≥ 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY.

Table R1 EAL THRESHOLD	
Method	SITE AREA EMERGENCY DRMS Grid 6 Threshold
Main Plant Vent	Primary 4GE125 4.70E+07 μCi/sec Secondary N/A
Fuel Building Vent	Primary 4GE005 6.70E+06 μCi/sec Secondary N/A
Radwaste Building Vent	N/A

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Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

Deleted: [Refer to Appendix A for a detailed basis of the radiological effluent IC/EALs.] ¶

Deleted: [While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.] ¶
 [The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, some states have decided to calculate child thyroid CDE. Utility IC/EALs need to be consistent with those of the states involved in the facility's emergency planning zone.] ¶
 [The TEDE dose is set at 10% of the EPA PAG, while the 500 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.] ¶

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 [The meteorology used should be the same as those used for determining AU1 and AA1 monitor reading EALs. The same source term (noble gases, particulates, and halogens) ¶

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

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ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity \geq 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 \geq the GENERAL EMERGENCY reading for \geq 15 minutes.

OR

2. Dose assessment using actual meteorology indicates doses \geq 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY.

OR

3. Field survey results indicate closed window dose rates \geq 1000 mR/hr expected to continue for \geq 60 minutes; or analyses of field survey samples indicate thyroid CDE \geq 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY.

Table R1 EAL THRESHOLD			
Method		GENERAL EMERGENCY	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	4.70E+08 μ Ci/sec
	Secondary	N/A	
Fuel Building Vent	Primary	4GE005	6.70E+07 μ Ci/sec
	Secondary	N/A	
Radwaste Building Vent		N/A	

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Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

Deleted: [Refer to Appendix A for a detailed basis of the radiological effluent IC/EALs.] ¶

Deleted: [While these failures are addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.]¶
[The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE..." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, some states have decided to calculate child thyroid CDE. Utility IC/EALs need to be consistent with those of the states involved in the facilities emergency planning zone.] ¶
[The TEDE dose is set at the EPA PAG, while the 5000 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.]

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[The meteorology used should be the same as those used for determining AU1 and AA1 monitor reading EALs. The same source term (noble gases, particulates, and halogens)¶ may also be used as long as it maintains a realistic and near linear escalation between the EALs for ... [1]

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 ~~are~~ not, the results from these assessments may indicate that the classification is not warranted. ~~For this reason, emergency implementing procedures~~ should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS leakage

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

Emergency Action Level(s):

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

1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for ≥ 15 minutes

Basis:

This IC is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA1 or CA3.

References:

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Deleted: 1. RCS leakage results in the inability to maintain or restore level within (site specific pressurizer or RCS/RPV level target band) for 15 minutes or longer. [PWR] ¶

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of RCS/RPV inventory.

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

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

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

1. UNPLANNED RCS level drop as indicated by either of the following:

a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange

OR

b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange.

OR

2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss.

Basis:

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

Refueling evolutions that lower RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level lowering below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of 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 makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA1 or CA3.

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

EAL #1

This EAL involves a drop 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 reductions in flooded reactor cavity level, which is addressed by AU2 EAL1, until such time as the level drops to the level of the vessel flange.

If RPV level continues to drop and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA1 would be appropriate.

EAL #2

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of 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. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA1 or CA3.

References:

Deleted: [The difference between CU1 and CU2 deals with the RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means].

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Deleted: [For PWRs] If RPV level continues to decrease and reaches the Bottom ID of the RCS Loop then escalation to CA1 would be appropriate.

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU5

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Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

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

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

Emergency Action Level(s):

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

1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes.

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AND

- b. Any additional single power source failure will result in station blackout.

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Basis:

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Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

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The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of onsite emergency diesel generators with only one train of emergency busses being fed from offsite power (or backfed from offsite power through the main transformer). The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA5.

Deleted: [At multi-unit stations, the EALs should allow credit for operation of installed design features, such as cross-ties or swing diesels, provided that abnormal or emergency operating procedures address their use. However, these stations must also consider the impact of this condition on other shared safety functions in developing the site specific EAL.] ¶

[Plants that have a proceduralized capability to cross-tie AC power from an off-site power supply of a companion unit may take credit for the redundant power source in the associated EAL for this IC.]

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

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

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Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

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

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Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

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

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

1. UNPLANNED event results in RCS temperature exceeding 200 °F.

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OR

2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes.

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Basis:

This IC is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

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During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that lower 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 rises in RCS/RPV temperatures depending on the time since shutdown.

Deleted: [Entry into cold shutdown conditions may be attained within hours of operating at power. Entry into the refueling mode procedurally may not occur for typically 100 hours (site specific) 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). In addition, the operators should be able to monitor RCS temperature and RPV level so that escalation to the alert level via CA4 or CA1 will occur if required.]

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Normal means of core temperature indication and 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 temperature indication were to be lost in either the cold shutdown of refueling modes, EAL 2 would result in

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

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declaration of a NOUE if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication.

Escalation to Alert would be via CA1 based on an inventory loss or CA3 based on exceeding its temperature criteria

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU8

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Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Mode D..... Defueled

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

1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations:

Plant radio system

Plant paging system

Sound powered phones

In-plant telephones

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OR

2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications:

All telephones

NRC phones

State of Louisiana Radio

Offsite notification system and hotline

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Basis:

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

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

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Deleted: [Site specific list for on-site communications loss must encompass the loss of all means of routine communications (e.g., commercial telephones, sound powered phone systems, page party system and radios / walkie talkies). ¶ Site specific list for off-site communications loss must encompass the loss of all means of communications with off-site authorities. This should include the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems.]

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU6

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Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of required DC power for ≥ 15 minutes.

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Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

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Emergency Action Level(s):

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

1. < 105 VDC on required Vital DC busses for ≥ 15 minutes.

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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.

It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA3.

Deleted: [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.]

[Plants will routinely perform maintenance on a Train related basis during shutdown periods. The required busses are the minimum allowed by Technical Specifications for the mode of operation.]

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

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References:

Deleted: [(Site specific) bus voltage should be based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value should incorporate 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. Typically the value for the entire battery set is approximately 105 VDC. For a 60 cell string of batteries the cell voltage is typically 1.75 Volts per cell. For a 58 string battery set the minimum voltage is typically 1.81 Volts per cell.]

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CUZ

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Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality,

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Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

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Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation,

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

Basis:

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This IC addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events. This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification.

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This condition can be identified using period monitors. The term "sustained" is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

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Escalation would be by Emergency Director Judgment.

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition - ALERT

Loss of RCS/RPV inventory,

Operating Mode Applicability:

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

Emergency Action Level(s):

(1 or 2)

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

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss.

Basis:

These EALs are not applicable when the RPV is defueled and 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 lowering and potential core uncover. This condition will result in a minimum emergency classification level of an Alert.

EAL #1

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

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[Bottom ID of the RCS loop (PWR)]

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EAL #2

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

If RPV level continues to lower then escalation to Site Area Emergency will be via CS1.

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA5

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Initiating Condition - ALERT

Loss of all offsite and all on-site AC power to emergency busses for ≥ 15 minutes.

Operating Mode Applicability:

Mode 4..... Cold Shutdown
Mode 5..... Refueling
Mode D..... Defueled

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Emergency Action Level(s):

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

1. Loss of all offsite and all on-site AC power to Div I & Div II ENS busses for ≥ 15 minutes.

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Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to Div I & Div II compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, raising the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

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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 emergency busses. Even though an emergency 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.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent ICs.

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

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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Initiating Condition - ALERT

Inability to maintain plant in cold shutdown,

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

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

1. An UNPLANNED event results in RCS temperature > 200 °F for > the specified duration in Table C2.

OR

2. An UNPLANNED event results in RCS pressure rise, > 10 psig due to a loss of RCS cooling.

Table C2: RCS Reheat Duration Thresholds		
RCS	Containment Closure	Duration
Intact	N/A	60 minutes
Not intact	Established	20 minutes
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then the EAL is not applicable.		

Basis:

EAL #1

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established. As discussed above, 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.

Finally, the EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established.

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Deleted: Technical Specification cold shutdown temperature limit)

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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The (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

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EAL #2

The 10 psig pressure rise addresses situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS pressure setpoint chosen should be 10 psi or the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psig.

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

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

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

The Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded

References:

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

Initiating Condition - SITE AREA EMERGENCY

Loss of RCS/RPV inventory affecting core decay heat removal capability.

Operating Mode Applicability:

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

Emergency Action Level(s):

(1 or 2 or 3)

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

1. With CONTAINMENT CLOSURE not established, RPV level < -49 inches.

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF).

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:

- RMS-RE16 reading ≥ 100 R/hr.
- Erratic Source Range Monitor indication.
- Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss.

Basis:

These EALs are not applicable when the RPV is defueled.

Under the conditions specified by this IC, continued reduction in RCS level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG1 or AG1.

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[6" below the low-low ECCS actuation setpoint (BWR)] ¶

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

EAL #3

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

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

References:

COP-1050 NEDC-33045P
Calculation G13.18.9.4-047 Rev. 0

Deleted: EAL #1 ¶

[6" below the bottom ID of the RCS Loop should be the level equal to 6" below the bottom of the RPV loop penetration (not the low point of the loop). PWRs unable to measure this level should choose the first observable point below the bottom ID of the loop as the EAL value. If a water level instrument is not available such that the PWR EAL value cannot be determined, then EAL 3 should be used to determine if the IC has been met.]

Deleted: [Since BWRs have RCS penetrations below the EAL value, continued level decrease may be indicative of pressure boundary leakage.] ¶

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[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.]

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Initiating Condition - GENERAL EMERGENCY

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

Operating Mode Applicability:

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

Emergency Action Level(s):

(1 or 2)

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

1. a. RPV level < - 162 inches (TAF) for ≥ 30 minutes

AND

- b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncover indicated by any of the following for ≥ 30 minutes

- RMS-RE16 reading > 100 R/hr
- Erratic Source Range Monitor indication
- Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

AND

- b. Any containment challenge indication in Table C1

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COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Table C1 Containment Challenge Indications		
<ul style="list-style-type: none"> CONTAINMENT CLOSURE not established, Explosive mixture inside containment, UNPLANNED rise in containment pressure, Secondary containment area radiation monitor above EOP Max Safe Operating Value below; 		
Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

Basis:

These EALs are not applicable when the RPV is defueled.

This IC represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncover therefore, 30 minutes was conservatively chosen. If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncover time limit then escalation to GE would not occur.

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

EAL #2

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Deleted: [Site shutdown contingency plans typically provide for re-establishing CONTAINMENT CLOSURE following a loss of heat removal or RCS inventory functions.] ¶

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Deleted: [For BWRs, the use of secondary containment radiation monitors should provide indication of increased release that may be indicative of a challenge to secondary containment. The site specific radiation monitor values should be based on the EOP "maximum safe values" because these values are easily recognizable and have an emergency basis.] ¶

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

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

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As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

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References:

COP-1050

NEDC-33045P

Calculation G13.18.9.4-047 Rev. 0

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[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.]

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability:

All

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1. Damage to a loaded 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.

This EAL addresses a dropped cask, a tipped over cask, EXPLOSION, PROJECTILE damage, FIRE damage or natural phenomena affecting a cask (e.g., seismic event, tornado, etc.).

Deleted: [The results of the ISFSI Safety Analysis Report (SAR) per NUREG 1536 or SAR referenced in the cask(s) Certificate of Compliance and the related NRC Safety Evaluation Report identify natural phenomena events and accident conditions that could potentially effect the CONFINEMENT BOUNDARY]

FISSION PRODUCT BARRIER DEGRADATION

General Bases

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The logic used for these initiating conditions reflects the following considerations:

1. The Fuel Clad barrier and the RCS barrier are weighted more heavily than the Containment barrier, NOUE ICs associated with RCS and Fuel Clad barriers are addressed under System Malfunction (S) ICs.
2. At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from the threshold for a General Emergency. For example, if Fuel Clad and RCS barrier "Loss" EALs existed, that, in addition to off-site dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS barrier "Potential Loss" EALs existed, the Emergency Director would have more assurance that there was no immediate need to escalate to a General Emergency.
3. The ability to escalate to higher emergency classes, as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety.
4. The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is **IMMINENT**. In this **IMMINENT** loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs	RCS Barrier (RC) EALs	Containment Barrier (PC) EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
1. Primary Coolant Activity Level (FC1)	1. Drywell Pressure (RC1)	1. Primary Containment Conditions (PC1)	
Coolant activity \geq 300 μ Ci/gm dose equivalent I-131	Drywell pressure > 1.68 psid with indications of reactor coolant leak in the drywell	1. PC pressure ≥ 15 psig 1. Rapid unexplained loss of PC pressure following initial pressure rise and rising OR 2. PC pressure response not consistent with LOCA conditions, 2.a. PC hydrogen in the unsafe zone of	

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for LOSS or POTENTIAL LOSS of Barriers*

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*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

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GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs	RCS Barrier (RC) EALs	Containment Barrier (PC) EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

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		HDOL curve OR b.DW hydrogen concentration > 9% OR 3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL
2. Reactor Vessel Water Level (FC2)	2. Reactor Vessel Water Level (RC2)	2. Reactor Vessel Water Level (PC2)
RPV water level cannot be restored and maintained above.	RPV water level cannot be restored and maintained above.	RPV water level None
		None
		Entry into PC

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table

EALs for LOSS or POTENTIAL LOSS of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs	RCS Barrier (RC) EALs	Containment Barrier (PC) EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
<p>1. Primary Containment Radiation Monitors (FC3)</p> <p>Containment None radiation monitor RMS-RE16 reading > 3,000 R/hr</p>	<p>3. RCS Leak Rate (RC3)</p> <p>1.a. 1 RCS leakage UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close AND 2 UNISO-LABLE RCS AND High MSL flow annunciator (P601-19A-A2) AND leakage</p>	<p>3. Primary Containment Isolation Failure or Bypass (PC3)</p> <p>1. a. Failure of all valves in any one line to close AND b. Direct downstream pathway to the environment exists after PC isolation signal OR 2-Intentional PC venting per EOPs</p>	<p>flooding procedures SAP-1 and SAP-2</p>

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table

EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMIDENT. In this IMMIDENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss of or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs		Containment Barrier (PC) EALs			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS		
		Main Steam Tunnel Temperature > 144°F [173°F NRC TS submittal change]		outside PC		or SAPs	
		OR		as indicated by exceeding either of the following:		OR	
		b. Indication of an UNISOLABLE HPCS, Feedwater, RWCU or RCIC break		a. Max Normal Operating Temperature (Table F2)		3. UNISOLABLE, RCS leakage outside PC, as indicated by exceeding either of the following:	
		OR		2. Emergency RPV depressurization is required		a. Max Safe Operating Temperature (Table F1)	
		OR		b. Max Normal Area Radiation (Table F2)		OR	
						b. Max Safe Area Radiation (Table F1)	
		4. Drywell Radiation (RC4)				4. Primary Containment Radiation Monitors (PC4)	
		None				None	
		Drywell radiation monitor RMS-RE20				Containment radiation monitor	

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for LOSS or POTENTIAL LOSS of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs	Containment Barrier (PC) EALs
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

	reading, > 100 R/hr due to reactor coolant leakage		RMS-RE16 reading > 10,000 R/hr
4. Emergency Director Judgment (FC4)			
Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier,	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier,		
	5. Emergency Director Judgment (RC5)	5. Emergency Director Judgment (PC5)	
	Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier,	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment	Any condition in the opinion of the Emergency Director that indicates potential loss

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FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

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*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

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GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss of or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs		Containment Barrier (PC) EALs			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS		
		of the RCS barrier,		barrier,		of the Primary Containment barrier,	

FISSION PRODUCT BARRIER DEGRADATION

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FU1

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INITIATING CONDITION – NOTIFICATION OF UNUSUAL EVENT

ANY loss or ANY potential loss of containment

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of containment

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Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or any potential loss of containment.

The Fuel Cladding (FC) and the Reactor Coolant System (RCS) are weighted more heavily than the Primary Containment (PC) barrier, NOUE ICs associated with RCS and FC barriers are addressed under System Malfunction ICs.

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

FISSION PRODUCT BARRIER DEGRADATION

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FA1

INITIATING CONDITION – ALERT

Any loss or any potential loss of either fuel clad or RCS

<u>Operating Mode Applicability:</u>	Mode 1	Power Operation
	Mode 2	Startup
	Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of fuel clad.

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OR

Any loss or any potential loss of RCS

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or potential loss of a fuel clad barrier or a loss or potential loss of the RCS barrier.

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 fuel bundle 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.

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FISSION PRODUCT BARRIER DEGRADATION

Deleted: BWR TABLE 5-F-2

FS1

INITIATING CONDITION – SITE AREA EMERGENCY

Loss or potential loss of any two barriers

<u>Operating Mode Applicability:</u>	<u>Mode 1</u>	<u>Power Operation</u>
	<u>Mode 2</u>	<u>Startup</u>
	<u>Mode 3</u>	<u>Hot Shutdown</u>

Emergency Action Level(s):

1. Loss or potential loss of any two barriers

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Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates loss or potential loss of any two barriers.

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

FISSION PRODUCT BARRIER DEGRADATION

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FG1

INITIATING CONDITION – GENERAL EMERGENCY

Loss of any two barriers and loss or potential loss of third barrier

<u>Operating Mode Applicability:</u>	<u>Mode 1</u>	<u>Power Operation</u>
	<u>Mode 2</u>	<u>Startup</u>
	<u>Mode 3</u>	<u>Hot Shutdown</u>

Emergency Action Level(s):

1. Loss of any two barriers

AND

Loss or potential loss of the third barrier

Bases:

▲ Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss of any two barriers and the loss or potential loss of the third barrier.

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.

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FISSION PRODUCT BARRIER DEGRADATION

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FC1

FUEL CLAD

Emergency Action Level:

Primary coolant activity level

EAL Threshold:

LOSS: Coolant activity \geq 300 $\mu\text{Ci/g}$ dose equivalent I-131

Deleted: Primary

Deleted: greater than (site specific value)

POTENTIAL LOSS: NONE

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Bases:

LOSS – The site specific value is 300 $\mu\text{Ci/gm}$ dose equivalent I-131. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad barrier is considered lost.

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POTENTIAL LOSS - NONE

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References:

FISSION PRODUCT BARRIER DEGRADATION

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FC2

FUEL CLAD

Emergency Action Level:

Reactor vessel water level

EAL Threshold:

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

Deleted: (site specific RPV water level corresponding to the

Deleted: requirement for primary containment flooding)

POTENTIAL LOSS:.....RPV water level cannot be restored and maintained above
-162 inches or cannot be determined

Deleted: (site specific RPV water level corresponding to the top of

Deleted: active fuel).

Bases:

LOSS - This site specific value corresponds to the level used in EOPs to indicate challenge of core cooling. This is the minimum value to assure core cooling without further degradation of the clad. Reactor vessel water level less than the minimum steam cooling RPV water level (-186") with injection is the lowest level with adequate core cooling to maintain peak clad temperature less than 1500°F where fuel clad damage (fuel rod perforation) may begin. Corrective actions as described in the Emergency Operating Procedures (EOPs) and Severe Accident Guidelines (SAGs) will be needed to mitigate fuel clad/core damage.

Deleted: Loss Threshold A

POTENTIAL LOSS - This threshold is the same as the RCS barrier loss threshold RC2, and corresponds to the site specific water level at the top of the active fuel. Thus, this threshold indicates a potential loss of the Fuel Clad barrier and a loss of the RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency. 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.

Deleted: [Depending on the plant this may be the Minimum Steam Cooling RPV Water Level or the jet pump suction without the requisite Core Spray cooling flow. BWROG EPGs/SAGs provide explicit direction when RPV water level cannot be determined. Since the loss of ability to determine if adequate core cooling is being provided presents a significant challenge to the fuel clad barrier, a potential loss of the fuel clad barrier is specified.]¶

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References:

FISSION PRODUCT BARRIER DEGRADATION

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FC3

FUEL CLAD

Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: Containment radiation monitor RMS-RE16 reading \geq 3,000 R/hr

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POTENTIAL LOSS: NONE

Bases:

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.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

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

[The reading should be calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μ Ci/gm dose equivalent I-131 or the calculated concentration equivalent to the clad damage used in threshold 1 into the drywell atmosphere.]¶

POTENTIAL LOSS - NONE

References:

Calculation G13.18.9.4-045 Rev. 0

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Deleted: This value is higher than that specified for RCS barrier Loss threshold #4. Thus, this threshold indicates a loss of both Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency. ¶

Deleted: [Caution: it is important to recognize that in the event the radiation monitor is sensitive to shine from the reactor vessel or piping, spurious readings will be present and another indicator of fuel clad damage is necessary or compensated for in the threshold value.]

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FISSION PRODUCT BARRIER DEGRADATION

FC4

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FUEL CLAD

Emergency Action Level:

Emergency Director judgment

EAL Threshold:

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

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POTENTIAL LOSS: Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier

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Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

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FISSION PRODUCT BARRIER DEGRADATION

REACTOR COOLANT SYSTEM Emergency Action Level:

Drywell pressure

EAL Threshold:

LOSS: Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell

POTENTIAL LOSS: NONE

Bases:

LOSS - The site specific primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating the ECCS or equivalent makeup system.

Pressure rise due solely to loss of containment or drywell heat removal capability, testing, etc are not considered for this EAL threshold.

POTENTIAL LOSS - NONE

References:

RC1

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FISSION PRODUCT BARRIER DEGRADATION

RC2

REACTOR COOLANT SYSTEM

Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS:RPV water level cannot be restored and maintained above
-162 inches or cannot be determined

POTENTIAL LOSS:NONE

Bases:

LOSS - The loss EAL threshold of site specific RPV water level corresponds to the level that is used in EOPs to indicate challenge of core cooling.

This threshold is the same as the Fuel Clad barrier potential loss EAL threshold FC2 and corresponds to a challenge to core cooling. Thus, this threshold indicates a loss of the RCS barrier and potential loss of the Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

POTENTIAL LOSS – NONE

References:

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FISSION PRODUCT BARRIER DEGRADATION

RC3

REACTOR COOLANT SYSTEM

Emergency Action Level:

RCS leak rate

EAL Threshold:

LOSS:1.a. UNISOLABLE main
steam line break as indicated by the failure of
both MSIVs in any one line to close

AND

High MSL flow annunciator (P601-19A-A2)

AND

Main Steam Tunnel Temperature > 144°F [173°F NRC TS
submittal change]

OR

b. indication of an UNISOLABLE HPCS, Feedwater,
RWCU or RCIC break

OR

2. Emergency RPV depressurization is required

POTENTIAL LOSS:1. RCS leakage ≥ 50 gpm inside the drywell

OR

2. UNISOLABLE RCS leakage outside PC, as indicated by
exceeding either of the following:

a. Max Normal Operating Temperature (Table F2)

OR

b. Max Normal Area Radiation (Table F2)

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FISSION PRODUCT BARRIER DEGRADATION

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RC3

TABLE F2			
RC 3 Potential Loss of RCS			
Parameter	Area Temperature (isolation temperature alarm)	Area Radiation Level	
		DRMS Grid 2	Max Normal Operating Value
RHR A equipment area	117° F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equipment area	117° F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equipment area	N/A	1215	8.2E+01 mR/hr
RCIC room	182° F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	144°F [173°F NRC TS submittal change] (P601-19A-A1/A3/B1/B3)	N/A	
RWCU pump room 1 (A) / 2 (B)	165° F (P680-1A-A2/B2)	N/A	

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Bases:

LOSS - An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this EAL threshold is included for consistency with the Alert emergency classification level.

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Other large high-energy line breaks such as HPCS, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered as MSL breaks for purposes of classification.

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The leak is NOT isolable from the Main Control Room **OR** an attempt for isolation from the Main Control Room panels has been made and was not successful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification, this INITIATING CONDITION is not applicable. Dispatch of operators outside the Control Room for manual attempts to close the valve is not considered.

Plant symptoms requiring Emergency RPV depressurization per the site specific EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

Deleted: Loss Threshold #B

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POTENTIAL LOSS - This threshold is based on leakage set at a level indicative of a small breach of the RCS but which is well within the makeup capability of normal and emergency high pressure systems. Core uncover is not a significant concern for a

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#A

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FISSION PRODUCT BARRIER DEGRADATION

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RC3

50 gpm leak, however, break propagation leading to 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. Other indications include a rise in drywell temperature and pressure and a rise in the drywell radiation monitors. If the leakage computer is unavailable, sump level and pump status may help determine if the leakage is greater than 50 gpm.

If the DFR discharge line containment isolation valves have not isolated and a pump is running continuously without lowering sump level, the leakage may be assumed to exceed 50 gpm. The second pump can be started to verify that the first pump is not degraded. It is not intended to conclude a potential loss of the RCS barrier exists if both pumps are degraded and the observed leak rate as noted by rate of rise of level in the sump or calculated by the computer is such that it clearly confirms leakage below 50 gpm.

References:

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FISSION PRODUCT BARRIER DEGRADATION

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RC4

REACTOR COOLANT SYSTEM

Emergency Action Level:

Drywell radiation

EAL Threshold:

LOSS: Drywell radiation monitor RMS-RE20 reading ≥ 100
R/hr

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POTENTIAL LOSS: NONE

Bases:

LOSS – The site specific reading is a value which indicates the release of reactor coolant to the drywell.

Deleted: primary containment

POTENTIAL LOSS - NONE

Deleted: [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.] ¶

References:

G13.18.9.4-051

Deleted: This reading will be less than that specified for Fuel Clad barrier Loss threshold #4. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier threshold, fuel damage would also be indicated. ¶

Deleted: [However, if the site specific physical location of the primary containment 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 threshold should be omitted and other site specific indications of RCS leakage substituted.] ¶

Deleted: There is no Potential Loss threshold associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

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RC5

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REACTOR COOLANT SYSTEM

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

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

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Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

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References:

FISSION PRODUCT BARRIER DEGRADATION

PRIMARY CONTAINMENT

Emergency Action Level:

Primary containment conditions

EAL threshold:

LOSS:

1. Rapid unexplained loss of PC pressure following initial pressure rise

OR

2. PC pressure response not consistent with LOCA conditions

POTENTIAL LOSS: 1. PC pressure \geq 15 psig and rising

OR

2. a. PC hydrogen in the unsafe zone of HDOL curve

OR

b. DW hydrogen concentration $>$ 9%

OR

3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL

PC1

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FISSION PRODUCT BARRIER DEGRADATION

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PC1

Bases:

LOSS – Rapid unexplained loss of pressure (i.e., not attributable to condensation effects or restoration of containment or drywell unit coolers) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy released into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity. This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition. Control room indicators may include ERIS data points, P808 CMS indication, or back-panel CMS pressure indication.

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POTENTIAL LOSS -

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The site specific pressure is based on the primary containment design pressure. Primary Containment pressure greater than 15 psig and rising is based on the design pressure of the Primary Containment. If the 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.

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.

Deleted: Potential Loss Threshold B ¶
[BWRs specifically define the limits associated with explosive mixtures in terms of deflagration concentrations of hydrogen and oxygen. For Mk I/II containments the deflagration limits are "6% hydrogen and 5% oxygen in the drywell or suppression chamber". For Mk III containments, the limit is the "Hydrogen Deflagration Overpressure Limit". The term "explosive mixture" is synonymous with "deflagration limits" and is used as it is a more easily understood term.] ¶

The Heat Capacity Temperature Limit (HCTL) is the highest suppression pool temperature from which emergency RPV depressurization will not raise: suppression chamber temperature above the maximum temperature capability of the suppression chamber and equipment within the suppression chamber which may be required to operate when the RPV is pressurized,

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FISSION PRODUCT BARRIER DEGRADATION

PCI

Suppression chamber pressure above PC pressure limit A, while the rate of energy transfer from the RPV to the containment is greater than the capacity of the containment vent.

The HCTL is a function of RPV pressure and suppression pool water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

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FISSION PRODUCT BARRIER DEGRADATION

PC2

PRIMARY CONTAINMENT

Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS: NONE

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

Bases:

LOSS – NONE

POTENTIAL LOSS - The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into SAP-1 and SAP-2 is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and higher potential for containment failure. In conjunction with Reactor Vessel water level "loss" thresholds in the Fuel Clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

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FISSION PRODUCT BARRIER DEGRADATION

PRIMARY CONTAINMENT

Emergency Action Level:

Primary containment isolation failure or bypass

EAL Threshold:

LOSS: 1. a. Failure of all valves in any one line to close

AND

b. Direct downstream pathway to the environment exists after PC isolation signal

OR

2. Intentional PC venting per EOPs or SAPs

OR

3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following:

a. Max Safe Operating Temperature (Table F1)

OR

b. Max Safe Area Radiation (Table F1)

POTENTIAL LOSS: NONE

PC3

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FISSION PRODUCT BARRIER DEGRADATION

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PC3

TABLE F1		
PC 3 Loss of Primary Containment		
Parameter	Area Temperature	Area Radiation Level
	Max Safe Operating Value	DRMS Grid 2 Max Safe Operating Value
RHR A equipment area	200° F	1213 9.5E+03 mR/hr
RHR B equipment area	200° F	1214 9.5E+03 mR/hr
RHR C equipment area	N/A	1215 9.5E+03 mR/hr
RCIC room	200° F	1219 9.5E+03 mR/hr
MSL Tunnel	200° F	N/A
RWCU pump room 1 (A) / 2 (B)	200° F	N/A

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Bases:

These thresholds address incomplete containment isolation that allows direct release to the environment.

LOSS - Failure to isolate - 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. Dispatch of Operators outside the Control Room for manual attempts to close the valve is not considered.

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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.

The use of the modifier "direct" in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

FISSION PRODUCT BARRIER DEGRADATION

PC3

Containment Venting - Site specific EOPs and SAPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs or SAPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure when not in an accident situation should not be considered.

Area temperature or radiation – The presence of area radiation or temperature Max Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The 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.

POTENTIAL LOSS - None

References:

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FISSION PRODUCT BARRIER DEGRADATION

PC4

PRIMARY CONTAINMENT

Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: NONE

POTENTIAL LOSS: Containment radiation monitor RMS-RE16 reading \geq 10,000 R/hr

BASIS

LOSS – NONE

POTENTIAL LOSS – The site specific reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and fuel clad.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

References:

..... Calculation G13.18.9.4-045 Rev. 0

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Deleted: [As stated in Section 3.8, a major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.] ¶
[NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%. Unless there is a (site specific) analysis justifying a higher value, it is recommended that a radiation monitor reading corresponding to 20% fuel clad damage be specified here.]¶

FISSION PRODUCT BARRIER DEGRADATION

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PC5

REACTOR COOLANT SYSTEM

Emergency Action Level:

Emergency Director judgment

EAL Threshold:

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

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

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Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

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The Primary Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Primary Containment barrier. When no event is in progress (loss or potential loss of either Fuel Clad and/or RCS) the Primary Containment barrier status is addressed by Technical Specifications.

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References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Natural or destructive phenomena affecting the PROTECTED AREA

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Operating Mode Applicability:

All

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Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:

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- Seismic event confirmed by activated seismic switch as indicated by receipt of EITHER a OR b:

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- a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)
- b. Event Indicator on ERS-NBI-102 is white

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- Earthquake felt in plant

- National Earthquake Center

OR

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2. Tornado striking within PROTECTED AREA boundary,

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OR

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3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

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OR

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

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OR

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5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

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Table H1 Uncontrolled Flooding Threshold Area Water Level	
Affected Location / Parameter	Max Safe Operating Value / Indicator
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Room 70' EL	4 inches above floor (P870-51A-G4)
RHR A Room 70' EL	4 inches above floor (P870-51A-G4)
RHR B Room 70' EL	4 inches above floor (P870-51A-G4)
RHR C Room 70' EL	4 inches above floor (P870-51A-G4)
LPCS Room 70' EL	4 inches above floor (P870-51A-G4)
RCIC Room 70' EL	4 inches above floor (P870-51A-G4)

Basis:

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

EAL #1

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

The annunciators "Seismic Tape Recording SYS Start" and the "white" event indicator are listed in the Alarm Response Procedure as verification of an earthquake event.

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

EAL #2

This EAL is based on a tornado striking (touching down) within the PROTECTED AREA.

Deleted: [For most plants with seismic instrumentation, the seismic switches are set at an acceleration of about 0.01g. This EAL should be developed on site specific basis. The method of detection can be based on instrumentation, validated by a reliable source, or operator assessment.] ¶

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA6.

EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

The EAL is only applicable to areas in Table H1 areas that contain systems required for safe shutdown of the plant and that are not designed to be partially or fully submerged. The EAL is based on VALID indication that the area water level has reached 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 safety of the plant and is appropriately treated as an Unusual Event.

Escalation of this emergency classification level, if appropriate, would be via HA6, or by other plant conditions.

EAL #4

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU4 and HU5.

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 this emergency classification level, if appropriate, would be to HA6 based on damage done by PROJECTILES generated by the failure or by the radiological releases. These latter events would be classified by the radiological (A) ICs or Fission Product Barrier (F) ICs.

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Deleted: [The site specific areas include those areas that contain systems required for safe shutdown of the plant, which are not designed to be partially or fully submerged. The plant's IPEEE may provide insight into areas to be considered when developing this EAL.] ¶

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This EAL addresses other site specific phenomena (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

EAL #5

This EAL is based on the assumption that high winds within the PROTECTED AREA may have potentially damaged plant structures, listed in Table H2, 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 lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average meter wind speed on the MET Tower is 100 mph. If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport. If damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

References:

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Deleted: [Sites subject to severe weather as defined in the NUMARC station blackout initiatives should include an EAL based on activation of the severe weather mitigation procedures (e.g., precautionary shutdowns, diesel testing, staff call-outs, etc.).]

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA

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Operating Mode Applicability: All

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

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

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area.

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Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

OR

2. EXPLOSION within the PROTECTED AREA

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Basis:

This IC addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

EAL #1

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

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other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

EAL #2

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency Director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA4.

References:

Deleted: [The site specific list should be limited and applies to buildings and areas in actual contact with or immediately adjacent to 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 in actual contact with or immediately adjacent to VITAL AREAS. This excludes FIRES within administration buildings, waste-basket FIRES, and other small FIRES of no safety consequence. Immediately adjacent implies that the area immediately adjacent contains or may contain equipment or cabling that could impact equipment located in VITAL AREAS or the fire could damage equipment inside VITAL AREAS or that precludes access to VITAL AREAS.]

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.

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Operating Mode Applicability: All

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

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

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OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an off-site event.

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Basis:

This IC is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

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The fact that SCBAs may be worn does not eliminate the need to declare the event.

This IC is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

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References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

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Operating Mode Applicability: _____ All

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

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the RBS security shift supervision

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OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

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Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72.

Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

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A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. Consideration shall be given to upgrading the emergency response status and emergency classification, in accordance with the Safeguards Contingency Plan and Emergency Plan.

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EAL #1

The Security Shift Supervisor is the designated individual on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

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This EAL is based on the Safeguards Contingency Plan. The Safeguards Contingency Plan is based on guidance provided in NEI 03-12.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

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EAL #2

This EAL is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of Unusual Event.

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The determination of "credible" is made through use of information found in the Safeguards Contingency Plan.

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EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

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NEI 03-12

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU2

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

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

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Operating Mode Applicability: All

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Emergency Action Level(s):

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

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Basis:

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

References:

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

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Initiating Condition - ALERT

Natural or destructive phenomena affecting VITAL AREAS,

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event \geq Operating Basis Earthquake (OBE) as indicated by:

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

AND

Event Indicator on ERS-NBI-102 is white

AND

Receipt of EITHER 1 OR 2:

1. Annunciator "Seismic Event High" (P680-02A-C06)

2. Annunciator "Seismic Event High-High" (P680-02A-B06) AND amber light(s) on panel NBI-101

AND

- b. Earthquake confirmed by any of the following:

- Earthquake felt in plant
- National Earthquake Center
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado striking, resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems,

OR

3. Internal flooding in Auxiliary Building 70 ft elevation, resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems,

OR

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

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

OR

5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems.

OR

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Basis:

These EALs escalate from HU6 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by Control Room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in these EALs to assess the actual magnitude of the damage. The significance here is not

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

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that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction (S) ICs.

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). At RBS, the term "freshly off-loaded reactor core" refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

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Deleted: [These EALs should specify site specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant. Site specific Safe

Deleted: Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.]

EAL #1

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

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

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

EAL #2

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

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EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant. The areas of concern are the areas identified in Table 4 of EOP 3 that contain systems required

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

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for safe shutdown of the plant that are not designed to be partially or fully submerged. Indication may be by local verification, control room indication, or in degraded performance of systems affected by the flooding.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

EAL #4

This EAL addresses the threat to safety related equipment imposed by PROJECTILES generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an ALERT in that the potential exists for actual or substantial potential degradation of the level of safety of the plant. Some structures on the list may not be at risk for the turbine generated missile but are included for consistency in identifying structures or areas containing systems and functions required for safe shutdown of the plant.

Deleted: [The site specific areas include those areas that contain systems required for safe shutdown of the plant, which are not designed to be partially or fully submerged. The plant's IPEEE may provide insight into areas to be considered when developing this EAL.] ¶

EAL #5

This EAL addresses vehicle crashes within the PROTECTED AREA that result in VISIBLE DAMAGE to VITAL AREAS (as shown in Table H2) or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

Deleted: [The site specific list of areas should include all areas containing safety structure, system, or component, their controls, and their power supplies.] ¶

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EAL #6

This EAL is based on high winds within the PROTECTED AREA that have caused VISIBLE DAMAGE to structures or areas 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 lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average wind speed on the MET Tower is 100 mph. If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

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Deleted: This EAL addresses other site specific phenomena that result in VISIBLE DAMAGE to VITAL AREAS or results in indication of damage to safety structures, systems, or

Deleted: components containing functions and systems required for safe shutdown of the plant (such as hurricane, flood, or seiche) that can also be precursors of more serious events. ¶

[Sites subject to severe weather as defined in the NUMARC station blackout initiatives should include an EAL based on activation of the severe weather mitigation procedures (e.g., precautionary shutdowns, diesel testing, staff call-outs, etc.).]

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

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Initiating Condition - ALERT

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

Operating Mode Applicability: _____ All

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems,

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Basis:

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

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Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radiological Effluent (A) ICs.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

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Initiating Condition - ALERT

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

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Operating Mode Applicability:

All

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Emergency Action Level(s):

Note: *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to a VITAL AREA (Table H2) is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.

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Basis:

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA_s may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

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Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radioactive Effluent (A) ICs.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

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Initiating Condition - ALERT

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

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Operating Mode Applicability: _____ All Emergency Action Level(s): _____ (1 or 2)

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Example

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1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision.
2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

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Basis:

NOTE: *Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.*

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These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL #1

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

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Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes Independent Spent Fuel Storage Installations that may be outside the PROTECTED AREA but still in the OWNER CONTROLLED AREA.

EAL #2

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a

[If not previously notified by the NRC that the airborne HOSTILE ACTION was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.] ¶

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

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state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

References:

NEI 03-12

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

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Initiating Condition - ALERT

Control room evacuation has been initiated

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Operating Mode Applicability: _____ All

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Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room, requires Control Room evacuation.

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Basis:

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With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

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Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

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Initiating Condition - ALERT

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

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Operating Mode Applicability: _____ All

Deleted: Example

Emergency Action Level(s):

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

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Basis:

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

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS3

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Initiating Condition - SITE AREA EMERGENCY

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

Operating Mode Applicability: _____ All

Emergency Action Level(s): _____

1. a. Control room evacuation has been initiated.

AND

b. Control of the plant cannot be established in accordance with AOP-0031.
Shutdown from Outside the Main Control Room, within 15 minutes.

Basis:

The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

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

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director judgment. The Emergency Director is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant from the remote shutdown panel.

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

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Deleted: [The site specific time for transfer is based on analysis or assessments as to how quickly control must be reestablished without core uncovering and/or core damage. This time should not exceed 15 minutes without additional justification.]

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

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Initiating Condition - SITE AREA EMERGENCY

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

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Operating Mode Applicability: _____ All

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Emergency Action Level(s):

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

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Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

References:

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

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Initiating Condition - SITE AREA EMERGENCY

HOSTILE ACTION within the PROTECTED AREA

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Operating Mode Applicability: All

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Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision.

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Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

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[If not previously notified by NRC that the airborne HOSTILE ACTION was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.]*

References:

NEI 03-12

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition - GENERAL EMERGENCY

HOSTILE ACTION resulting in loss of physical control of the facility,

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Operating Mode Applicability: All

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

Deleted: Example

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions,

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OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool,

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Basis:

EAL #1

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location. These safety functions are reactivity control (ability to shut down the reactor and keep it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

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Loss of physical control of the Control Room or remote shutdown panel capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

Deleted: [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) for a BWR. The equivalent functions for a PWR are reactivity control, RCS inventory, and secondary heat removal.] ¶

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

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EAL #2

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool. At RBS, the term "freshly off-loaded reactor core" refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

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HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG2

Initiating Condition - GENERAL EMERGENCY

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

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Operating Mode Applicability: _____ All

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Emergency Action Level(s):

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

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Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

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SYSTEM MALFUNCTION

SU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite AC power to emergency busses for ≥ 15 minutes.

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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Emergency Action Level(s):

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

1. Loss of all offsite AC power to Div I & II ENS busses for ≥ 15 minutes.

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Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency busses.

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

References:

Deleted: [At multi-unit stations, the EALs should allow credit for operation of installed design features, such as cross-ties or swing diesels, provided that abnormal or emergency operating procedures address their use. However, these stations must also consider the impact of this condition on other shared safety functions in developing the site specific EAL.] ¶
[Plants that have a proceduralized capability to cross-tie AC power from an off-site power supply of a companion unit may take credit for the redundant power source in the associated EAL for this IC.]

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SYSTEM MALFUNCTION

SU11

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inability to reach required operating mode within Technical Specification limits.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

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

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Basis:

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

References:

Deleted: [Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other System Malfunction, Hazards, or Fission Product Barrier Degradation ICs.]

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SYSTEM MALFUNCTION

SU6

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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Emergency Action Level(s):

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

1. UNPLANNED Loss of \geq , approximately 75% of the following for ≥ 15 minutes:

a. Control room safety system annunciation,

OR

b. Control Room safety system indication,

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Basis:

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

Recognition of the availability of computer based indication equipment is considered e.g., SPDS, plant computer, etc.

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the

SYSTEM MALFUNCTION

SU6

NOUE is based on SU11, "Inability to reach required operating mode within Technical Specification limits."

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

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

This NOUE will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

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Deleted: [Site specific annunciators or indicators for this EAL must include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).] ¶

Deleted: [Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no IC is indicated during these modes of operation.] ¶

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SYSTEM MALFUNCTION

SU9

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Fuel clad degradation

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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

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1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits

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Table S1				
FLOW (cfm)	Dose Rate Limit (mR/hr)		FLOW (cfm)	Dose Rate Limit (mR/hr)
15	9579		70	1865
17.875	8064		80	1671
20	7219		90	1510
25	5788		100	1376
30	4829		110	1262
32.83	2849		120	1165
35	2810		130	1082
40	2680		140	1009
45	2529		150	945
50	2377		175	815
60	2098		200	716

OR

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Deleted: 2. (Site specific coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.)

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SYSTEM MALFUNCTION

SU9

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2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits

- >4.0 $\mu\text{Ci/gm}$ dose equivalent I-131

OR

- >0.2 $\mu\text{Ci/gm}$ dose equivalent I-131 for > 48 hours

Basis:

This IC is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

EAL #1

This EAL addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

The Technical Specification limit of 290 mCi/sec Offgas pre-treatment release is equivalent to 11,210 mR/hr (assumes flow of 17.875 cfm without adjustment for instrument accuracy). The Table S1 values account for instrument inaccuracy and changing offgas flow rate. The dose rate in the table corresponds to the adjusted TS limit for that associated indicated flow. The table dose rate values may not reflect the H13-P601/22A/F03 alarm setpoint. To determine if EAL conditions are met when the pre-treatment high radiation alarm (H13-P601/22A/F03) is lit, the operator must read the actual indicated offgas flow rate and indicated pre-treatment mR/hr value on H13-P600. Compare the indicated mR/hr value with the Table S1 dose rate mR/hr for the indicated flow value. If the indicated mR/hr is greater than the Table S1 value, the EAL condition is met.

EAL #2

This EAL addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits and coolant samples exceeding coolant Technical Specifications for nominal operating iodine limits for the time period specified in the Technical Specifications.

Escalation of this IC to the Alert level is via the Fission Product Barriers (F).

References:

TS 3.4.8/B 3.4.8

TS 3.7.4 / B 3.7.4

G13.18.9.6.*012 Rev 0

G13.18.9.5-019-3B

G13.18.9.5-019-3C

USAR 15.7.1

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SYSTEM MALFUNCTION

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

RCS leakage

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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

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1. Unidentified or pressure boundary leakage \geq 10 gpm

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OR

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2. Identified leakage \geq 35 gpm

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Basis:

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This IC is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

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Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation (F) ICs.

References:

RBS Technical Specification 3.4.5

SYSTEM MALFUNCTION

SU8

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities,

Operating Mode Applicability:

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

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

1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:

Plant radio system
Plant paging system
Sound powered phones
In-plant telephones

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OR

2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:

All telephones
NRC phones
State of Louisiana Radio
Offsite notification system and hotline

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Basis:

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

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

Deleted: [The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.] ¶

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Deleted: [Site specific list for on-site communications loss must encompass the loss of all means of communications (e.g., commercial telephones, sound powered phone systems, page

SYSTEM MALFUNCTION

SU8

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Deleted: [Site specific list for off-site communications loss must encompass the loss of all means of communications with off-site authorities. This should include the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems that are routinely used for offsite emergency notifications.]

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SYSTEM MALFUNCTION

SU10

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Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality.

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Operating Mode Applicability:

Mode 3.....Hot Shutdown

Emergency Action Level(s):

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1. UNPLANNED sustained positive period observed on nuclear instrumentation.

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Basis:

Deleted: 1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation. [PWR] ¶

This IC addresses inadvertent criticality events. 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 "sustained" is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

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Escalation would be by the Fission Product Barrier Table (F), as appropriate to the operating mode at the time of the event.

SYSTEM MALFUNCTION

Initiating Condition - ALERT

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

Operating Mode Applicability:

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

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

- b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%

Basis:

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

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. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

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

References:

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SYSTEM MALFUNCTION

SA6

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Initiating Condition - ALERT

UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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Emergency Action Level(s):

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

1. a. UNPLANNED loss of \geq approximately 75% of the following for ≥ 15 minutes:

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- Control room safety system annunciation.

OR

- Control Room safety system indication.

AND

b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress

OR

- Compensatory indications are unavailable.

Basis:

This IC is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

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

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

SYSTEM MALFUNCTION

SA6

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

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It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11, "Inability to reach required operating mode within Technical Specification limits."

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory 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. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

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Deleted: [Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no IC is indicated during these modes of operation.]

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SYSTEM MALFUNCTION

SA1

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Initiating Condition - ALERT

AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes, such that any additional single failure would result in station blackout.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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Emergency Action Level(s):

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

1. _a. _AC power capability to Div I and II ENS busses, reduced to a single power source for ≥ 15 minutes,

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AND

- b. _Any additional single power source failure will result in station blackout.

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Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

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The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency diesel generator to supply power to its emergency busses. Another related condition could be the loss of all offsite power and loss of onsite emergency diesels generators with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency diesel generators with only one train of emergency busses being fed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with SS1.

Deleted: [This IC and the associated EALs are intended to provide an escalation from IC SU1, "Loss of All Off-site AC Power To Emergency Busses for Greater Than 15 Minutes."] ¶

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

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

SYSTEM MALFUNCTION

SA1

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Deleted: [At multi-unit stations, the EALs should allow credit for operation of installed design features, such as cross-ties or swing diesels, provided that abnormal or emergency operating procedures address their use. However, these stations must also consider the impact of this condition on other shared safety functions in developing the site specific EAL.]

Deleted: [Plants that have a proceduralized capability to cross-tie AC power from an off-site power supply of a companion unit may take credit for the redundant power source in the associated EAL for this IC.]

SYSTEM MALFUNCTION

SS1

Initiating Condition - SITE AREA EMERGENCY

Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes.

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for ≥ 15 minutes.

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

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

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 emergency busses. Even though an emergency bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus was the only energized bus then a SAE per SS1 should be declared.

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Deleted: [At multi-unit stations, the EALs should allow credit for operation of installed design features, such as cross-ties or swing diesels, provided that abnormal or emergency operating procedures address their use. However, these stations must also consider the impact of this condition on other shared safety functions in developing the site specific EAL.] ¶
[Plants that have a proceduralized capability to cross-tie AC power from an off-site power supply of a companion unit may take credit for the redundant power source in the associated EAL for this IC.] ¶

SYSTEM MALFUNCTION

SS1

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or IC SG1, "Prolonged loss of all offsite, and all onsite AC power to emergency busses."

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SYSTEM MALFUNCTION

SS3

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Initiating Condition - SITE AREA EMERGENCY

Automatic scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Emergency Action Level(s):

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1. _a. An automatic scram failed to shutdown the reactor.

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- b. _Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power > 5%.

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Basis:

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

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s), which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

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Deleted: [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.] ¶

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SYSTEM MALFUNCTION

SS4

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Initiating Condition - SITE AREA EMERGENCY

Loss of all vital DC power for ≥ 15 minutes.

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Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

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Emergency Action Level(s):

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

1. < 105 VDC on all vital DC busses for ≥ 15 minutes.

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Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

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

Deleted: [Site specific bus voltage should be based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value should incorporate 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. Typically the value for the entire battery set is approximately 105 VDC. For a 60 cell string of batteries the cell voltage is typically 1.75 Volts per cell. For a 58 string battery set the minimum voltage is typically 1.81 Volts per cell.] ¶

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Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluent (A), Fission Product Barrier Degradation (F).

References:

SYSTEM MALFUNCTION

SS6

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(s):

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

1. a. Loss of \geq approximately 75% of the following for ≥ 15 minutes:

- Control Room safety system annunciation,

OR

- Control Room safety system indication,

AND

- b. A SIGNIFICANT TRANSIENT is in progress,

AND c. Compensatory indications are unavailable,

Basis:

This IC is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a

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SYSTEM MALFUNCTION

SS6

function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11, "Inability to reach required operating mode within Technical Specification limits."

A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Site specific indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory 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.

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

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SYSTEM MALFUNCTION

SG1

Initiating Condition - GENERAL EMERGENCY

Prolonged loss of all offsite and all onsite AC power to emergency busses,

Operating Mode Applicability:

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

Emergency Action Level(s):

1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses,

AND

- b. Either of the following:

- Restoration of at least one emergency bus in ≤ 4 hours is not likely,

OR

- RPV level can not be maintained > -162 inches,

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one 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:

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SYSTEM MALFUNCTION

SG1

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?

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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?

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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.

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SYSTEM MALFUNCTION

SG3

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Initiating Condition - GENERAL EMERGENCY

Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.

Operating Mode Applicability:

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

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor.

AND

- b. All manual actions do not shutdown the reactor as indicated by reactor power > 5%.

AND

- c. Either of the following exist or have occurred due to continued power generation:

- Core cooling is extremely challenged as indicated by RPV level can not be maintained > -186 inches

OR

- Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

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

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Attachment 3

To

RBG-47165

Proposed Technical Basis Document (Clean)

RIVERBEND STATION (RBS) EAL BASIS DOCUMENT

RBS EAL BASIS DOCUMENT
TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
General Notes on Basis Document Use.....	5
Definitions.....	6
Abnormal Radiation Levels/Radiological Effluents.....	10
AU1.....	11
AU2.....	14
AA1.....	16
AA2.....	19
AA3.....	21
AS1.....	22
AG1.....	24
Cold Shutdown/Refueling System Malfunction.....	26
CU1.....	27
CU2.....	28
CU3.....	30
CU5.....	31
CU6.....	32
CU7.....	33
CU8.....	34
CA1.....	35
CA3.....	36
CA5.....	38
CS1.....	39
CG1.....	41

RBS EAL BASIS DOCUMENT
TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Independent Spent Fuel Storage Installation (ISFSI) Malfunction.....	43
E-HU1.....	44
Fission Product Barrier Degradation.....	45
General Bases.....	46
Fission Product Barrier Table.....	47
FU1.....	52
FA1.....	53
FS1.....	54
FG1.....	55
Fuel Clad Barrier EALs (FC).....	56
RCS Barrier EALs (RC).....	60
Containment Barrier EALS (PC).....	67
Hazards and Other Conditions Affecting Plant Safety	74
HU1.....	75
HU2.....	77
HU4.....	78
HU5.....	80
HU6.....	81
HA1.....	85
HA2.....	87
HA3.....	88
HA4.....	89
HA5.....	90
HA6.....	92
HS1.....	96
HS2.....	97
HS3.....	98

RBS EAL BASIS DOCUMENT
TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
HG1.....	99
HG2.....	100
System Malfunction.....	101
SU1.....	102
SU6.....	103
SU7.....	105
SU8.....	106
SU9.....	107
SU10.....	109
SU11.....	110
SA1.....	111
SA3.....	112
SA6.....	113
SS1.....	115
SS3.....	116
SS4.....	117
SS6.....	118
SG1.....	120
SG3.....	122

General Notes on Basis Document Use

Plant Operating Mode Usage for RBS EALs:

MODE	TITLE	REACTOR MODE SWITH POSITION	AVERAGE REACTOR COOLANT TEMPERATIURE (°F)
1	Power Operation	Run	N/A
2	Startup	Refuel ^(a) or Startup/Hot Standby	N/A
3	Hot Shutdown ^(a)	Shutdown	> 200
4	Cold Shutdown ^(a)	Shutdown	≤ 200
5	Refueling ^(b)	Shutdown or Refuel	N/A

(a) All reactor vessel head closure bolts fully tensioned.

(b) One or more reactor vessel head closure bolts less than fully tensioned.

Defueled (D) – All reactor fuel removed from reactor pressure vessel (full core offload during refueling or extended outage). This is not an operating mode designation by Technical Specifications.

This basis document serves two basic functions:

- It provides background and explanatory information based on NEI 99-01 to present a basis for the origination of the RBS EALs for reviewers and users.
- The second function this basis document may provide is an aid to decision makers when making a determination to classify an emergency event. It is intended that decision makers have all the information in Attachment 7.1 of this procedure that they need to make a sound classification decision. Information that may be useful to a decision maker in classifying emergency events is also contained in the Basis section for each IC in the Basis Document.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. A decision maker's use of this Basis Document for assistance is not intended to delay the classification.

The following definitions are taken from NEI 99-01 and the RBS Emergency Plan and applicable to the RBS emergency classification system:

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

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

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

ALERT: Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA PAG exposure levels.

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

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

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

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

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

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

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

GENERAL EMERGENCY: Events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

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

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

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

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

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

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

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

NOTIFICATION OF UNUSUAL EVENT (NOUE): Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

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

PROTECTED AREA: Encompasses all controlled areas within the security protected area fence.

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

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

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) Safety Injection Activation, or (5) thermal power oscillations >10%.

SITE AREA EMERGENCY: Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on Entergy or its affiliates. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

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

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

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

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

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

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes

OR

2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes

Table R1 EAL THRESHOLD			
Method		NOUE	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	3.06E+05 $\mu\text{Ci/sec}$
	Secondary	1GE126	5.26E-03 $\mu\text{Ci/ml}$
Fuel Building Vent	Primary	4GE005	2.19E+04 $\mu\text{Ci/sec}$
	Secondary	5GE005	4.65E-03 $\mu\text{Ci/ml}$
Radwaste Building Vent	Primary	4GE006	2.58E+04 $\mu\text{Ci/sec}$
	Secondary	5GE006	6.84E-04 $\mu\text{Ci/ml}$

Basis:

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

This IC addresses a potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases (Offsite Dose Calculation Manual - ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

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

Releases should not be prorated or averaged over 60 minutes. For example, a release exceeding 4 X the ODCM limit for 30 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors' EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU1

established by the radioactivity discharge permit. This value is associated with a planned batch release.

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

References:

T.R. 3.11

RSP-0008, *Offsite Dose Calculation Manual (ODCM)*

G.13.18.9.6*012 Rev 0, *Effect of Core Uprate on the DRMS Process Safety Limit / Conversion Factors* / PR-C-495 Rev 2 p 4

ESK-RMS05

ESK-RMS25

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU2

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED rise in plant radiation levels

Operating Mode Applicability: All

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

1. a. UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following:
 - Water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal indication on Control Room Panel 870
 - Personnel observation by visual or remote means

AND

- b. UNPLANNED VALID area radiation monitor alarm on any of the following:

RMS-RE140
RMS-RE141
RMS-RE192
RMS-RE193

OR

2. UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

NOTE: For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.

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

Basis:

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

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AU2

EAL #1

The locations of the EAL specific area radiation monitors are:

Containment RMS-RE140, North Refueling Floor
RMS-RE141, South Refueling Floor

Fuel Building RMS-RE192, South Operating Floor
RMS-RE193, North Operating Floor

The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

For refueling events where the water level drops below the RPV flange classification would be via CU2. This event escalates to an Alert per AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating modes 1-3.

EAL #2

This EAL addresses rises in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level rises that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the Threshold. The intent is to identify loss of control of radioactive material in any monitored area.

References:

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

Initiating Condition - ALERT

Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes

Operating Mode Applicability: All

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

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

1. VALID reading on any of the radiation monitors in Table R1 > the ALERT reading for ≥ 15 minutes

OR

2. For RMS-RE107 effluent monitor:

EITHER

VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes

OR

VALID reading > $1.27\text{E-}01$ $\mu\text{Ci/ml}$ for ≥ 15 minutes

OR

3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes

Table R1 EAL THRESHOLD			
Method		ALERT	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	3.06E+07 $\mu\text{Ci/sec}$
	Secondary	1GE126	2.82E-01 $\mu\text{Ci/ml}$
Fuel Building Vent	Primary	4GE005	2.19E+06 $\mu\text{Ci/sec}$
	Secondary	5GE005	2.82E-01 $\mu\text{Ci/ml}$
Radwaste Building Vent	Primary	4GE006	2.58E+06 $\mu\text{Ci/sec}$
	Secondary	5GE006	6.84E-02 $\mu\text{Ci/ml}$

Basis:

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

This IC addresses an actual or substantial potential reduction in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. RBS incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

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

Releases should not be prorated or averaged. For example, a release exceeding 600 times the ODCM limit for 5 minutes does not meet the threshold for this IC.

This Initiating Condition includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit.

EAL #1

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the Initiating Condition.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA1

Any release on the routine effluent monitors in excess of the TRM limit is considered a non-routine release. Table R1 provides the monitors' EAL setpoint values. Values are provided for a primary and secondary source for NOUE and Alert EAL determination. The Division I safety related monitors (DRMS 4GE125 and 4GE005) are the preferred source for main plant exhaust and fuel building EAL determination. Radwaste building preferred value is the effluent monitor (4GE006). The secondary monitors in Table R1 should be used to determine EALs if the preferred monitors are inoperable.

EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in this Initiating Condition established by the radioactivity discharge permit. This value is associated with a planned batch release.

Historical release permits indicate that the Alert value of 200 times the radiation monitor setpoint established by the current permit may exceed the operating range of the RMS-RE107 effluent monitor in some instances. This potentially affected monitor is listed in EAL #2 with a corresponding value for the top of its indicating range.

EAL #3

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

References:

- T.R. 3.11
- RSP-0008, *Offsite Dose Calculation Manual (ODCM)*
- G.13.18.9.6*012 Rev 0, *Effect of Core Upstate on the DRMS Process Safety Limit / Conversion Factors* / PR-C-495 Rev 2 p 4
- ESK-RMS05
- ESK-RMS25

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA2

Initiating Condition - ALERT

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

Operating Mode Applicability: All

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

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

OR

2. A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:

RMS-RE140 2000 mR/hr
RMS-RE141 2000 mR/hr
RMS-RE192 2000 mR/hr
RMS-RE193 2000 mR/hr
RMS-RE5A 1.64E+03 μ Ci/sec
RMS-RE5B (GE) 5.29E-04 μ Ci/ml

Basis:

This IC addresses rises in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2 in that fuel activity has been released, or is anticipated due to fuel heatup. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

The locations of the EAL specific area radiation monitors are:

Containment	RMS-RE140	North Refueling Floor
	RMS-RE141	South Refueling Floor
Fuel Building	RMS-RE192	South Operating Floor
	RMS-RE193	North Operating Floor
	RMS-RE5A (B)	Fuel Building Ventilation Exhaust

EAL #1

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level indication, the declaration may be based on indications of water makeup rate or

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA2

decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level.

EAL #2

This EAL addresses radiation monitor indications of fuel uncover and/or fuel damage.

Elevated ventilation monitor readings may be an indication of a radioactivity release from the fuel, confirming that damage has occurred. Elevated background at the ventilation monitor due to water level drop may mask elevated ventilation exhaust airborne activity and needs to be considered.

While a radiation monitor could detect a rise in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. **Generally, elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.**

The Abnormal Operating Procedure (AOP) provides a table for guidance on pool level and of potential scenarios and the expected pool level assuming no operator action. The AOP is also entered for UNPLANNED lowering of refueling cavity or lower fuel pool water level during refueling operations. When control rod blades are stored in the Spent Fuel Pool, dose rate rise in the area may be attributed to the stored items instead of uncovered fuel assemblies.

Escalation of this emergency classification level, if appropriate, would be based on AS1 or AG1.

References:

TS Table 3.3.6.2-1
Calculation G13.18.9.4*10

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AA3

Initiating Condition - ALERT

Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

Operating Mode Applicability: All

Emergency Action Level(s):

Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:

Main Control Room
CAS

Basis:

This IC addresses elevated radiation levels that: impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the rise in radiation levels is not a concern of this IC. The Emergency Director must consider the source or cause of the elevated radiation levels and determine if any other IC may be involved.

This IC is not meant to apply to increases in the containment dome radiation monitors as these are events which are addressed in the fission product barrier matrix EALs.

RP surveys should be performed in the CAS area if radiation above the program limit is detected outside the RCA. The Control Room area radiation monitor should be observed for EAL conditions if rising radiation levels are detected outside the RCA.

The Main Control Room and CAS are the areas at RBS requiring continuous occupancy.

References:

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AS1

Initiating Condition -- SITE AREA EMERGENCY

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

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD			
Method		SITE AREA EMERGENCY	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	4.70E+07 μ Ci/sec
	Secondary	N/A	
Fuel Building Vent	Primary	4GE005	6.70E+06 μ Ci/sec
	Secondary	N/A	
Radwaste Building Vent		N/A	

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

ABNORMAL RAD LEVELS / RADIOLOGICAL EFFLUENT

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology

Operating Mode Applicability: All

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

Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.

1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes

OR

2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY

OR

3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY

Table R1 EAL THRESHOLD			
Method		GENERAL EMERGENCY	
		DRMS Grid 6	Threshold
Main Plant Vent	Primary	4GE125	4.70E+08 μCi/sec
	Secondary	N/A	
Fuel Building Vent	Primary	4GE005	6.70E+07 μCi/sec
	Secondary	N/A	
Radwaste Building Vent		N/A	

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

EAL #1

The monitor list in EAL #1 includes monitors on all potential release pathways.

EAL #2

Since dose assessment in EAL #2 is based on actual meteorology, whereas the monitor readings in EAL #1 are not, the results from these assessments may indicate that the classification is not warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EALs.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Emergency Action Level(s):

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

1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for ≥ 15 minutes

Basis:

This IC is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA1 or CA3.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of RCS/RPV inventory

Operating Mode Applicability:

Mode 5..... Refueling

Emergency Action Level(s):

(1 or 2)

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

1. UNPLANNED RCS level drop as indicated by either of the following:
 - a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange

OR

- b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange

OR

2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

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

Refueling evolutions that lower RCS water level below the RPV flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level lowering below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of 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 makeup that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA1 or CA3.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

EAL #1

This EAL involves a drop in RCS level below the top of the RPV flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to reductions in flooded reactor cavity level, which is addressed by AU2 EAL1, until such time as the level drops to the level of the vessel flange.

If RPV level continues to drop and reaches the Low-Low ECCS Actuation Setpoint then escalation to CA1 would be appropriate.

EAL #2

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of 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. Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA1 or CA3.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

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 Level(s): (1 or 2)

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

1. UNPLANNED event results in RCS temperature exceeding 200 °F.

OR

1. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes.

Basis:

This IC is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that lower 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 rises in RCS/RPV temperatures depending on the time since shutdown.

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

Escalation to Alert would be via CA1 based on an inventory loss or CA3 based on exceeding its temperature criteria.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU5

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

AC power capability to emergency 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 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

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

2. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes

AND

- b. Any additional single power source failure will result in station blackout

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of onsite emergency diesel generators with only one train of emergency busses being fed from offsite power (or backfed from offsite power through the main transformer). The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA5.

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

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of required DC power for ≥ 15 minutes

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

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

1. < 105 VDC on required Vital DC busses for ≥ 15 minutes

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.

It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per CA3.

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

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU7

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Basis:

This IC addresses criticality events that occur in Cold Shutdown or Refueling modes such as fuel mis-loading events . This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification.

This condition can be identified using period monitors. The term "sustained" is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by Emergency Director Judgment.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

Mode 4..... Cold Shutdown
Mode 5..... Refueling
Mode D..... Defueled

Emergency Action Level(s):

(1 or 2)

1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations:
 - Plant radio system
 - Plant paging system
 - Sound powered phones
 - In-plant telephones

OR

2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications:
 - All telephones
 - NRC phones
 - State of Louisiana Radio
 - Offsite notification system and hotline

Basis:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with offsite authorities. The loss of 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 federal, state, and local authorities of plant issues. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition - ALERT

Loss of RCS/RPV inventory

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

(1 or 2)

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

1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)

OR

2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

These EALs are not applicable when the RPV is defueled and 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 lowering and potential core uncover. This condition will result in a minimum emergency classification level of an Alert.

EAL #1

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

EAL #2

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

If RPV level continues to lower then escalation to Site Area Emergency will be via CS1.

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

Initiating Condition - ALERT

Inability to maintain plant in cold shutdown

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

(1 or 2)

1. An UNPLANNED event results in RCS temperature > 200 °F for > the specified duration in Table C2

OR

2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling

Table C2: RCS Reheat Duration Thresholds		
RCS	Containment Closure	Duration
Intact	N/A	60 minutes
Not intact	Established	20 minutes
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, then the EAL is not applicable.		

Basis:

EAL #1

The RCS Reheat Duration Threshold table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established.) As discussed above, 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

Finally, the EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither CONTAINMENT CLOSURE nor RCS integrity are established.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

The (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

EAL #2

The 10 psig pressure rise addresses situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS pressure setpoint chosen should be 10 psi or the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psig.

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

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

The Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is IMMINENT. If, in the judgment of the Emergency Director, an IMMINENT situation is at hand, the classification should be made as if the threshold has been exceeded.

.References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA5

Initiating Condition - ALERT

Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Mode D..... Defueled

Emergency Action Level(s):

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

1. Loss of all offsite and all on-site AC power to Div I & Div II ENS busses for ≥ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to Div I & Div II compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, raising the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

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 emergency busses. Even though an emergency 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.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent ICs.

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

References:

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

Initiating Condition - SITE AREA EMERGENCY

Loss of RCS/RPV inventory affecting core decay heat removal capability

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

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

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

1. With CONTAINMENT CLOSURE not established, RPV level < -49 inches

OR

2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)

OR

3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:
 - RMS-RE16 reading > 100 R/hr
 - Erratic Source Range Monitor indication
 - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

Basis:

These EALs are not applicable when the RPV is defueled.

Under the conditions specified by this IC, continued reduction in RCS level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG1 or AG1.

EAL #3

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

References:

COP-1050 NEDC-33045P
Calculation G13.18.9.4-047 Rev. 0

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Initiating Condition - GENERAL EMERGENCY

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

Operating Mode Applicability:

Mode 4..... Cold Shutdown

Mode 5..... Refueling

Emergency Action Level(s):

(1 or 2)

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

1. a. RPV level < - 162 inches (TAF) for ≥ 30 minutes

AND

- b. Any containment challenge indication in Table C1

OR

2. a. RCS level cannot be monitored with core uncover indicated by any of the following for ≥ 30 minutes:
 - RMS-RE16 reading > 100 R/hr
 - Erratic Source Range Monitor indication
 - Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss

AND

- b. Any containment challenge indication in Table C1

Table C1 Containment Challenge Indications		
<ul style="list-style-type: none">• CONTAINMENT CLOSURE <u>not</u> established• Explosive mixture inside containment• UNPLANNED rise in containment pressure• Secondary containment area radiation monitor above EOP Max Safe Operating Value below:		
Area	DRMS Grid 2	Max Safe Operating Value
RHR Equip Rm A	1213	9.5E+03 mR/hr
RHR Equip Rm B	1214	9.5E+03 mR/hr
RHR Equip Rm C	1215	9.5E+03 mR/hr

Basis:

These EALs are not applicable when the RPV is defueled.

This IC represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the CONTAINMENT breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or IMMINENT loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the Fuel Clad barrier. Examples include initial vessel level and shutdown heat removal system design.

Analysis indicates that core damage may occur within an hour following continued core uncovering therefore, 30 minutes was conservatively chosen. If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovering time limit then escalation to GE would not occur.

In the early stages of a core uncovering event, it is unlikely that hydrogen buildup due to a core uncovering 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.

EAL #2

Sump and tank level rise must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

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

As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

References:

COP-1050
NEDC-33045P
Calculation G13.18.9.4-047 Rev. 0

DEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) MALFUNCTION

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask CONFINEMENT BOUNDARY

Operating Mode Applicability: All

Emergency Action Level(s):

1. Damage to a loaded 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.

This EAL addresses a dropped cask, a tipped over cask, EXPLOSION, PROJECTILE damage, FIRE damage or natural phenomena affecting a cask (e.g., seismic event, tornado, etc.).

FISSION PRODUCT BARRIER DEGRADATION

FISSION PRODUCT BARRIER DEGRADATION

General Bases

The logic used for these initiating conditions reflects the following considerations:

1. The Fuel Clad barrier and the RCS barrier are weighted more heavily than the Containment barrier. NOUE ICs associated with RCS and Fuel Clad barriers are addressed under System Malfunction (S) ICs.
2. At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from the threshold for a General Emergency. For example, if Fuel Clad and RCS barrier "Loss" EALs existed, that, in addition to off-site dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS barrier "Potential Loss" EALs existed, the Emergency Director would have more assurance that there was no immediate need to escalate to a General Emergency.
3. The ability to escalate to higher emergency classes as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety.
4. The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs	Containment Barrier (PC) EALs
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

1. Primary Coolant Activity Level (FC1)	1. Drywell Pressure (RC1)	1. Primary Containment Conditions (PC1)
Coolant activity > 300 µCi/gm dose equivalent I-131 None	Drywell pressure > 1.68 psid with indications of reactor coolant leak in the drywell None	1. Rapid unexplained loss of PC pressure following initial pressure rise <u>OR</u> 2. PC pressure response not consistent with LOCA conditions 1. PC pressure > 15 psig and rising <u>OR</u> 2. a. PC hydrogen in the unsafe zone of HDOL curve <u>OR</u> b. DW hydrogen concentration > 9% <u>OR</u> 3. RPV pressure

FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMIDENT. In this IMMIDENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs	Containment Barrier (PC) EALs
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

			and suppression pool temperature cannot be maintained below the HCTL
2. Reactor Vessel Water Level (FC2)		2. Reactor Vessel Water Level (RC2)	2. Reactor Vessel Water Level (PC2)
RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	RPV water level cannot be restored and maintained above -162 inches or cannot be determined None	None Entry into PC flooding procedures SAP-1 and SAP-2

FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMIDENT. In this IMMIDENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs	Containment Barrier (PC) EALs
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

3. Primary Containment Radiation Monitors (FC3)	3. RCS Leak Rate (RC3)	3. Primary Containment Isolation Failure or Bypass (PC3)
Containment radiation monitor RMS-RE16 reading > 3,000 R/hr None	1.a. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close <u>AND</u> High MSL flow Annunciator (P601-19A-A2) <u>AND</u> Main Steam Tunnel Temperature > 144°F [173°F NRC TS] <u>OR</u> b. Indication of an UNISOLABLE HPCS, Feedwater, RWCU or RCIC break 1. RCS leakage > 50 gpm inside the drywell <u>OR</u> 2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Normal Operating Temperature (Table F2) <u>OR</u>	1. a. Failure of all valves in any one line to close <u>AND</u> b. Direct downstream pathway to the environment exists after PC isolation signal <u>OR</u> 2. Intentional PC venting per EOPs or SAPs <u>OR</u> 3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of

FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss of or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs	Containment Barrier (PC) EALs
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

		OR 2. Emergency RPV depressurization is required b. Max Normal Area Radiation (Table F2)	the following: a. Max Safe Operating Temperature (Table F1) OR b. Max Safe Area Radiation (Table F1)
4. Emergency Director Judgment (FC4)	4. Drywell Radiation (RC4)	4. Primary Containment Radiation Monitors (PC4)	
Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	Drywell radiation monitor None RMS-RE20 reading > 100 R/hr due to reactor coolant leakage	Containment radiation monitor None RMS-RE16 reading > 10,000 R/hr

FISSION PRODUCT BARRIER DEGRADATION

Fission Product Barrier Table
EALs for **LOSS** or **POTENTIAL LOSS** of Barriers*

*Determine which combination of the three barriers are lost or have a potential loss and use the following key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMIDENT. In this IMMIDENT loss situation use judgment and classify as if the EALs are exceeded.

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss of or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
Fuel Clad Barrier (FC) EALs		RCS Barrier (RC) EALs		Containment Barrier (PC) EALs			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

	5. Emergency Director Judgment (RC5)		5. Emergency Director Judgment (PC5)	
	Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier

FISSION PRODUCT BARRIER DEGRADATION

FU1

INITIATING CONDITION – NOTIFICATION OF UNUSUAL EVENT

ANY loss or ANY potential loss of containment

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of containment

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or any potential loss of containment.

The Fuel Cladding (FC) and the Reactor Coolant System (RCS) are weighted more heavily than the Primary Containment (PC) barrier. NOUE ICs associated with RCS and FC barriers are addressed under System Malfunction ICs.

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

FISSION PRODUCT BARRIER DEGRADATION

FA1

INITIATING CONDITION – ALERT

Any loss or any potential loss of either fuel clad or RCS

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Any loss or any potential loss of fuel clad

OR

Any loss or any potential loss of RCS

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss or potential loss of a Fuel Clad barrier or a loss or potential loss of the RCS barrier.

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 fuel bundle 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.

FISSION PRODUCT BARRIER DEGRADATION

FS1

INITIATING CONDITION – SITE AREA EMERGENCY

Loss or potential loss of any two barriers

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Loss or potential loss of any two barriers

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates loss or potential loss of any two barriers.

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

FISSION PRODUCT BARRIER DEGRADATION

FG1

INITIATING CONDITION – GENERAL EMERGENCY

Loss of any two barriers and loss or potential loss of third barrier

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown

Emergency Action Level(s):

1. Loss of any two barriers

AND

Loss or potential loss of the third barrier

Bases:

Comparison of conditions / values with those listed in Fission Product Barrier Matrix indicates a loss of any two barriers and the loss or potential loss of the third barrier.

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.

FISSION PRODUCT BARRIER DEGRADATION

FC1

FUEL CLAD

Emergency Action Level:

Primary coolant activity level

EAL Threshold:

LOSS: Coolant activity > 300 $\mu\text{Ci/g}$ dose equivalent I-131

POTENTIAL LOSS: NONE

Bases:

LOSS – The site specific value is 300 $\mu\text{Ci/gm}$ dose equivalent I-131. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad barrier is considered lost.

POTENTIAL LOSS - NONE

References:

FISSION PRODUCT BARRIER DEGRADATION

FC2

FUEL CLAD

Emergency Action Level:

Reactor vessel water level

EAL Threshold:

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 or cannot be determined

Bases:

LOSS - This site specific value corresponds to the level used in EOPs to indicate challenge of core cooling. This is the minimum value to assure core cooling without further degradation of the clad. Reactor vessel water level less than the minimum steam cooling RPV water level (-186") with injection is the lowest level with adequate core cooling to maintain peak clad temperature less than 1500°F where fuel clad damage (fuel rod perforation) may begin. 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 – This threshold is the same as the RCS barrier loss threshold RC2 and corresponds to the site specific water level at the top of the active fuel. Thus, this threshold indicates a potential loss of the Fuel Clad barrier and a loss of the RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency. 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:

FISSION PRODUCT BARRIER DEGRADATION

FC3

FUEL CLAD

Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: Containment radiation monitor RMS-RE16 reading
> 3,000 R/hr

POTENTIAL LOSS: NONE

Bases:

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.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

POTENTIAL LOSS - NONE

References:

Calculation G13.18.9.4-045 Rev. 0

FISSION PRODUCT BARRIER DEGRADATION

FC4

FUEL CLAD

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

Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

References:

FISSION PRODUCT BARRIER DEGRADATION

RC1

REACTOR COOLANT SYSTEM

Emergency Action Level:

Drywell pressure

EAL Threshold:

LOSS: Drywell pressure > 1.68 psid with indications of reactor
coolant leak in drywell

POTENTIAL LOSS: NONE

Bases:

LOSS - The site specific primary containment pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating the ECCS or equivalent makeup system.

Pressure rise due solely to loss of containment or drywell heat removal capability, testing, etc are not considered for this EAL threshold.

POTENTIAL LOSS - NONE.

References:

FISSION PRODUCT BARRIER DEGRADATION

RC2

REACTOR COOLANT SYSTEM

Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS:RPV water level cannot be restored and maintained above
-162 inches or cannot be determined

POTENTIAL LOSS:.....NONE

Bases:

LOSS - The loss EAL threshold of site specific RPV water level corresponds to the level that is used in EOPs to indicate challenge of core cooling.

This threshold is the same as the Fuel Clad barrier potential loss EAL threshold FC2 and corresponds to a challenge to core cooling. Thus, this threshold indicates a loss of the RCS barrier and potential loss of the Fuel Clad barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

POTENTIAL LOSS – NONE

References:

FISSION PRODUCT BARRIER DEGRADATION

RC3

REACTOR COOLANT SYSTEM

Emergency Action Level:

RCS leak rate

EAL Threshold:

LOSS:1.a. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close

AND

High MSL flow annunciator (P601-19A-A2)

AND

Main Steam Tunnel Temperature > 144°F [173°F NRC TS submittal change]

OR

b. Indication of an UNISOLABLE HPCS, Feedwater, RWCU or RCIC break

OR

2. Emergency RPV depressurization is required

POTENTIAL LOSS:1. RCS leakage > 50 gpm inside the drywell

OR

2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following:

a. Max Normal Operating Temperature (Table F2)

OR

b. Max Normal Area Radiation (Table F2)

FISSION PRODUCT BARRIER DEGRADATION

RC3

TABLE F2			
RC 3 Potential Loss of RCS			
Parameter	Area Temperature (isolation temperature alarm)	Area Radiation Level	
		DRMS Grid 2	Max Normal Operating Value
RHR A equipment area	117° F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equipment area	117° F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equipment area	N/A	1215	8.2E+01 mR/hr
RCIC room	182° F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	144°F [173°F NRC TS submittal change] (P601-19A-A1/A3/B1/B3)	N/A	
RWCU pump room 1 (A) / 2 (B)	165° F (P680-1A-A2/B2)	N/A	

Bases:

LOSS - An UNISOLABLE MSL break is a breach of the RCS barrier. Thus, this EAL threshold is included for consistency with the Alert emergency classification level.

Other large high-energy line breaks such as HPCS, Feedwater, RWCU, or RCIC that are UNISOLABLE also represent a significant loss of the RCS barrier and should be considered as MSL breaks for purposes of classification.

The leak is NOT isolable from the Main Control Room **OR** an attempt for isolation from the Main Control Room panels has been made and was not successful. An attempt for isolation should be made prior to the accident classification. If isolable upon identification, this INITIATING CONDITION is not applicable. Dispatch of operators outside the Control Room for manual attempts to close the valve is not considered.

Plant symptoms requiring Emergency RPV depressurization per the site specific EOPs are indicative of a loss of the RCS barrier. If Emergency RPV depressurization is required, the plant operators are directed to open safety relief valves (SRVs) and keep them open. Even though the RCS is being vented into the suppression pool, a loss of the RCS should be considered to exist due to the diminished effectiveness of the RCS pressure barrier to a release of fission products beyond its boundary.

POTENTIAL LOSS - This threshold is based on leakage set at a level indicative of a small breach of the RCS but which is well within the makeup capability of normal and emergency high pressure systems. Core uncover is not a significant concern for a

FISSION PRODUCT BARRIER DEGRADATION

RC3

50 gpm leak, however, break propagation leading to 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. Other indications include a rise in drywell temperature and pressure and a rise in the drywell radiation monitors. If the leakage computer is unavailable, sump level and pump status may help determine if the leakage is greater than 50 gpm.

If the DFR discharge line containment isolation valves have not isolated and a pump is running continuously without lowering sump level, the leakage may be assumed to exceed 50 gpm. The second pump can be started to verify that the first pump is not degraded. It is not intended to conclude a potential loss of the RCS barrier exists if both pumps are degraded and the observed leak rate as noted by rate of rise of level in the sump or calculated by the computer is such that it clearly confirms leakage below 50 gpm.

References:

FISSION PRODUCT BARRIER DEGRADATION

RC4

REACTOR COOLANT SYSTEM Emergency Action Level:

Drywell radiation

EAL Threshold:

LOSS: Drywell radiation monitor RMS-RE20 reading > 100
R/hr

POTENTIAL LOSS: NONE

Bases:

LOSS – The site specific reading is a value which indicates the release of reactor coolant to the drywell.

POTENTIAL LOSS - NONE

References:

G13.18.9.4-051

FISSION PRODUCT BARRIER DEGRADATION

RC5

REACTOR COOLANT SYSTEM

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 potential loss of the RCS barrier

Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

References:

FISSION PRODUCT BARRIER DEGRADATION

PC1

PRIMARY CONTAINMENT Emergency Action Level:

Primary containment conditions

EAL threshold:

LOSS:.....1. Rapid unexplained loss of PC pressure following initial pressure rise

OR

2. PC pressure response not consistent with LOCA conditions

POTENTIAL LOSS:.....1. PC pressure > 15 psig and rising

OR

2. a. PC hydrogen in the unsafe zone of HDOL curve

OR

b. DW hydrogen concentration > 9%

OR

3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL

FISSION PRODUCT BARRIER DEGRADATION

PC1

Bases:

LOSS – Rapid unexplained loss of pressure (i.e., not attributable to condensation effects or restoration of containment or drywell unit coolers) following an initial pressure rise from a high energy line break indicates a loss of containment integrity. Primary containment pressure should rise as a result of mass and energy released into containment from a LOCA. Thus, primary containment pressure not rising under these conditions indicates a loss of containment integrity. This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition. Control room indicators may include ERIS data points, P808 CMS indication, or back-panel CMS pressure indication.

POTENTIAL LOSS - The site specific pressure is based on the primary containment design pressure. Primary Containment pressure greater than 15 psig and rising is based on the design pressure of the Primary Containment. If the 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.

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.

The Heat Capacity Temperature Limit (HCTL) is the highest suppression pool temperature from which emergency RPV depressurization will not raise: suppression chamber temperature above the maximum temperature capability of the suppression chamber and equipment within the suppression chamber which may be required to operate when the RPV is pressurized,

OR

Suppression chamber pressure above PC pressure limit A, while the rate of energy transfer from the RPV to the containment is greater than the capacity of the containment vent.

The HCTL is a function of RPV pressure and suppression pool water level. It is utilized to preclude failure of the containment and equipment in the containment necessary for the safe shutdown of the plant and therefore, the inability to maintain plant parameters below the limit constitutes a potential loss of containment.

References:

FISSION PRODUCT BARRIER DEGRADATION

PC1

PRIMARY CONTAINMENT Emergency Action Level:

Reactor vessel water level

EAL Threshold:

LOSS: NONE

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

Bases:

LOSS – NONE

POTENTIAL LOSS - The potential loss requirement for Primary Containment Flooding indicates adequate core cooling cannot be established and maintained and that core melt is possible. Entry into SAP-1 and SAP-2 is a logical escalation in response to the inability to maintain adequate core cooling.

The condition in this potential loss threshold represents a potential core melt sequence which, if not corrected, could lead to vessel failure and higher potential for containment failure. In conjunction with Reactor Vessel water level "loss" thresholds in the fuel clad and RCS barrier columns, this threshold will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third.

References:

FISSION PRODUCT BARRIER DEGRADATION

PC3

**PRIMARY CONTAINMENT
Emergency Action Level:**

Primary containment isolation failure or bypass

EAL Threshold:

LOSS: 1. a. Failure of all valves in any one line to close

AND

b. Direct downstream pathway to the environment
exists after PC isolation signal

OR

2. Intentional PC venting per EOPs or SAPs

OR

3. UNISOLABLE RCS leakage outside PC as indicated
by exceeding either of the following:

a. Max Safe Operating Temperature (Table F1)

OR

b. Max Safe Area Radiation (Table F1)

POTENTIAL LOSS: NONE

TABLE F1			
PC 3 Loss of Primary Containment			
Parameter	Area Temperature	Area Radiation Level	
	<u>Max Safe Operating Value</u>	<u>DRMS Grid 2</u>	<u>Max Safe Operating Value</u>
RHR A equipment area	200° F	1213	9.5E+03 mR/hr
RHR B equipment area	200° F	1214	9.5E+03 mR/hr
RHR C equipment area	N/A	1215	9.5E+03 mR/hr
RCIC room	200° F	1219	9.5E+03 mR/hr
MSL Tunnel	200° F		N/A
RWCU pump room 1 (A) / 2 (B)	200° F		N/A

FISSION PRODUCT BARRIER DEGRADATION

PC3

Bases:

These thresholds address incomplete containment isolation that allows direct release to the environment.

LOSS – Failure to isolate - 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. Dispatch of Operators outside the Control Room for manual attempts to close the valve is not considered.

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.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

Containment Venting - Site specific EOPs and SAPs may direct containment isolation valve logic(s) to be intentionally bypassed, regardless of radioactivity release rates. Under these conditions with a valid containment isolation signal, the containment should also be considered lost if containment venting is actually performed.

Intentional venting of primary containment for primary containment pressure or combustible gas control per EOPs or SAPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for pressure when not in an accident situation should not be considered.

Area temperature or radiation – The presence of area radiation or temperature Max Safe Operating setpoints indicating unisolable primary system leakage outside the primary containment are addressed after a containment isolation. The 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.

POTENTIAL LOSS - None

References:

FISSION PRODUCT BARRIER DEGRADATION

PC4

PRIMARY CONTAINMENT Emergency Action Level:

Primary containment radiation monitors

EAL Threshold:

LOSS: NONE

POTENTIAL LOSS: Containment radiation monitor RMS-RE16 reading >
10,000 R/hr

BASIS

LOSS – NONE

POTENTIAL LOSS – The site specific reading is a value that indicates significant fuel damage well in excess of that required for loss of RCS and fuel clad.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

References:

.....Calculation G13.18.9.4-045 Rev. 0

FISSION PRODUCT BARRIER DEGRADATION

PC5

REACTOR COOLANT SYSTEM

Emergency Action Level:

Emergency Director judgment

EAL Threshold:

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

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

Bases:

LOSS or POTENTIAL LOSS – This EAL addresses any other factors that are to 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 Emergency Director judgment that the barrier may be considered lost or potentially lost.

The primary containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Primary Containment barrier. When no event is in progress (loss or potential loss of either fuel clad and/or RCS) the Primary Containment barrier status is addressed by Technical Specifications.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant

Operating Mode Applicability: All

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

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the RBS security shift supervision

OR

2. A credible site specific security threat notification

OR

3. A validated notification from NRC providing information of an aircraft threat

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. Consideration shall be given to upgrading the emergency response status and emergency classification in accordance with the Safeguards Contingency Plan and Emergency Plan.

EAL #1

The Security Shift Supervisor is the designated individual on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This EAL is based on the Safeguards Contingency Plan . The Safeguards Contingency Plan is based on guidance provided in NEI 03-12.

EAL #2

This EAL is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of Unusual Event.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

The determination of "credible" is made through use of information found in the Safeguards Contingency Plan.

EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

References:

NEI 03-12

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU2

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

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

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or
EXPLOSION within the PROTECTED AREA

Operating Mode Applicability: All

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

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

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area.

OR

2. EXPLOSION within the PROTECTED AREA

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Basis:

This IC addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

EAL #1

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

EAL #2

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency Director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA4.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS

Operating Mode Applicability: All

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

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

OR

2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an off-site event

Basis:

This IC is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

This IC is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Natural or destructive phenomena affecting the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)

1. Seismic event identified by any 2 of the following:

- Seismic event confirmed by activated seismic switch as indicated by receipt of **EITHER** a **OR** b:
 - a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)
 - b. Event Indicator on ERS-NBI-102 is white
- Earthquake felt in plant
- National Earthquake Center

OR

2. Tornado striking within PROTECTED AREA boundary

OR

3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area

OR

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

OR

5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Table H1 Uncontrolled Flooding Threshold Area Water Level	
<u>Affected Location / Parameter</u>	<u>Max Safe Operating Value / Indicator</u>
Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)
HPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RHR A Room 70'EL	4 inches above floor (P870-51A-G4)
RHR B Room 70'EL	4 inches above floor (P870-51A-G4)
RHR C Room 70'EL	4 inches above floor (P870-51A-G4)
LPCS Room 70'EL	4 inches above floor (P870-51A-G4)
RCIC Room 70'EL	4 inches above floor (P870-51A-G4)

Basis:

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

EAL #1

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

The annunciators "Seismic Tape Recording SYS Start" and the "white" event indicator are listed in the Alarm Response Procedure as verification of an earthquake event.

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

EAL #2

This EAL is based on a tornado striking (touching down) within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA6.

EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

The EAL is only applicable to areas in Table H1 areas that contain systems required for safe shutdown of the plant and that are not designed to be partially or fully submerged. The EAL is based on VALID indication that the area water level has reached 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 safety of the plant and is appropriately treated as an Unusual Event.

Escalation of this emergency classification level, if appropriate, would be via HA6, or by other plant conditions.

EAL #4

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU4 and HU5.

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 this emergency classification level, if appropriate, would be to HA6 based on damage done by PROJECTILES generated by the failure or by the radiological releases. These latter events would be classified by the radiological (A) ICs or Fission Product Barrier (F) ICs.

EAL #5

This EAL is based on the assumption that high winds within the PROTECTED AREA may have potentially damaged plant structures, listed in Table H2, 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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Meteorological Tower lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average meter wind speed on the MET Tower is 100 mph. If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport. If damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Initiating Condition - ALERT

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat

Operating Mode Applicability: All

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

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision
2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL #1

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes Independent Spent Fuel Storage Installations that may be outside the PROTECTED AREA but still in the OWNER CONTROLLED AREA.

EAL #2

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

References:

NEI 03-12

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

Initiating Condition - ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

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

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA3

Initiating Condition - ALERT

Control room evacuation has been initiated

Operating Mode Applicability: All

Emergency Action Level(s):

1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation

Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition - ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Basis:

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radiological Effluent (A) ICs.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Initiating Condition - ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

Note: *If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.*

1. Access to a VITAL AREA (Table H2) is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor

Basis:

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radioactive Effluent (A) ICs.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition - ALERT

Natural or destructive phenomena affecting VITAL AREAS

Operating Mode Applicability: All

Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by: .
Annunciator "Seismic Tape Recording System Start" (P680-02A-D06)

AND

Event Indicator on ERS-NBI-102 is white

AND

Receipt of **EITHER** 1 **OR** 2:

1. Annunciator "Seismic Event High" (P680-02A-C06)
2. Annunciator "Seismic Event High-High" (P680-02A-B06) **AND** amber light(s) on panel NBI-101

AND

- b. Earthquake confirmed by any of the following:

- Earthquake felt in plant
- National Earthquake Center
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

OR

2. Tornado striking resulting in **VISIBLE DAMAGE** to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

OR

3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems

OR

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

OR

5. Vehicle crash resulting in **VISIBLE DAMAGE** to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems.

OR

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems

Table H2 Structures Containing Functions or Systems Required for Safe Shutdown	
Reactor Building	Standby Cooling Tower
Auxiliary Building	Diesel Generator Building
Control Building	Tunnels (B, D, E, F, G, T)
Fuel Building	

Basis:

These EALs escalate from HU6 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by Control Room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in these EALs to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction (S) ICs.

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). At RBS, the term "freshly off-loaded reactor core" refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

EAL #1

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

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

EAL #2

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

EAL #3

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

The areas of concern are the areas identified in Table 4 of EOP 3 that contain systems required for safe shutdown of the plant that are not designed to be partially or fully submerged. Indication may be by local verification, control room indication, or in degraded performance of systems affected by the flooding.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

EAL #4

This EAL addresses the threat to safety related equipment imposed by **PROJECTILES** generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an **ALERT** in that the potential exists for actual or substantial potential degradation of the level of safety of the plant. Some structures on the list may not be at risk for the turbine generated missile but are included for consistency in identifying structures or areas containing systems and functions required for safe shutdown of the plant.

EAL #5

This EAL addresses vehicle crashes within the **PROTECTED AREA** that result in **VISIBLE DAMAGE** to **VITAL AREAS** (as shown in Table H2) or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

EAL #6

This EAL is based on high winds within the **PROTECTED AREA** that have caused **VISIBLE DAMAGE** to structures or areas 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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

available; therefore, a sustained indication of 74 mph on the Meteorological Tower lower elevation average wind speed indication will be used to determine that this EAL is met. The upper scale for the lower elevation average wind speed on the MET Tower is 100 mph. If the MET Tower lower average wind speed sensors are not operable, other tower sensors or sources may be considered for estimating wind speed at RBS such as NOAA or Baton Rouge regional Airport.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

Initiating Condition - SITE AREA EMERGENCY

HOSTILE ACTION within the PROTECTED AREA

Operating Mode Applicability: All

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision

Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

References:

NEI 03-12

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS2

Initiating Condition - SITE AREA EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS3

Initiating Condition - SITE AREA EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. a. Control room evacuation has been initiated

AND

- b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes

Basis:

The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

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

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director judgment. The Emergency Director is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant from the remote shutdown panel.

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

References:

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

Initiating Condition - GENERAL EMERGENCY

HOSTILE ACTION resulting in loss of physical control of the facility

Operating Mode Applicability: All

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

1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool

Basis:

EAL #1

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location. These safety functions are reactivity control (ability to shut down the reactor and keep it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

Loss of physical control of the Control Room or remote shutdown panel capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

EAL #2

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool. At RBS, the term "freshly off-loaded reactor core" refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

References:

NEI 03-12

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG2

Initiating Condition - GENERAL EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

References:

SYSTEM MALFUNCTION

SYSTEM MALFUNCTION

SU1

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite AC power to emergency busses for ≥ 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. Loss of all offsite AC power to Div I & II ENS busses for ≥ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency busses.

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

References:

SYSTEM MALFUNCTION

SU6

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of 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(s):

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

1. UNPLANNED Loss of > approximately 75% of the following for ≥ 15 minutes:

a. Control room safety system annunciation

OR

b. Control Room safety system indication

Basis:

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

Recognition of the availability of computer based indication equipment is considered e.g., SPDS, plant computer, etc..

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the

SYSTEM MALFUNCTION

SU6

NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

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

This NOUE will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

References:

SYSTEM MALFUNCTION

SU7

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

RCS leakage

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

(1 or 2)

1. Unidentified or pressure boundary leakage > 10 gpm

OR

2. Identified leakage > 35 gpm

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this IC. However, a relief valve that operates and fails to close per design should be considered applicable to this IC if the relief valve cannot be isolated.

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation (F) ICs.

References:

RBS Technical Specification 3.4.5

SYSTEM MALFUNCTION

SU8

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

(1 or 2)

1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:
 - Plant radio system
 - Plant paging system
 - Sound powered phones
 - In-plant telephones

OR

2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:
 - All telephones
 - NRC phones
 - State of Louisiana Radio
 - Offsite notification system and hotline

Basis:

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

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

References:

SYSTEM MALFUNCTION

SU9

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 Level(s):

(1 or 2)

1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits

Table S1				
FLOW (cfm)	Dose Rate Limit (mR/hr)		FLOW (cfm)	Dose Rate Limit (mR/hr)
15	9579		70	1865
17.875	8064		80	1671
20	7219		90	1510
25	5788		100	1376
30	4829		110	1262
32.83	2849		120	1165
35	2810		130	1082
40	2680		140	1009
45	2529		150	945
50	2377		175	815
60	2098		200	716

OR

2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits

- >4.0 $\mu\text{Ci/gm}$ dose equivalent I-131

OR

- >0.2 $\mu\text{Ci/gm}$ dose equivalent I-131 for > 48 hours

SYSTEM MALFUNCTION

SU9

Basis:

This IC is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

EAL #1

This EAL addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

The Technical Specification limit of 290 mCi/sec Offgas pre-treatment release is equivalent to 11,210 mR/hr (assumes flow of 17.875 cfm without adjustment for instrument accuracy). The Table S1 values account for instrument inaccuracy and changing offgas flow rate. The dose rate in the table corresponds to the adjusted TS limit for that associated indicated flow. The table dose rate values may not reflect the H13-P601/22A/F03 alarm setpoint. To determine if EAL conditions are met when the pre-treatment high radiation alarm (H13-P601/22A/F03) is lit, the operator must read the actual indicated offgas flow rate and indicated pre-treatment mR/hr value on H13-P600. Compare the indicated mR/hr value with the Table S1 dose rate mR/hr for the indicated flow value. If the indicated mR/hr is greater than the Table S1 value, the EAL condition is met.

EAL #2

This EAL addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits and coolant samples exceeding coolant Technical Specifications for nominal operating iodine limits for the time period specified in the Technical Specifications.

Escalation of this IC to the Alert level is via the Fission Product Barriers (F).

References:

- TS 3.4.8/B 3.4.8
- TS 3.7.4 / B 3.7.4
- G13.18.9.6.*012 Rev 0
- G13.18.9.5-019-3B
- G13.18.9.5-019-3C
- USAR 15.7.1

SYSTEM MALFUNCTION

SU10

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality

Operating Mode Applicability:

Mode 3.....Hot Shutdown

Emergency Action Level(s):

1. UNPLANNED sustained positive period observed on nuclear instrumentation

Basis:

This IC addresses inadvertent criticality events. This IC indicates a potential degradation of the level of safety of the plant, warranting 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 "sustained" is used in order to allow exclusion of expected short term positive periods from planned fuel bundle or control rod movements during core alteration. These short term positive periods are the result of the rise in neutron population due to subcritical multiplication.

Escalation would be by the Fission Product Barrier Table (F), as appropriate to the operating mode at the time of the event.

SYSTEM MALFUNCTION

SU11

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Inability to reach required operating mode within Technical Specification limits

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

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

Basis:

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

References:

SYSTEM MALFUNCTION

SA1

Initiating Condition - ALERT

AC power capability to emergency 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(s):

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

1. a. AC power capability to Div I and II ENS busses reduced to a single power source for ≥ 15 minutes

AND

-
- b. Any additional single power source failure will result in station blackout

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency diesel generator to supply power to its emergency busses. Another related condition could be the loss of all offsite power and loss of onsite emergency diesel generators with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency diesel generators with only one train of emergency busses being fed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with SS1.

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

Div III D/G and bus E22-S004 are not discussed explicitly in this IC. The loss of Div I and Div II are considered a station blackout. If Div III D/G or E22-S004 is available, entry into this IC is applicable.

References:

SYSTEM MALFUNCTION

SA3

Initiating Condition - ALERT

Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

- b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%

Basis:

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

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. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

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

References:

SYSTEM MALFUNCTION

SA6

Initiating Condition - ALERT

UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. a. UNPLANNED loss of > approximately 75% of the following for ≥ 15 minutes:

- Control room safety system annunciation

OR

- Control Room safety system indication

AND

b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress

OR.

- Compensatory indications are unavailable

Basis:

This IC is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

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

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

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

SYSTEM MALFUNCTION

SA6

the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory 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. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

References:

SYSTEM MALFUNCTION

SS1

Initiating Condition - SITE AREA EMERGENCY

Loss of all offsite and all onsite AC power to emergency busses for
≥ 15 minutes

Operating Mode Applicability:

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

Emergency Action Level(s):

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

1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for
≥ 15 minutes

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

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

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 emergency busses. Even though an emergency bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus was the only energized bus then a SAE per SS1 should be declared.

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or IC SG1, "Prolonged loss of all offsite and all onsite AC power to emergency busses."

References:

SYSTEM MALFUNCTION

SS3

Initiating Condition - SITE AREA EMERGENCY

Automatic scram fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

-
- b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power $\geq 5\%$

Basis:

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

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual scram actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual scram actions are not considered successful if action away from the reactor control console is required to scram the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

References:

SYSTEM MALFUNCTION

SS4

Initiating Condition - SITE AREA EMERGENCY

Loss of all vital DC power for ≥ 15 minutes

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

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

1. < 105 VDC on all vital DC busses for ≥ 15 minutes

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

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

Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluent (A), Fission Product Barrier Degradation (F).

References:

SYSTEM MALFUNCTION

SS6

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(s):

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

1. a. Loss of > approximately 75% of the following for ≥ 15 minutes :

- Control Room safety system annunciation

OR

- Control Room safety system indication

AND

b. A SIGNIFICANT TRANSIENT is in progress

AND

c. Compensatory indications are unavailable

Basis:

This IC is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the

SYSTEM MALFUNCTION

SS6

concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Site specific indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures (EOPs and SAPs), and in other EALs (e.g., area process, and/or effluent rad monitors, etc.). Indicators associated with safety systems are those indicators for reactivity control, core cooling, RCS status and containment status. The panels to consider include: H13-P601, H13-P680, H13-P808 (CMS and DRMS), H13-P863 (DRMS), P870 and P877 safety related annunciators and indicators.

"Compensatory 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.

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

References:

SYSTEM MALFUNCTION

SG1

Initiating Condition - GENERAL EMERGENCY

Prolonged loss of all offsite and all onsite AC power to emergency busses

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Mode 3.....Hot Shutdown

Emergency Action Level(s):

1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses.

AND

- b. Either of the following:

- Restoration of at least one emergency bus in < 4 hours is not likely

OR

- RPV level can not be maintained > -162 inches

Basis:

Preferred station transformers are: 1RTX-XSR1C, 1RTX-XSR1D, 1RTX-XSR1E and 1RTX-XSR1F.

Loss of all AC power to emergency busses 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 to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one 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.

SYSTEM MALFUNCTION

SG1

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.

SYSTEM MALFUNCTION

SG3

Initiating Condition - GENERAL EMERGENCY

Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists

Operating Mode Applicability:

Mode 1.....Power Operation

Mode 2.....Startup

Emergency Action Level(s):

1. a. An automatic scram failed to shutdown the reactor

AND

- b. All manual actions do not shutdown the reactor as indicated by reactor power $\geq 5\%$

AND

- c. Either of the following exist or have occurred due to continued power generation:

- Core cooling is extremely challenged as indicated by RPV level can not be maintained > -186 inches

OR

- Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

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

References:

Attachment 4

To

RBG-47165

Proposed EAL Matrix Chart and Review Table (For Information)

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT

	GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE	
	AG1	1 2 3 4 5 D	AS1	1 2 3 4 5 D	AA1	1 2 3 4 5 D	AU1	1 2 3 4 5 D
Radiological Effluents	Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR thyroid CDE for the actual or projected duration of the release using actual meteorology		Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR thyroid CDE for the actual or projected duration of the release		Any release of gaseous or liquid radioactivity to the environment > 200 times the ODCM limit for ≥ 15 minutes		Any release of gaseous or liquid radioactivity to the environment > 2 times the ODCM limit for ≥ 60 minutes	
	Emergency Action Level(s): (1 or 2 or 3) NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.		Emergency Action Level(s): (1 or 2 or 3) NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.		Emergency Action Level(s): (1 or 2 or 3) NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.		Emergency Action Level(s): (1 or 2 or 3) NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	
	1. VALID reading on any of the radiation monitors in Table R1 > the GENERAL EMERGENCY reading for ≥ 15 minutes OR 2. Dose assessment using actual meteorology indicates doses > 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the SITE BOUNDARY OR 3. Field survey results indicate closed window dose rates > 1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 5000 mR for one hour of inhalation, at or beyond the SITE BOUNDARY		1. VALID reading on any of the radiation monitors in Table R1 > the SITE AREA EMERGENCY reading for ≥ 15 minutes OR 2. Dose assessment using actual meteorology indicates doses > 100 mR TEDE or 500 mR thyroid CDE at or beyond the SITE BOUNDARY OR 3. Field survey results indicate closed window dose rates > 100 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate thyroid CDE > 500 mR for one hour of inhalation, at or beyond the SITE BOUNDARY		1. VALID reading on any of the radiation monitors in Table R1 > the ALERT reading for ≥ 15 minutes OR 2. For RMS-RE107 effluent monitor: EITHER VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes OR VALID reading > 1.27E-01 µCi/ml for ≥ 15 minutes OR 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 times the ODCM limit for ≥ 15 minutes		1. VALID reading on any of the radiation monitors in Table R1 > the NOUE reading for ≥ 60 minutes OR 2. VALID reading on RMS-RE107 effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 60 minutes OR 3. Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 times the ODCM limit for ≥ 60 minutes	

Method	GENERAL EMERGENCY		Table R1 EAL THRESHOLD		ALERT		NOUE	
	DRMS	Threshold	DRMS	Threshold	DRMS	Threshold	DRMS	Threshold
Main Plant Vent Primary Secondary	4GE125 N/A	4.70E+08 µCi/sec	4GE125 N/A	4.70E+07 µCi/sec	4GE125 3.06E+07 µCi/sec 1GE126 2.82E-01 µCi/ml		4GE125 3.06E+05 µCi/sec 1GE126 5.26E-03 µCi/ml	
Fuel Building Vent Primary Secondary	4GE005 N/A	6.70E+07 µCi/sec	4GE005 N/A	6.70E+06 µCi/sec	4GE005 2.19E+06 µCi/sec 5GE005 2.82E-01 µCi/ml		4GE005 2.19E+04 µCi/sec 5GE005 4.65E-03 µCi/ml	
Radwaste Building Vent Primary Secondary	N/A		N/A		4GE006 2.58E+06 µCi/sec 5GE006 6.84E-02 µCi/ml		4GE006 2.58E+04 µCi/sec 5GE006 6.84E-04 µCi/ml	

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

ABNORMAL RADIATION LEVELS / RADIOLOGICAL EFFLUENT

Abnormal Radiation Levels	GENERAL EMERGENCY	SITE/AREA EMERGENCY	ALERT	NOUE
			AA2 1 2 3 4 5 D	AU2 1 2 3 4 5 D
			<p>Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel</p> <p><u>Emergency Action Level(s): (1 or 2)</u></p> <ol style="list-style-type: none"> A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered <p><u>OR</u></p> <ol style="list-style-type: none"> A VALID reading on any of the following radiation monitors due to damage to irradiated fuel or loss of water level: RMS-RE140 2000 mR/hr RMS-RE141 2000 mR/hr RMS-RE192 2000 mR/hr RMS-RE193 2000 mR/hr RMS-RE5A 1.64E+03 μCi/sec RMS-RE5B (GE) 5.29E-04 μCi/ml 	<p>UNPLANNED rise in plant radiation levels</p> <p><u>Emergency Action Level(s): (1 or 2)</u></p> <ol style="list-style-type: none"> <ol style="list-style-type: none"> UNPLANNED water level drop in a reactor refueling pathway as indicated by any of the following: <ul style="list-style-type: none"> Water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal indication on Control Room Panel 870 Personnel observation by visual or remote means. <p><u>AND</u></p> <ol style="list-style-type: none"> UNPLANNED VALID area radiation monitor alarm on any of the following: RMS-RE140 RMS-RE141 RMS-RE192 RMS-RE193 UNPLANNED VALID area radiation monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels <p><i>NOTE: For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indications unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the area radiation monitor indications going full scale.</i></p> <p>*Normal can be considered the highest reading in the past 24 hours excluding the current peak value.</p>
			<p>AA3 1 2 3 4 5 D</p> <p>Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions</p> <p><u>Emergency Action Level(s):</u></p> <ol style="list-style-type: none"> Dose rate > 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions: Main Control Room CAS 	

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

COLD SHUTDOWN/REFUELING

Loss of RCS/RPV Inventory	GENERAL EMERGENCY					SITE AREA EMERGENCY					ALERT					NOUE				
	CGI					CS1					CA1					CU1				
	Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged					Loss of RCS/RPV inventory affecting core decay heat removal capability					Loss of RCS/RPV inventory					RCS leakage				
	<u>Emergency Action Level(s): (1 or 2)</u>					<u>Emergency Action Level(s): (1 or 2 or 3)</u>					<u>Emergency Action Level(s): (1 or 2)</u>					<u>Emergency Action Level(s):</u>				
	1. a. RPV level < -162 inches (TAF) for ≥ 30 minutes					<i>NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i>					<i>NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i>					<i>NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i>				
	<u>AND</u>																			
	b. Any containment challenge indication in Table C1					1. With CONTAINMENT CLOSURE <u>not</u> established: RPV level < -49.inches					1. UNPLANNED loss of RCS inventory as indicated by RPV level < -43 inches (Level 2)					1. RCS leakage results in the inability to maintain or restore RPV level > +9.7 inches (Level 3) for ≥ 15 minutes				
	<u>OR</u>					<u>OR</u>					<u>OR</u>									
	2. a. RCS level cannot be monitored with core uncovery indicated by any of the following for ≥ 30 minutes:					2. With CONTAINMENT CLOSURE established, RPV level < -162 inches (TAF)					2. RCS level cannot be monitored for ≥ 15 minutes with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss									
	<ul style="list-style-type: none">• RMS-RE16 reading > 100 R/hr• Erratic Source Range Monitor indication• Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss					<u>OR</u>														
<u>AND</u>					3. RCS level cannot be monitored for ≥ 30 minutes with a loss of RCS inventory as indicated by any of the following:															
					<ul style="list-style-type: none">• RMS-RE16 reading > 100 R/hr• Erratic Source Range Monitor indication• Unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss															

COLD SHUTDOWN/REFUELING

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		NOUE										
Loss of RCS/RPV Inventory						<div>CU2</div> <div>UNPLANNED loss of RCS/RPV inventory</div> <div>Emergency Action Level(s) (1 or 2)</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. UNPLANNED RCS level drop as indicated by either of the following:</div> <div>a. RCS water level drop below the RPV flange for ≥ 15 minutes when the RCS level band is established above the RPV flange</div> <div>OR</div> <div>b. RCS water level drop below the RPV level band for ≥ 15 minutes when the RCS level band is established below the RPV flange</div> <div>OR</div> <div>2. RCS level cannot be monitored with a loss of RCS inventory as indicated by an unexplained rise in floor or equipment sump level, Suppression Pool level, vessel make-up rate or observation of leakage or inventory loss</div>	<div>12345D</div>									
Loss of Decay Heat Removal		<div>Table C2</div> <div>RCS Reheat Duration Thresholds</div> <table><tr><th>RCS</th><th>Containment Closure</th><th>Duration</th></tr><tr><td>Intact</td><td>N/A</td><td>60 minutes*</td></tr><tr><td rowspan="2">Not intact</td><td>Established</td><td>20 minutes*</td></tr><tr><td>Not Established</td><td>0 minutes</td></tr></table> <div>*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.</div>	RCS	Containment Closure	Duration	Intact	N/A	60 minutes*	Not intact	Established	20 minutes*	Not Established	0 minutes	<div>CA3</div> <div>Inability to maintain plant in cold shutdown</div> <div>Emergency Action Level(s): (1 or 2)</div> <div>1. An UNPLANNED event results in RCS temperature > 200 °F > the specified duration in Table C2</div> <div>OR</div> <div>2. An UNPLANNED event results in RCS pressure rise > 10 psig due to a loss of RCS cooling</div>	<div>CU3</div> <div>UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV</div> <div>Emergency Action Level(s): (1 or 2)</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. An UNPLANNED event results in RCS temperature exceeding 200°F</div> <div>OR</div> <div>2. Loss of all RCS temperature and RCS/RPV level indication for ≥ 15 minutes</div>	<div>12345D</div>
	RCS	Containment Closure	Duration													
Intact	N/A	60 minutes*														
Not intact	Established	20 minutes*														
	Not Established	0 minutes														

COLD SHUTDOWN/REFUELING

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT	NOUE
Loss of AC Power			CAS Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i> 1. Loss of all offsite and all onsite AC power to Div I and Div II ENS busses for ≥ 15 minutes	CU5 AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</i> 1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes AND b. Any additional single power source failure will result in station blackout	
Loss of DC Power				CU6 Loss of required DC power for ≥ 15 minutes <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time</i> 1. < 105 VDC on required Vital DC busses for ≥ 15 minutes	
Inadvertent Criticality				CU7 Inadvertent criticality <u>Emergency Action Level(s):</u> 1. UNPLANNED sustained positive period observed on nuclear instrumentation	
Loss of Communications				CU8 Loss of all onsite or offsite communications capabilities <u>Emergency Action Level(s): (1 or 2)</u> 1. Loss of all of the following onsite communication methods affecting the ability to perform routine operations: Plant radio system Plant paging system Sound powered phones In-plant telephones OR 2. Loss of all of the following offsite communication methods affecting the ability to perform offsite notifications: All telephones NRC phones State of Louisiana Radio Offsite notification system and hotline	

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

ISFSI MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Cask Damage				<p>E-HUI 12345D</p> <p>Damage to a loaded cask CONFINEMENT BOUNDARY</p> <p><u>Emergency Action Levels(s):</u></p> <p>1. Damage to a loaded cask CONFINEMENT BOUNDARY</p>

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

FISSION PRODUCT BARRIERS

GENERAL EMERGENCY			SITE AREA EMERGENCY			ALERT			NOUE		
FPB Loss / Potential Loss	FG1	1 2 3 4 5 6	FS1	1 2 3 4 5 6	FA1	1 2 3 4 5 6	FU1	1 2 3 4 5 6			
	Loss of ANY two barriers AND loss or potential loss of the third barrier <u>Emergency Action Level(s):</u> 1. Loss of any two barriers <u>AND</u> Loss or potential loss of the third barrier		Loss or potential loss of ANY two barriers <u>Emergency Action Level(s):</u> 1. Loss or potential loss of any two barriers		ANY loss or ANY potential loss of EITHER fuel clad or RCS <u>Emergency Action Level(s):</u> 1. Any loss or any potential loss of fuel clad <u>OR</u> Any loss or any potential loss of RCS		ANY loss or ANY potential loss of containment <u>Emergency Action Level(s):</u> 1. Any loss or any potential loss of containment				
FUEL CLAD (FC) Barrier			REACTOR COOLANT SYSTEM (RC) Barrier			PRIMARY CONTAINMENT (PC) Barrier					
Parameter	Loss	Potential Loss	Parameter	Loss	Potential Loss	Parameter	Loss	Potential Loss			
FC1 Primary coolant activity level	Coolant activity > 300 µCi/gm dose equivalent I-131	None	RC1 Drywell pressure	Drywell pressure > 1.68 psid with indications of reactor coolant leak in drywell	None	PC1 Primary containment conditions	1. Rapid unexplained loss of PC pressure following initial pressure rise <u>OR</u> 2. PC pressure response not consistent with LOCA conditions	1. PC pressure > 15 psig and rising <u>OR</u> 2. a. PC hydrogen in the unsafe zone of HDOL curve <u>OR</u> b. DW hydrogen concentration > 9% <u>OR</u> 3. RPV pressure and suppression pool temperature cannot be maintained below the HCTL			
FC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -186 inches	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	RC2 Reactor vessel water level	RPV water level cannot be restored and maintained above -162 inches or cannot be determined	None	PC2 Reactor vessel water level	None	Entry into PC flooding procedures SAP-1 and SAP-2			
FC3 Primary containment radiation monitors	Containment radiation monitor RMS-RE16 reading > 3,000 R/hr	None	RC3 RCS Leak Rate	1. a. UNISOLABLE main steam line break as indicated by the failure of both MSIVs in any one line to close <u>AND</u> High MSL flow annunciator (P601-19A- A2) <u>AND</u> Main Steam Tunnel Temperature > 144°F [173°F NRC TS submittal change] <u>OR</u> b. Indication of an UNISOLABLE HPCS, feedwater, RWCU or RCIC break <u>OR</u> 2. Emergency RPV depressurization is required	1. RCS leakage > 50 gpm inside the drywell <u>OR</u> 2. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Normal Operating Temperature (Table F2) <u>OR</u> b. Max Normal Area Radiation (Table F2)	PC3 Primary containment isolation failure or bypass	1. a. Failure of all valves in any one line to close <u>AND</u> b. Direct downstream pathway to the environment exists after PC isolation signal <u>OR</u> 2. Intentional PC venting per EOPs or SAPs <u>OR</u> 3. UNISOLABLE RCS leakage outside PC as indicated by exceeding either of the following: a. Max Safe Operating Temperature (Table F1) <u>OR</u> b. Max Safe Area Radiation (Table F1)	None			
			RC4 Drywell radiation	Drywell radiation monitor RMS-RE20 reading > 100 R/hr due to reactor coolant leakage	None	PC4 Primary containment radiation monitors	None	Containment radiation monitor RMS-RE16 reading > 10,000 R/hr			
FC4 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	RC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	PC5 Emergency Director judgment	Any condition in the opinion of the Emergency Director that indicates loss of the Primary Containment barrier	Any condition in the opinion of the Emergency Director that indicates potential loss of the Primary Containment barrier			

FISSION PRODUCT BARRIERS

TABLE F1			
PC 3 Loss of Primary Containment			
Parameter	Area Temperature	Area Radiation Level	
	Max Safe Operating Value	DRMS Grid 2	Max Safe Operating Value
RHR A equipment area	200° F	1213	9.5E+03 mR/hr
RHR B equipment area	200° F	1214	9.5E+03 mR/hr
RHR C equipment area	N/A	1215	9.5E+03 mR/hr
RCIC room	200° F	1219	9.5E+03 mR/hr
MSL Tunnel	200° F		N/A
RWCU pump room 1 (A) / 2 (B)	200° F		N/A

TABLE F2			
RC 3 Potential Loss of RCS			
Parameter	Area Temperature	Area Radiation Level	
	(isolation temperature alarm)	DRMS Grid 2	Max Normal Operating Value
RHR A equipment area	117° F (P601-20A-B4)	1213	8.2E+01 mR/hr
RHR B equipment area	117° F (P601-20A-B4)	1214	8.2E+01 mR/hr
RHR C equipment area	N/A	1215	8.2E+01 mR/hr
RCIC room	182° F (P601-21A-B6)	1219	1.20E+02 mR/hr
MSL Tunnel	144° F [173° F NRC TS submittal change] (P601-19A-A1/A3/B1/B3)		N/A
RWCU pump room 1 (A) / 2 (B)	165° F (P680-1A-A2/B2)		N/A

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Security	HG1 1 2 3 4 5 D HOSTILE ACTION resulting in loss of physical control of the facility <u>Emergency Action Level(s): (1 or 2)</u> 1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions OR 2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool	HS1 1 2 3 4 5 D HOSTILE ACTION within the PROTECTED AREA <u>Emergency Action Level(s):</u> 1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the RBS security shift supervision	HA1 1 2 3 4 5 D HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat <u>Emergency Action Level(s): (1 or 2)</u> 1. A HOSTILE Action is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the RBS security shift supervision OR 2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site	HU1 1 2 3 4 5 D Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant <u>Emergency Action Level(s): (1 or 2 or 3)</u> 1. A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the RBS security shift supervision OR 2. A credible site specific security threat notification OR 3. A validated notification from NRC providing information of an aircraft threat
	HG2 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency <u>Emergency Action Level(s):</u> 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area	HS2 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY <u>Emergency Action Level(s):</u> 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of or: (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY	HA2 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT <u>Emergency Action Level(s):</u> 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels	HU2 1 2 3 4 5 D Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE <u>Emergency Action Level(s):</u> 1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs
Discretionary				

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

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Control Room Evacuation		HS3 1 2 3 4 5 D Control room evacuation has been initiated and plant control cannot be established <u>Emergency Action Level(s):</u> 1. a. Control room evacuation has been initiated AND b. Control of the plant cannot be established in accordance with AOP-0031, Shutdown from Outside the Main Control Room, within 15 minutes	HA3 1 2 3 4 5 D Control room evacuation has been initiated <u>Emergency Action Level(s):</u> 1. AOP-0031, Shutdown from Outside the Main Control Room requires Control Room evacuation	
Fire			HA4 1 2 3 4 5 D FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown <u>Emergency Action Level(s):</u> 1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the structures or areas in Table H2 containing safety systems or components or Control Room indication of degraded performance of those safety systems	HU4 1 2 3 4 5 D FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA <u>Emergency Action Level(s): (1 or 2)</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.</i> 1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any Table H2 structure or area OR 2. EXPLOSION within the PROTECTED AREA
Toxic or Flammable Gases			HA5 1 2 3 4 5 D Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor <u>Emergency Action Level(s):</u> <i>Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.</i> 1. Access to a VITAL AREA (Table H2) is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor	HU5 1 2 3 4 5 D Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS <u>Emergency Action Level(s): (1 or 2)</u> 1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS OR 2. Report by West Feliciana Parish for evacuation or sheltering of site personnel based on an offsite event

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Natural or Destructive Phenomena	GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT	NOUE																												
	<table><tr><th colspan="2">Table H1 Uncontrolled Flooding Threshold Area Water Level</th></tr><tr><th>Affected Location / Parameter</th><th>Max Safe Operating Value / Indicator</th></tr><tr><td>Aux Bldg Crescent Area 70' EL</td><td>6 inches above floor (must be verified locally)</td></tr><tr><td>HPCS Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr><tr><td>RHR A Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr><tr><td>RHR B Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr><tr><td>RHR C Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr><tr><td>LPCS Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr><tr><td>RCIC Room 70'EL</td><td>4 inches above floor (P870-51A-G4)</td></tr></table>		Table H1 Uncontrolled Flooding Threshold Area Water Level		Affected Location / Parameter	Max Safe Operating Value / Indicator	Aux Bldg Crescent Area 70' EL	6 inches above floor (must be verified locally)	HPCS Room 70'EL	4 inches above floor (P870-51A-G4)	RHR A Room 70'EL	4 inches above floor (P870-51A-G4)	RHR B Room 70'EL	4 inches above floor (P870-51A-G4)	RHR C Room 70'EL	4 inches above floor (P870-51A-G4)	LPCS Room 70'EL	4 inches above floor (P870-51A-G4)	RCIC Room 70'EL	4 inches above floor (P870-51A-G4)	<table><tr><th colspan="2">Table H2 Structures Containing Functions or Systems Required for Safe Shutdown</th></tr><tr><td>Reactor Building</td><td>Standby Cooling Tower</td></tr><tr><td>Auxiliary Building</td><td>Diesel Generator Building</td></tr><tr><td>Control Building</td><td>Tunnels (B, D, E, F, G, T)</td></tr><tr><td>Fuel Building</td><td></td></tr></table>		Table H2 Structures Containing Functions or Systems Required for Safe Shutdown		Reactor Building	Standby Cooling Tower	Auxiliary Building	Diesel Generator Building	Control Building	Tunnels (B, D, E, F, G, T)	Fuel Building		<div>HA6<div>12345D</div></div> <p>Natural or destructive phenomena affecting VITAL AREAS</p> <p><u>Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)</u></p> <p>1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by:</p> <p>Annunciator "Seismic Tape Recording System Start" (P680-02A-D06)</p> <p><u>AND</u></p> <p>Event Indicator on ERS-NBI-102 is white</p> <p><u>AND</u></p> <p>Receipt of <u>EITHER</u> 1 <u>OR</u> 2:</p> <p>1. Annunciator "Seismic Event High" (P680-02A-C06)</p> <p>2. Annunciator "Seismic Event High-High" (P680-02A-B06) <u>AND</u> amber light(s) on panel NBI-101</p> <p><u>AND</u></p> <p>b. Earthquake confirmed by any of the following:</p> <ul style="list-style-type: none">Earthquake felt in plantNational Earthquake CenterControl Room indication of degraded performance of systems required for the safe shutdown of the plant <p><u>OR</u></p> <p>2. Tornado striking resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems</p> <p><u>OR</u></p> <p>3. Internal flooding in Auxiliary Building 70 ft elevation resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems</p> <p><u>OR</u></p> <p>4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems</p> <p><u>OR</u></p> <p>5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems</p> <p><u>OR</u></p> <p>6. Hurricane or high SUSTAINED wind conditions ≥ 74 mph within the PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the Table H2 structures or areas containing safety systems or components or Control Room indication of degraded performance of those safety systems</p>	<div>HU6<div>12345D</div></div> <p>Natural or destructive phenomena affecting the PROTECTED AREA</p> <p><u>Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)</u></p> <p>1. Seismic event identified by any 2 of the following:</p> <ul style="list-style-type: none">Seismic event confirmed by activated seismic switch as indicated by receipt of <u>EITHER</u> a <u>OR</u> b:a. Annunciator "Seismic Tape Recording SYS Start" (P680-02A-D06)b. Event Indicator on ERS-NBI-102 is whiteEarthquake felt in plantNational Earthquake Center <p><u>OR</u></p> <p>2. Tornado striking within the PROTECTED AREA boundary</p> <p><u>OR</u></p> <p>3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area</p> <p><u>OR</u></p> <p>4. Turbine failure resulting in casing penetration or damage to turbine or generator seals</p> <p><u>OR</u></p> <p>5. Severe weather or hurricane conditions with indication of SUSTAINED high winds ≥ 74 mph within the PROTECTED AREA boundary</p>
	Table H1 Uncontrolled Flooding Threshold Area Water Level																																	
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Plant Modes	1	Power Operation	2	Startup	3	Hot Shutdown	4	Cold Shutdown	5	Refuel	D	Defueled																						

SYSTEM MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of AC Power	<p>SG1 1 2 3 4 5 6</p> <p>Prolonged loss of all offsite and all onsite AC power to emergency busses</p> <p><u>Emergency Action Level(s):</u></p> <p>1. a. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses</p> <p><u>AND</u></p> <p>b. Either of the following:</p> <ul style="list-style-type: none"> Restoration of at least one emergency bus in < 4 hours is not likely <p><u>OR</u></p> <ul style="list-style-type: none"> RPV level cannot be maintained > -162 inches 	<p>SSI 1 2 3 4 5 6</p> <p>Loss of all offsite and all onsite AC power to emergency busses for ≥ 15 minutes</p> <p><u>Emergency Action Level(s):</u></p> <p><i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. Loss of all offsite and all onsite AC power to Div I, II and III ENS busses for ≥ 15 minutes</p>	<p>SA1 1 2 3 4 5 6</p> <p>AC power capability to emergency busses reduced to a single power source for ≥ 15 minutes such that any additional single failure would result in station blackout</p> <p><u>Emergency Action Level(s):</u></p> <p><i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. a. AC power capability to Div I and Div II ENS busses reduced to a single power source for ≥ 15 minutes</p> <p><u>AND</u></p> <p>b. Any additional single failure will result in a station blackout</p>	<p>SUI 1 2 3 4 5 6</p> <p>Loss of all offsite AC power to emergency busses for ≥ 15 minutes</p> <p><u>Emergency Action Level(s):</u></p> <p><i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i></p> <p>1. Loss of all offsite AC power to Div I and II ENS busses for ≥ 15 minutes</p>
Failure of Reactor Protection System	<p>SG3 1 2 3 4 5 6</p> <p>Automatic scram and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists</p> <p><u>Emergency Action Level(s):</u></p> <p>1. a. An automatic scram failed to shutdown the reactor</p> <p><u>AND</u></p> <p>b. All manual actions do not shutdown the reactor as indicated by reactor power ≥ 5%</p> <p><u>AND</u></p> <p>c. Either of the following exist or have occurred due to continued power generation:</p> <ul style="list-style-type: none"> Core cooling is extremely challenged as indicated by RPV level can not be maintained > -186 inches <p><u>OR</u></p> <ul style="list-style-type: none"> Heat removal is extremely challenged as indicated by RPV pressure and Suppression Pool temperature cannot be maintained in the EOP Heat Capacity Temperature Limit (HCTL) Safe Zone 	<p>SS3 1 2 3 4 5 6</p> <p>Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are not successful in shutting down the reactor</p> <p><u>Emergency Action Level(s):</u></p> <p>1. a. An automatic scram failed to shutdown the reactor</p> <p><u>AND</u></p> <p>b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power ≥ 5%</p>	<p>SA3 1 2 3 4 5 6</p> <p>Automatic scram fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor</p> <p><u>Emergency Action Level(s):</u></p> <p>1. a. An automatic scram failed to shutdown the reactor</p> <p><u>AND</u></p> <p>b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%</p>	

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

SYSTEM MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE
Loss of DC Power		SS4 1 2 3 4 5 6 Loss of all vital DC power for ≥ 15 minutes <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i> 1. < 105 VDC on all vital DC busses for ≥ 15 minutes		
Loss of Annunciation / Indication		SS6 1 2 3 4 5 6 Inability to monitor a SIGNIFICANT TRANSIENT in progress <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i> 1. a. UNPLANNED loss of $>$ approximately 75% of the following for ≥ 15 minutes: <ul style="list-style-type: none"> Control Room safety system annunciation <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Control Room safety system indication <p style="text-align: center;">AND</p> b. A SIGNIFICANT TRANSIENT is in progress <p style="text-align: center;">AND</p> c. Compensatory indications are unavailable	SA6 UNPLANNED loss of 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 <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i> 1. a. UNPLANNED loss of $>$ approximately 75% of the following for ≥ 15 minutes: <ul style="list-style-type: none"> Control Room safety system annunciation <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Control Room safety system indication <p style="text-align: center;">AND</p> b. Either of the following: <ul style="list-style-type: none"> A SIGNIFICANT TRANSIENT is in progress <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Compensatory indications are unavailable 	SU6 1 2 3 4 5 6 UNPLANNED loss of safety system annunciation or indication in the Control Room for ≥ 15 minutes <u>Emergency Action Level(s):</u> <i>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</i> 1. UNPLANNED loss of $>$ approximately 75% of the following for ≥ 15 minutes: <ul style="list-style-type: none"> Control Room safety system annunciation <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Control Room safety system indication
RCS Leakage				SU7 1 2 3 4 5 6 RCS leakage <u>Emergency Action Level(s): (1 or 2)</u> 1. Unidentified or pressure boundary leakage > 10 gpm <p style="text-align: center;">OR</p> 2. Identified leakage > 35 gpm

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

SYSTEM MALFUNCTION

	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	NOUE																																																
Loss of Communication				<div>SU8<div>123456</div><div>Loss of all onsite or offsite communications capabilities</div><div>Emergency Action Level(s): (1 or 2)</div><div>1. Loss of all of the following onsite communications methods affecting the ability to perform routine operations:<div>Plant radio system</div><div>Plant paging system</div><div>Sound powered phones</div><div>In-plant telephones</div></div><div>OR</div><div>2. Loss of all of the following offsite communications methods affecting the ability to perform offsite notifications:<div>All telephones</div><div>NRC phones</div><div>State of Louisiana Radio</div><div>Offsite notification system and hotline</div></div></div>																																																
Cladding Degradation			<div><div>Table S1</div><table><tr><th>FLOW (cfm)</th><th>Dose Rate Limit (mR/hr)</th><th>FLOW (cfm)</th><th>Dose Rate Limit (mR/hr)</th></tr><tr><td>15</td><td>9579</td><td>70</td><td>1865</td></tr><tr><td>17.875</td><td>8064</td><td>80</td><td>1671</td></tr><tr><td>20</td><td>7219</td><td>90</td><td>1510</td></tr><tr><td>25</td><td>5788</td><td>100</td><td>1376</td></tr><tr><td>30</td><td>4829</td><td>110</td><td>1262</td></tr><tr><td>32.83</td><td>2849</td><td>120</td><td>1165</td></tr><tr><td>35</td><td>2810</td><td>130</td><td>1082</td></tr><tr><td>40</td><td>2680</td><td>140</td><td>1009</td></tr><tr><td>45</td><td>2529</td><td>150</td><td>945</td></tr><tr><td>50</td><td>2377</td><td>175</td><td>815</td></tr><tr><td>60</td><td>2098</td><td>200</td><td>716</td></tr></table></div>	FLOW (cfm)	Dose Rate Limit (mR/hr)	FLOW (cfm)	Dose Rate Limit (mR/hr)	15	9579	70	1865	17.875	8064	80	1671	20	7219	90	1510	25	5788	100	1376	30	4829	110	1262	32.83	2849	120	1165	35	2810	130	1082	40	2680	140	1009	45	2529	150	945	50	2377	175	815	60	2098	200	716	<div>SU9<div>123456</div><div>Fuel clad degradation</div><div>Emergency Action Level(s): (1 or 2)</div><div>1. Offgas pre-treatment radiation monitor reading > the Table S1 Dose Rate Limit for the actual indicated offgas flow indicating fuel clad degradation > T.S. allowable limits</div><div>OR</div><div>2. Reactor coolant sample activity value indicating fuel clad degradation > T.S. allowable limits<ul style="list-style-type: none">> 4.0 $\mu\text{Ci/gm}$ dose equivalent I-131<div>OR</div><ul style="list-style-type: none">> 0.2 $\mu\text{Ci/gm}$ dose equivalent I-131 for > 48 hours</div></div>
FLOW (cfm)	Dose Rate Limit (mR/hr)	FLOW (cfm)	Dose Rate Limit (mR/hr)																																																	
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60	2098	200	716																																																	
Inadvertent Criticality				<div>SU10<div>123456</div><div>Inadvertent criticality</div><div>Emergency Action Level(s):</div><div>1. UNPLANNED sustained positive period observed on nuclear instrumentation</div></div>																																																
TECH SPEC Time Limit				<div>SU11<div>123456</div><div>Inability to reach required operating mode within Technical Specification limits</div><div>Emergency Action Level(s):</div><div>1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time</div></div>																																																

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

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL
NUMBER**

<u>RBS IC</u>	<u>NEI 99-01 IC</u>	<u>Diff. Doc. Page</u>	<u>Clean Basis Page No</u>
AU1	AU1	4	11
AU2	AU2	7	14
AA1	AA1	10	16
AA2	AA2	13	19
AA3	AA3	15	21
AS1	AS1	17	22
AG1	AG1	20	24
CU1	CU1	23	27
CU2	CU2	25	28
CU3	CU4	27	30
CU5	CU3	29	31
CU6	CU7	31	32
CU7	CU8	33	33
CU8	CU6	35	34
CA1	CA1	37	35
CA3	CA4	39	36
CA5	CA3	41	38
CS1	CS1	43	39
CG1	CG1	45	41
E-HU1	E-HU1	48	44
FU1	FU1	50	52
FA1	FA1	51	53

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL
NUMBER**

<u>RBS IC</u>	<u>NEI 99-01 IC</u>	<u>Diff. Doc. Page</u>	<u>Clean Basis Page No</u>
FS1	FS1	52	54
FG1	FG1	53	55
Fuel Clad EALs	Fuel Clad EALs	54	56
RCS EALs	RCS EALs	57	60
Containment EALs	Containment EALs	61	67
HU1	HU4	66	75
HU2	HU5	68	77
HU4	HU2	70	78
HU5	HU3	72	80
HU6	HU1	74	81
HA1	HA4	78	85
HA2	HA6	80	87
HA3	HA5	82	88
HA4	HA2	84	89
HA5	HA3	86	90
HA6	HA1	88	92
HS1	HS4	93	96
HS2	HS3	95	97
HS3	HS2	97	98
HG1	HG1	99	99
HG2	HG2	101	100
SU1	SU1	103	102

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL
NUMBER**

<u>RBS IC</u>	<u>NEI 99-01 IC</u>	<u>Diff. Doc. Page</u>	<u>Clean Basis Page No</u>
SU6	SU3	105	103
SU7	SU5	107	105
SU8	SU6	109	106
SU9	SU4	111	107
SU10	SU8	114	109
SU11	SU2	116	110
SA1	SA5	118	111
SA3	SA2	120	112
SA6	SA4	122	113
SS1	SS1	125	115
SS3	SS2	127	116
SS4	SS3	129	117
SS6	SS6	131	118
SG1	SG1	133	120
SG3	SG2	135	122

Attachment 5

To

RBG-47165

Supporting Referenced Document Pages

NEI 99-01 Rev 5 EALs
Bases for Values

Main Plant Exhaust

4125 Primary

Source document: Calculations G13.18.9.6*012 R0 (page 18) & PR-c-495 (page 3)

$$1/3 \text{ TS} = 5.11\text{E}4 \text{ uCi/Sec}$$

$$\text{TS} = 3 \times 5.11\text{E}4 = 1.53\text{E}5 \text{ uCi/Sec}$$

AU1-1 $2 \times \text{TS} = 2 \times 1.53\text{E}5 = \mathbf{3.06\text{E}5 \text{ uCi/Sec}}$

AA1-1 $200 \times \text{TS} = 200 \times 1.53\text{E}5 = \mathbf{3.06\text{E}7 \text{ uCi/Sec}}$

1126 Secondary

Source document: ESK-13RMS25 & Calculation G13.18.9.6-010 R0 (pages 1, 8 & 9)

$$1/3 \text{ TS} = 8.77\text{E}-4 \text{ uCi/ml}$$

$$\text{TS} = 3 \times 8.77\text{E}-4 = 2.63\text{E}-3 \text{ uCi/ml}$$

AU1-1 $2 \times \text{TS} = 2 \times 2.63\text{E}-3 = \mathbf{5.26\text{E}-3 \text{ uCi/ml}}$

***AA1-1** $200 \times \text{TS} = 200 \times 2.63\text{E}-3 = 5.26\text{E}-1 = \mathbf{2.82\text{E}-1 \text{ uCi/ml}}$ (max range)

*Detector max range is $2.82\text{E}-1$ for Kr-85 and $5.43\text{E}-1$ for Xe-133 based on Calculation G13.18.9.6-010 R0. Limited to max conservative value of (Kr-85) $2.82\text{E}-1$.

Fuel Building Exhaust

4005 Primary

Source document: Calculation G13.18.9.6*012 R0 (page 10)

$$1/3 \text{ TS} = 3.65\text{E}3 \text{ uCi/Sec}$$

$$\text{TS} = 3 \times 3.65\text{E}3 = 1.095\text{E}4 \text{ uCi/Sec}$$

AU1-1 $2 \times \text{TS} = 2 \times 1.095\text{E}4 = \mathbf{2.19\text{E}4 \text{ uCi/Sec}}$

AA1-1 $200 \times \text{TS} = 200 \times 1.095\text{E}4 = \mathbf{2.19\text{E}6 \text{ uCi/Sec}}$

5005 Secondary

Source document: Calculation G13.18.9.6*012 R0 (page 10) & G13.18.9.6-010 R0 (pages 1, 8 & 9)

$$1/3 \text{ TS} = 7.76\text{E}-4 \text{ uCi/ml}$$

$$\text{TS} = 3 \times 7.76\text{E}-4 = 2.328\text{E}-3 \text{ uCi/ml}$$

AU1-1 $2 \times \text{TS} = 2 \times 2.328\text{E}-3 = \mathbf{4.65\text{E}-3 \text{ uCi/ml}}$

***AA1-1** $200 \times \text{TS} = 200 \times 2.328\text{E}-3 = 4.65\text{E}-1 = \mathbf{2.82\text{E}-1 \text{ uCi/ml}}$ (max range)

*Detector max range is $2.82\text{E}-1$ for Kr-85 and $5.43\text{E}-1$ for Xe-133 based on Calculation G13.18.9.6-010 R0. Limited to max conservative value of (Kr-85) $2.82\text{E}-1$.

**NEI 99-01 Rev 5 EALs
Bases for Values**

Radwaste Building Exhaust

4006 Primary

Source document: Calculation G13.18.9.6*012 R0 (page 11)

$$1/3 \text{ TS} = 4.31\text{E}3 \text{ uCi/Sec}$$

$$\text{TS} = 3 \times 4.31\text{E}3 = 1.29\text{E}4 \text{ uCi/Sec}$$

AU1-1 $2 \times \text{TS} = 2 \times 1.29\text{E}4 = \mathbf{2.58\text{E}4 \text{ uCi/Sec}}$

AA1-1 $200 \times \text{TS} = 200 \times 1.29\text{E}4 = \mathbf{2.58\text{E}6 \text{ uCi/Sec}}$

5006 Secondary

Source document: Calculation ESK-13RMS05

$$1/3 \text{ TS} = 1.14\text{E}-4 \text{ uCi/ml}$$

$$\text{TS} = 3 \times 1.14\text{E}-4 = 3.42\text{E}-4 \text{ uCi/ml}$$

AU1-1 $2 \times \text{TS} = 2 \times 3.42\text{E}-4 = \mathbf{6.84\text{E}-4 \text{ uCi/ml}}$

AA1-1 $200 \times \text{TS} = 200 \times 3.42\text{E}-4 = \mathbf{6.84\text{E}-2 \text{ uCi/ml}}$

Liquid Effluent

107

Source Document: RSP-0008, CSP-0110, Calculation G13.18.9.6-010 R0 (pages 1 & 7)

The alarm setpoint is calculated for each discharge permit not to exceed TRM limit.

AU1-2 $>2 \times \text{alarm setpoint} \geq 60 \text{ minutes}$

AA1-2 $>200 \times \text{alarm setpoint OR } 1.27\text{E}-1 \geq 15 \text{ minutes}$

*Detector max range is $1.28\text{E}-1$ based on Calculation G13.18.9.6-010 R0 (pages 1 & 7).

Reduced EAL value by 0.001 to allow a reading within detector range above EAL setpoint.

AA2

RMS-RE140 2000 mr/hr *

RMS-RE141 2000 mr/hr *

RMS-RE192 2000 mr/hr *

RMS-RE193 2000 mr/hr *

RMS-RE5A $1.64\text{E}3 \text{ uCi/Sec}$ (high alarm setpoint and ventilation shifts to filtered)

RMS-RE5B (GE) $5.29\text{E}-04 \text{ uCi/ml}$ (high alarm setpoint and ventilation shifts to filtered)

*28 daily average readings were obtained from the 4 radiation monitors on 6/27/11. No refueling activities were being performed during this time period. During refueling activities the monitors may read higher due to work activities and higher pool water radioactivity concentrations. The readings ranged from 0.32 to 1 mr/hr. If AU2-2 is applied to these monitors, NOUE entry requirements would range from 320 to 1000 mr/hr. To make the AA2 Alert values higher than the NOUE, the highest reading (1 mr/hr) was multiplied by 2000 to give a value of 2000 mr/hr or a factor of 2 higher than NOUE EAL value of 1000 times normal.

NEI 99-01 Rev 5 EALs
Bases for Values

AS1

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. The Effluent Monitor values were determined using CADAP (offsite dose calculation software) methodologies with the following assumptions:

- Wind Speed 4 mph
- Stability Class D
- Filtered Release
- Pool Scrubbing (Fuel Building (FB) only) (required by software)
- No Damage for MPE, Clad Damage for FB (required by software)
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour

4125 4.7E7 uCi/Sec (Main Plant Exhaust)

4005 6.7E6 uCi/Sec (Fuel Building Exhaust)

AG1

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. The Plant Vent and Fuel Building vent values was determined using CADAP (offsite dose calculation software) methodologies with the following assumptions:

- Wind Speed 4 mph
- Stability Class D
- Filtered Release
- Pool Scrubbing (Fuel Building (FB) only) (required by software)
- No Damage for MPE, Clad Damage for FB (required by software)
- 1 hour Release Duration
- Time after reactor shutdown = 1:00 hour

4125 4.7E8 uCi/Sec (Main Plant Exhaust)

4005 6.7E7 uCi/Sec (Fuel Building Exhaust)

NEI 99-01 Rev 5 EALs
Bases for Values

CS1 & CG1

RBS does not have a calculation for a specific setpoint to indicate that the core is uncovered. As water level in the RPV lowers, the dose rate above the core will rise. The dose rate due to core shine should result in a rapid rise in the Containment high range monitor indication and possible alarm. COP-1050, the procedure used to estimate core damage in accident conditions, does have values for the containment PAMs during the 24 hour period following shutdown. The COP-1050 values are from Calculation G13.18.9.4-047 which is based on the GE document NEDC-33045P. The conditions are reactor shutdown and depressurized.

The 100% clad damage 24 hours after shutdown containment radiation level is 1.56E4 R/hr. The radiation level is assumed to be linear to the percent of clad damage.

Indicated Radiation Level = 100% Clad Damage Radiation Level X % Clad Damage/100

Indicated Radiation Level = 1.56E4 R/hr X 1%/100 = 156 R/hr

The 1% fuel cladding damage value shown above is rounded down to 100 R/hr to provide for a more conservative value. This value does not take into account any additional dose rates due to radiation shine from uncovered vessel internals and fuel due to low water level in an open RPV during refueling. This value is not a calculated EAL measure since time of shutdown and available nuclide source may vary the magnitude of dose rate. Since fuel movement is allowed to start at 24 hours after shutdown, the assumption from COP-1050 is reasonable.

FC3

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. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage.

Calculation G13.18.9.4-045 Rev. 0 (page 14) shows that 5% clad damage ranges from ~7000 to ~3000 R/hr during the first 3 hours.

NEI 99-01 Rev 5 EALs
Bases for Values

RC4

The physical location of the River Bend drywell radiation monitor is exposed to shine from the reactor vessel and RCS piping. Calculation G13.18.9.4-051 (page 7) was performed to determine the expected radiation indication threshold in the drywell for a reactor coolant leak. The EAL threshold value of 100 R/hr is within the calculated value.

The drywell post accident radiation monitor was selected in lieu of the containment post accident radiation monitor due to the physical layout of RCS piping and the location of the monitors. The drywell contains the RPV with the majority of RCS piping and its respective containment isolation valves. The RCS piping continues through the enclosed containment steam tunnel (accessed via pull plugs) to the annulus and then to the auxiliary building steam tunnel. Therefore, the drywell radiation monitors are the most likely monitors to initially detect a RCS leak within the containment building.

PC4

Calculation G13.18.9.4-045 Rev. 0 (page 15) shows that 20% clad damage ranges from ~12,000 to ~10,000 R/hr during the first 4 hours after shutdown and a failure of the reactor coolant system allowing the entire inventory to be disbursed inside the containment. The threshold set point of 10,000 R/hr is used conservatively and is easily recognized. The reading of 10,000 R/hr is a value which indicates significant fuel damage well in excess of that required for loss of RCS and fuel clad.