

**TREAT AS  
SENSITIVE  
INFORMATION**



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W3F1-2004-0120

December 15, 2004

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

Subject: Waterford 3 Response to Request for Additional Information for Proposed Upgraded Emergency Action Levels (EALs) Using NEI 99-01 Revision 4 Methodology  
Waterford Steam Electric Station, Unit 3 (Waterford 3)  
Docket No. 50-382  
License No. NPF-38

REFERENCES:

1. June 16, 2004 e-mail from T. Alexion, NRC, to L England, EAL RAIs for [ANO and Waterford 3]
2. February 5, 2004 letter to Document Control Desk, Waterford 3 SES – Proposed Upgraded Emergency Action Levels (EALs) Using NEI 99-01 Revision 4 Methodology – W3F1-2004-0003
3. NEI 99-01, Rev 4 "Methodology for Development of Emergency Action Levels".

Dear Sir or Madam:

Reference 2 provided Waterford 3 SES submittal of proposed EALs using the methodology outlined in NEI 99-01, "Methodology for Development of Emergency Action Levels" (Revision 4, January 2003). Reference 1 contained the NRC Request for Additional Information (RAI). This letter provides the Waterford 3 SES response to Reference 1. In responding to the RAIs, Entergy took the opportunity to further standardize our regional approach and made format and editorial changes in addition to addressing the RAI issues. Accordingly, a complete revision to our initial submittal is enclosed that incorporates all changes as described in the attachments to this letter.

Significant changes have been reviewed and approved by the Onsite Safety Review Committee. Prior to implementation, changes will be discussed and agreed upon with state authorities as required.

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Plant specific information is attached as follows:

- Response to NRC RAI questions
- Proposed Emergency Plan Pages – Changes Incorporated
- Proposed EALs – To Be Incorporated in Procedure
- Proposed EAL Bases - To Be Incorporated in Procedure
- NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications
- Cross reference matrix from NEI EAL number to Entergy EAL number (i.e. NEI number, previous Entergy number, new Entergy number)
- Copies of documentation received from state agencies indicating discussions of and agreement with the proposed EAL changes
- Schematic illustrating unit auxiliary and start-up transformers

Differences and deviations from NEI 99-01 Rev 4 are based on NRC guidance contained in Supplement 1 to RIS 2003-00018 dated July 13, 2004.

We request NRC approval of this submittal within 120 days of receipt. Waterford 3 SES plans to implement these new EALs at the earliest opportunity following NRC approval.

There are no new commitments contained in this submittal. If you have any questions regarding this submittal, please contact Mr. Oscar Pipkins at (504) 739-6707.

Sincerely,



R.J. Murillo  
Manager, Licensing (Acting)

RJM/OPP/cbh

Attachment(s)

- Attachment 1 Response to NRC RAI questions
- Attachment 2 Proposed Emergency Plan Pages – Changes Incorporated
- Attachment 3 Proposed EALs – To Be Incorporated in Procedure
- Attachment 4 Proposed EAL Bases – To Be Incorporated in Procedure
- Attachment 5 NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications
- Attachment 6 Cross reference matrix from NEI EAL number to Entergy EAL Number (i.e. NEI number, previous Entergy number, new Entergy number)
- Attachment 7 Copies of documentation received from state agencies indicating discussions of and agreement with the proposed EAL changes
- Attachment 8 Schematic illustrating unit auxiliary and start-up transformers

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**Attachment 1**

**W3F1-2004-0120**

**Response to NRC Questions**

ENTERGY OPERATIONS, INC RESPONSES TO REQUESTS FOR ADDITIONAL  
INFORMATION (RAIs) REGARDING ADOPTION OF NEI 99-01, REVISION 4  
FOR WATERFORD 3 STATION, UNIT 3  
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**General Comments:**

This document provides NRC comments and Entergy responses in a format where the comment received from the NRC is repeated, then the Entergy response is provided below it. A change was made throughout the EAL documents to separate EALs for a particular IC with "OR" where applicable. Formatting changes were made throughout the submitted EAL documents to provide better agreement with NEI 99-01 formatting. These changes are most noticeable in the reduced use of bold font.

**NRC Comment #1:**

10 CFR 50, Appendix E -- Section IV.B (Assessment Actions) states, "...emergency action levels shall be discussed and agreed on by the applicant [*licensee*] and State and local governmental authorities, and approved by NRC." (Italics added) In its submittal cover letter, the licensee states that "[t]hese changes have been reviewed and approved by...the State of Louisiana and local governmental authorities." Provide documentation indicating that these discussion have occurred and that there is agreement with State and local governmental authorities on the implementation of the proposed EAL changes based on NEI 99-01, Revision 4.

**Entergy Response:**

Entergy representatives met with representatives from the Louisiana Department of Environmental Quality, Louisiana Office of Homeland Security & Emergency Preparedness, St. Charles Parish and St. John the Baptist Parish on January 7, 2004. These agencies represent all of the key State and local agencies described in the Waterford 3 Emergency Plan and required to be notified within 15 minutes of an emergency at Waterford 3. The proposed EAL changes were presented to the State and local agency representatives at the January 7 meeting. Documentation from all four agencies signifying agreement on implementation of the proposed EAL changes was either received immediately following the meeting or subsequent to the meeting but prior to submittal of the EALs to the NRC for approval. Copies of the documentation received from the agencies are provided in Attachment 7 to this letter.

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**General Comments (Cont'd):**

**NRC Comment #1(Cont'd):**

**Entergy Response (Cont'd):**

Entergy also notes in this response that the representative from the Louisiana Office of Environmental Quality present at the January 7 meeting had joined with Entergy personnel as a member of the NEI 99-01 EAL development team from the start of the project, attended EAL development meetings and was a key contributor throughout the development process working in partnership with his Entergy counterparts.

**NRC Comment #2:**

Provide a copy or include a detailed description in licensee Bases of calculations used to determine effluent monitor thresholds under AG1, AS1, AA1 and AU1, and specify any deviations from guidance in NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A. In addition, provide ranges for effluent monitor instrumentation referenced.

**Entergy Response:**

The bases and the underlying calculation for ICs AG1, AS1, AA1 and AU1 have been revised to specify use of the same source term (noble gases, particulates and halogens) and meteorology for all four ICs. The guidance from NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A were used for these calculations. This methodology is described in the Basis Document.

Ranges for the effluent monitors in the EALs for these Initiating Conditions were taken from the Waterford 3 Radiation Monitoring System (RMS) Database Manual and are provided below:

Condenser Exhaust WRGM	10E <sup>-7</sup> to 10E <sup>5</sup> uCi/cc*
Fuel Handling Building Exhaust PIG Gas Channel	10E <sup>-7</sup> to 10E <sup>-1</sup> uCi/cc
Fuel Handling Building Exhaust WRGM	10E <sup>-7</sup> to 10E <sup>5</sup> uCi/cc*
Plant Stack PIG Gas Channel	10E <sup>-7</sup> to 10E <sup>-1</sup> uCi/cc
Plant Stack WRGM	10E <sup>-7</sup> to 10E <sup>5</sup> uCi/cc*
Dry Cooling Tower Sumps	10E <sup>-8</sup> to 10E <sup>-2</sup> uCi/ml
Turbine Building Industrial Waste Sump	10E <sup>-8</sup> to 10E <sup>-2</sup> uCi/ml

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**General Comments (Cont'd):**

**NRC Comment #2 (Cont'd):**

**Entergy Response (Cont'd):**

In the process of providing a response to this question, Waterford 3 determined that the monitor readings provided for Initiating Condition AA1 for the Dry Cooling Towers and Turbine Building Industrial Waste Sumps would result in a monitor overranged condition, therefore these monitor reading EALs were removed for the Alert condition.

\*Effluent monitor release channels that provide a reading in uCi/sec use a mathematical calculation to provide a reading based on the source term component (range provided above in uCi/cc) and the release rate in cubic feet per minute.

**NRC Comment #3:**

Provide a simplified drawing or schematic illustrating unit auxiliary and start-up transformers and describe inter-relationship regarding conditions needed for a loss of off-site power and the ability of emergency diesel generators to supply on essential busses.

**Entergy Response:**

The requested simplified drawing is provided in Attachment 8 to this letter.

The following information is taken from Waterford 3 UFSAR section 1.2.2.4:

"Waterford 3 generates power at a nominal 25kV. This is transformed up to 230 kV and enters the 230 kV switchyard through two overhead tie lines. Two start-up transformers, each supplied from one of the two overhead tie lines provide power for start-up, shutdown, reserve full load operation and preferred emergency shutdown service to the 6.9kV and 4.16kV auxiliary system buses. While the unit is in normal operation, these buses are normally supplied by two auxiliary transformers connected to the main generator 15kV bus.

Redundant sources of offsite power are supplied by seven separate transmission lines connected to the 230 kV switchyard. Any one of these lines together with either of the tie lines and its start-up transformer is capable of supplying the total emergency power requirements to ensure that no single failure of any active component can prevent a safe and orderly shutdown.

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**General Comments (Cont'd):**

**NRC Comment #3 (Cont'd):**

**Entergy Response (Cont'd):**

Redundant sources of onsite power are supplied by two diesel generators, either of which is capable of supplying sufficient engineered safety features (ESF) loads to ensure safe shutdown and maintenance in a safe condition in the event of complete loss of offsite power.

The ESF redundant systems have been electrically and physically designed and segregated so that a single electrical fault or a single credible event will not cause a loss of power to both sets of redundant essential electrical components.”

**NRC Comment #4:**

Licensee Basis (under CU3) states that “[t]emporary instrumentation and jumpers are maintained in service such that the operators are able to monitor RCS temperature and reactor vessel level...Redundant means of reactor vessel level indication are procedurally installed to assure that the ability to monitor level will not be interrupted.” Describe instrument range of RPV water level indication in Modes 5 and 6, specifically ability to monitor level at the top of active fuel and the bottom ID of the RCS loop; and identify any periods during mode transition when indication would not be available. In addition, provide reference to specific procedural requirements for installing temporary instrumentation, and describe means in place to preclude modification of this procedural requirement without concurrent evaluation and revision of EALs.

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**General Comments (Cont'd):**

**NRC Comment #4 (Cont'd):**

**Entergy Response:**

Corrected information regarding level monitoring capability is provided in this submittal and included in the appropriate EAL documentation enclosed. OP-001-003 provides direction on installation of various level monitoring instrumentation. A commitment has been issued for this procedure to require notification to Emergency Planning of any changes to OP-001-003 for concurrent evaluation and revision (as necessary) of EALs.

Modes 5 and 6 level instrumentation information is provided as follows:

**Reactor Vessel Level Monitoring System (RVLMS)**

Applicable Mode – Mode 5

Range – Eight monitoring points are provided with 3 in the reactor head area. For the reactor vessel, 5 measurement points are provided. The lowest of these points corresponds to a reading of 0% upper plenum level and is located 12.6" above the top of the fuel alignment plate. This represents the lowest monitoring point of any level monitoring system for the Waterford 3 reactor vessel. This level is below the bottom ID of the RCS loop (hot leg), but is above the Top of Active Fuel. The next monitoring point above this level corresponds to a reading of 20% upper plenum level and is located in the area of the bottom ID of the RCS loop at 11.8 ft. MSL, with the bottom ID of the RCS loop taken to be 11.625 ft. MSL.

Mode Transition – RVLMS is not considered available in mode 6 for Waterford 3 EALs because of reactor disassembly. It is possible that RVLMS may not be available in mode 5 for short durations in the preparations to go to mode 6 and when going from mode 6 to mode 5.

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**General Comments (Cont'd):**

**NRC Comment #4 (Cont'd):**

**Entergy Response (Cont'd):**

**Refueling Water Level Indicating System (RWLIS)**

Applicable Mode – Installed for modes 5 and 6

Range - The indicated lowest range point for the RWLIS instrumentation is 12 ft. MSL, with bottom ID of the RCS loop taken to be 11.625 ft. MSL.

Mode Transition – The RWLIS is designed for operation while the plant is in modes 5 and 6 but is not considered for mode 5 EALs because it may be installed and removed while in mode 5 (mode changes from mode 4 to mode 5 and mode 5 to mode 4).

**Reactor Coolant Shutdown Level Measurement System (RCSLMS)**

Applicable Mode – Installed in modes 5 and 6 and provides redundant capability to RWLIS.

Mode Transition – The RCSLMS is designed for operation while the plant is in modes 5 and 6 but is not considered for mode 5 EALs because it may be installed and removed while in mode 5 (mode changes from mode 4 to mode 5 and mode 5 to mode 4).

Range – The indicated lowest range point for the RCSLMS instrumentation is 12 ft. MSL, with bottom ID of the RCS loop (hot leg) taken to be 11.625 ft. MSL.

**Refueling Level Indicating System (RLIS)**

Applicable Mode – Installed in modes 5 and 6

The following is from the RCS System Description (SD-RCS): "The RLIS consists of a tygon hose that is "permanently" attached to a graduated scale mounting. It is normally valved out and disconnected. When needed, it would be connected to instrument taps on the hot leg and the pressurizer to provide backup level indication during shutdown operation. The system taps off the same hot leg connection as the RWLIS and the same pressurizer connection as RCSLMS."

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**General Comments (Cont'd):**

**NRC Comment #5:**

Provide update to Attachment 5 (Waterford 3 NEI EAL Differences Document) based on evaluation of changes proposed to NEI 99-01 guidance in submittal to ensure that any deletions to NEI 99-01 Initiating Condition (IC) statements, example EALs criterion and basis, or significant content changes (other than format, nomenclature, simple terminology or system names, etc.) that may impact intent or thresholds established or guidance provided in NEI 99-01, are listed as deviations. In addition, provide site-specific technical justification for any deviations, as appropriate. (Specific examples are listed under "Specific Comments", but are not all inclusive.)

**Entergy Response:**

An update to Attachment 5 is provided.

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**Specific Comments:**

**NRC Comment #1:**

**AU1 / EAL1 (corresponds to NEI 99-01, AU1 / EAL 1)**

**AA1 / EAL1 (corresponds to NEI 99-01, AA1 / EAL 1)**

EAL Basis (Attachment 4) provides a listing of applicable effluent radiation monitors. However, listing is not provided in EAL matrix (Attachment 3) for event classification purposes. Clarify justification for inconsistency between attachments, or provide listing of applicable effluent radiation monitors in EAL matrix.

**Entergy Response:**

The EAL Basis Document was revised to provide a list of applicable effluent radiation monitors. This list now matches that found in the EAL matrix.

**NRC Comment #2:**

**AU1 / EAL 3 (corresponds to NEI 99-01, AU1 / EAL 3)**

**AA1 / EAL 3 (corresponds to NEI 99-01, AA1 / EAL 3)**

Provide listing of applicable, site-specific technical specification references for gaseous and liquid releases per NEI 99-01 guidance.

**Entergy Response:**

Added Table A1 to the EAL matrix and Basis Document for AU1 and AA1 providing the technical specification limits. Revised EAL #3 for AU1 to reference this table and the source of its information (Waterford 3 Technical Requirements Manual).

An additional change was made in AU1 and AA1 to eliminate reference to the Radiological Effluent Technical Specifications and refer entirely to the ODCM to provide consistency among Entergy sites.

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**Specific Comments (Cont'd):**

**NRC Comment #3:**

**AU1 / EALs 4 and 5 (corresponds to NEI 99-01, AU1 / EALs 4 and 5)**

**AA1 / EALs 4 and 5 (corresponds to NEI 99-01, AA1 / EALs 4 and 5)**

Basis lists the deletion of EALs 4 and 5 as a difference. While deletion is technically justified, provide further clarification why change does not constitute a deviation, based on the elimination of specific NEI 99-01 example EAL criteria, or provide change listing deletion as a deviation and providing technical justification in deviations document (Attachment 5).

**Entergy Response:**

Differences changed to deviations and justified as such.

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**Specific Comments (Cont'd):**

**NRC Comment #4:**

**AU2 / EAL 1 (corresponds to NEI 99-01, AU2 / EAL 1.a)**

Provide site-specific indication of uncontrolled water level decrease in EAL per NEI 99-01 guidance, or provide site-specific technical justification for deviation in deviations document (Attachment 5).

**Entergy Response:**

Site specific indications have been added related to observation of a water level decrease using methods addressed in the NEI 99-01 basis.

**NRC Comment #5.a:**

**AA1(corresponds to NEI 99-01, AA1)**

Licensee Basis states that “[f]or this IC [*initiating condition*], it is expected that PIG monitors on the release pathway will be over-ranged.” Identify the specific monitors in question, and clarify whether designated monitor thresholds will be on-scale. If off-scale, provide further justification for use of designated monitor threshold vs. off-scale high. (Italics added)

**Entergy Response:**

Waterford 3 provides monitors in the EAL matrix that are on scale for the condition identified. Therefore, the statement in the Basis Document was removed.

**NRC Comment #5.b:**

**AA1(corresponds to NEI 99-01, AA1)**

Licensee Basis states, “...effluent radiation monitor readings that exceed 200 times the Technical Specification limit...” This is inconsistent with licensee EAL 1 criterion and NEI 99-01 guidance, which specifies “...effluent radiation monitor readings that exceed 200 times the alarm setpoint established by the radioactivity discharge permit.” Provide technical justification in Basis (e.g., alarm setpoint established by the radioactivity discharge permit are based on Technical Specification limit, etc.), or provide the proposed change to Basis to comply with EAL 1 criterion and NEI 99-01 guidance wording.

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**Specific Comments (Cont'd):**

**NRC Comment #5.b (Cont'd):**

**Entergy Response:**

Revised Basis Document to be consistent with the EAL matrix and NEI 99-01.

**NRC Comment #5.c:**

**AA1 (corresponds to NEI 99-01, AA1)**

Provide change to address inconsistency in EAL 2 for instrument numbering between EAL Matrix (Attachment 3) and Basis (Attachment 4) for the Fuel Handling Building Exhaust WRGM (e.g., PRM-IRE-3032).

**Entergy Response:**

Change made to correct the Basis Document.

**NRC Comment #6.a:**

**AA2 (corresponds to NEI 99-01, AA2)**

Licensee inserted the qualifier: "...for this IC to apply the event must have radiological consequences - high radiation monitor alarm for this classification to apply," in 1<sup>st</sup> paragraph of Basis. This statement is applicable to EAL 1 only, and not EAL 2 per NEI guidance, which is declared based on the actual or likely uncover of irradiated fuel outside the reactor vessel. Provide further technical justification for Basis qualification statement as being applicable to IC in general, or provide change to apply basis statement to only EAL 1.

**Entergy Response:**

The inserted qualifier was removed.

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**Specific Comments (Cont'd):**

**NRC Comment #6.b:**

**AA2 (corresponds to NEI 99-01, AA2)**

Licensee inserted the qualifier: "For this event, by definition, the loss of water inventory would have to exceed makeup capacity," in 1<sup>st</sup> paragraph of Basis. This statement may be misleading, since EAL is applicable if irradiated fuel is uncovered, regardless of make-up capacity. For example, sufficient make-up capacity may have been available, but not initiated in a timely manner to prevent the uncovering of irradiated fuel. Provide further clarification of qualifying statement in Basis to address concern.

**Entergy Response:**

The inserted qualifier was removed.

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**Specific Comments (Cont'd):**

**NRC Comment #6.c:**

**AA2 (corresponds to NEI 99-01, AA2)**

Provide a correlation between site-specific radiation monitors designated licensee EAL 1 and those listed in NEI 99-01, AA2 / EAL 1. In addition, specifically provide technical justification for deviation in deviations document (Attachment 5), due to the apparent lack of a Refuel Bridge Area Radiation Monitor.

**Entergy Response:**

The Waterford 3 EALs have been revised (both addition and deletion of monitors) to provide better correlation between NEI 99-01 radiation monitors and Waterford 3 radiation monitors. Although no deviation is taken, further discussion on differences between the Waterford 3 monitors and NEI 99-01 monitors is provided in the deviations document. In addition, minor changes were made to some of the monitor designations to provide better identifying labels. These minor changes were made throughout all the documents submitted as applicable, including other ICs and EALs.

**NEI 99-01 AA2 Radiation Monitor:**

Refuel Floor Area Radiation Monitor

**Corresponding Waterford 3 Monitors:**

ARM-IRE-5024S, 5025S, 5026S and 5027S  
ARM-IRE-5014 and ARM-IRE-5015

**NEI 99-01 AA2 Radiation Monitor:**

Fuel Handling Building Ventilation Monitor

**Corresponding Waterford 3 Monitors:**

ARM-IRE-0300.1S, 2S, 3S and 4S  
PRM-IRE-5107A or B

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**Specific Comments (Cont'd):**

**NRC Comment #6.c (Cont'd):**

**Entergy Response (Cont'd):**

**NEI 99-01 AA2 Radiation Monitor:**

Refueling Bridge Area Radiation Monitor

**Corresponding Waterford 3 Monitor:**

ARM-IRE-5013

**NRC Comment #6.d:**

**AA2 (corresponds to NEI 99-01, AA2)**

Licensee EAL 2 lists the deletion of site-specific water level indication as a difference, rather than a deviation. While deletion is technically justified, provide further clarification why change does not constitute a deviation, based on the elimination of specific NEI 99-01 EAL 2 criteria, or provide change listing deletion as a deviation, with appropriate technical justification in deviations document (Attachment 5).

**Entergy Response:**

Clarifying information is provided in the Waterford 3 deviations document. While a direct level measurement in feet that will result in fuel uncovering can not be provided for the spent fuel pool, RCS level instrumentation is put in service for modes 5 and 6 as described in the response to NRC general comment #4 that could provide some indication for the fuel transfer canal and refueling cavity. This indication would be dependent on plant conditions at the time and the location of the fuel (refueling cavity storage racks, refuel mast, fuel transfer canal). The deviations document was revised to indicate this item as a deviation.

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**Specific Comments (Cont'd):**

**NRC Comment #7.a:**

**AA3 / EAL 1 (corresponds to NEI 99-01, AA3 / EAL 1)**

Licensee EAL 1 deviates from NEI 99-01 guidance by using "radiation survey" vs. site-specific radiation monitor reading. Licensee's justification is that Control Room radiation monitor is not safety-qualified, and therefore, would be validated by survey. Per NEI 99-01 guidance, the term "VALID" is used in conjunction with radiation monitor to address this contingency. The radiation monitor is used to provide prompt assessment of accident conditions, and considered VALID unless proven otherwise per definition. If radiation monitor is unavailable or determined to be invalid, then the use of direct survey readings would apply under EALs, in lieu of specific radiation monitors. This interpretation is consistent with licensee Basis, which states that "[t]he radiation levels in the EALs for this IC may be identified by a radiation monitor value or direct survey. Provide further technical justification supporting deviation, or provide change specifically addressing NEI 99-01 EAL 1 criterion.

**Entergy Response:**

EAL changed to address NEI 99-01 EAL 1 criterion (for the Main Control Room and CAS). In addition, Entergy revised the EAL to be consistent with NEI 99-01 guidance, although a deviation was taken for the use of radiation survey information.

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**Specific Comments (Cont'd):**

**NRC Comment #7.b:**

**AA3 / EAL 1 (corresponds to NEI 99-01, AA3 / EAL 1)**

NEI 99-01, AA3 / EAL 1 requires licensee to identify site-specific areas requiring continuous occupancy to maintain plant safety functions, and specifically references under Basis the Control Room, Radwaste Control Room and Central Alarm Station (CAS). The licensee only addresses the Control Room, and does not reflect changes as deviations from NEI 99-01 EAL 1 criterion. Describe evaluation performed for determining areas requiring continuous occupancy to maintain plant safety functions, and provide technical justification for deviation by eliminating the Radwaste Control Room and CAS from consideration.

**Entergy Response:**

A deviation was taken for a Radwaste Control Room in the deviations document. CAS was added to the EAL. In addition, Entergy revised the EAL to be consistent with NEI 99-01 guidance, although a deviation was taken for the use of radiation survey information.

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**Specific Comments (Cont'd):**

**NRC Comment #8.a:**

**AA3 / EAL 2 (corresponds to NEI 99-01, AA3 / EAL 2)**

Licensee identifies as a difference the decision not to include a site-specific list of areas requiring infrequent access to maintain plant safety functions. While technically justified, change should be considered a deviation due to the elimination of specific criterion based on NEI 99-01 guidance. Provide discussion of technical justification for change as a deviation.

**Entergy Response:**

Deviation taken for EAL #2 in the deviations document.

**NRC Comment #8.b:**

**AA3 / EAL 2 (corresponds to NEI 99-01, AA3 / EAL 2)**

Licensee established a site-specific value of 20 R/hr, which per licensee Basis represents a value that would require a restrictive stay time of 15 minutes or less in order to remain within the 10CFR20 normal occupational exposure guidelines and limits (5 Rem TEDE). As described in licensee Basis, the actual site-specific value should be "5 R/hr" or "20 R/hr based on a stay time of  $\leq 15$  minutes". Explain the apparent inconsistency between EAL 2 threshold value and Basis discussion, or provide appropriate change to address inconsistency. Provide clarification that under the existing station radiation protection program, no actions (e.g., dose extensions, briefings, etc.) would be required until an expected dose of 5 Rem that would "impede" operator actions per NEI 99-01 guidance. In addition, clarify whether if standard Radiation Protection procedures are used, is the proposed threshold consistent with other Entergy stations currently using NESP-007 scheme or proposing adoption of NEI 99-01.

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**Specific Comments (Cont'd):**

**NRC Comment #8.b (Cont'd):**

**Entergy Response:**

The site specific value was changed to 10 R/hr. The Basis Document discussion was also revised. A standard set of radiological practices and procedures does exist for Entergy Nuclear South plants contained in corporate Radiation Protection (RP) procedures. These procedures are standard for the Entergy South Region plants (submitting plants to change from NUREG-0654 to NEI 99-01 Revision 4) but are not common for the entire Entergy system. These procedures do require specific actions prior to an expected dose of 5 Rem. With regard to application to this EAL, these procedures are in general based on expected dose for an activity and not exposure rates. For instance, RP-105, Radiation Work Permits step 5.3.1.2 states "Stay times are required for activities that will result in an exposure of > 500 mrem/entry..." NEI 99-01 states "As used here, *impede*, includes hindering or interfering provided that the interference or delay is sufficient to significantly threaten the safe operation of the plant." This guidance implies that some actions required by exposure rates encountered may not be severe enough to warrant consideration as applicable to this IC because they may not represent a *significant* (emphasis added) threat to the safe operation of the plant. Exposure rates and required time in the area that together cause the requirement to use stay times do not appear in themselves enough to meet the NEI criteria as stated above. Neither does any requirement for briefings as these would be expected to occur in order to conduct the activities required with the Radiation Protection briefing included as a part of the task briefing. Therefore, Entergy establishes a value for this EAL that considers stay times that may be so restrictive that they may require multiple entries with multiple personnel to accomplish a task to prevent exceeding Entergy administrative limits or will require extension of the administrative limits.

**NRC Comment #8.c:**

**AA3 / EAL 2 (corresponds to NEI 99-01, AA3 / EAL 2)**

Licensee has expanded EAL 2 criteria to add qualifier: "and access is required for safe plant operation, but is impeded due to radiation dose rates." Per the NEI 99-01 guidance, access to the affected area is not a requirement, but rather that the threshold value in these infrequently accessed areas is exceeded. In addition, per the NEI 99-01 guidance, exceeding the threshold value is intended to reflect that access would be impeded, thus rendering statement "but is impeded due to radiation dose rates" redundant. Provide site-specific technical justification for deviations from NEI 99-01 guidance in deviations document (Attachment 5), or provide change to reflect NEI 99-01 AA3 / EAL 2 guidance.

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**Specific Comments (Cont'd):**

**NRC Comment #8.c (Cont'd):**

**Entergy Response:**

EAL changed to reflect NEI 99-01 guidance.

**NRC Comment #9.a:**

**AS1 (corresponds to NEI 99-01, AS1)**

**AG1 (corresponds to NEI 99-01, AG1)**

In NEI EAL Differences Document, under General Comments, the licensee states that "...the Emergency Plan Exclusion Area Boundary is the site boundary." However, the term Exclusion Area Boundary is not defined for user reference in EAL matrix or EAL Basis definitions. Define term "Exclusion Area Boundary" in EAL AG1/AS1 Bases or under Definitions consistent with that provided under General Comments in the NEI EAL Differences Document.

**Entergy Response:**

Exclusion Area Boundary definition provided in EAL Basis Document definitions. The term "Exclusion Area Boundary (EAB)" was replaced with "offsite dose" in AG1 and AS1 ICs to provide consistency with NEI 99-01.

**NRC Comment #9.b:**

**AS1 (corresponds to NEI 99-01, AS1)**

**AG1 (corresponds to NEI 99-01, AG1)**

Licensee proposes to consolidate dose assessment and field survey data EAL criteria under a common EAL for TEDE (whole body) – EAL 2, and thyroid CDE – EAL3. However, while identifying the threshold dose at or beyond the site boundary, the proposed AS1 / EALs 2 and 3 do not address specific NEI 99-01 EAL 4 criteria for interpreting field survey data. NEI 99-01 EAL 4 criteria states that "[f]ield survey results indicate *closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour*, or analysis of field survey samples indicate thyroid CDE of 500 mR for *one hour of inhalation*, at or beyond the site boundary." Provide further justification for the deletion of criteria from EAL statements in deviations document (Attachment 5), or provide change to comply with NEI 99-01 guidance.

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**Specific Comments (Cont'd):**

**NRC Comment #9.b (Cont'd):**

**Entergy Response:**

EAL changes were made to comply with NEI guidance. Basis Document changes were made to coincide with these changes. In addition, deviations were taken in the deviations document for AS1 and AG1 for telemetered perimeter radiation monitors.

**NRC Comment #9.c:**

**AS1 (corresponds to NEI 99-01, AS1)**

**AG1 (corresponds to NEI 99-01, AG1)**

NEI 99-01 AS1/AG1 Bases guidance states that the meteorology and source term used should be the same as those used for determining the monitor reading EALs in ICs AU1 and AA1. However, the licensee's Basis states that a methodology consistent with AU1 and AA1 was not used for AS1/AG1. Rather, licensee appears to determine AS1/AG1 thresholds based on a ratio from AU1 dose rates. NEI 99-01 Basis and Appendix A state that thresholds for AU1 and AA1 are developed using ODCM methodology, and AS1 and AG1 using dose assessment method. Provide calculations for AS1 EAL 1 monitor readings based on meteorology and source term used in AU1 and AA1 using station dose assessment model, versus ODCM calculational methodology, for comparison with proposed licensee AS1/AG1 EAL monitor readings. In addition, provide justification for deviation from NEI 99-01 guidance in deviations document (Attachment 5).

**Entergy Response:**

The Entergy calculation was supplemented to conform to the NEI guidance. Appropriate changes to the EAL Basis Document were made.

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**Specific Comments (Cont'd):**

**NRC Comment #10.a:**

**CU1 (corresponds to NEI 99-01, CU2)**

Deviations document (Attachment 5) does not reflect IC statement in NEI 99-01 CU2, but rather duplicates IC statement in NEI 99-01 CU1. Provide change to address inconsistency with IC statement wording.

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary.

**NRC Comment #10.b:**

**CU1 (corresponds to NEI 99-01, CU2)**

Licensee identifies the consolidation of NEI 99-01 CU1 and CU2 under licensee CU1 as a difference, rather than a deviation. Provide technical justification for consolidation, including impact on overall NEI 99-01 EAL criteria, as a deviation in deviations document (Attachment 5).

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary.

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**Specific Comments (Cont'd):**

**NRC Comment #11:**

**CU1 (corresponds to NEI 99-01, CU1 and CU2)**

**CA1 (corresponds to NEI 99-01, CA1 and CA2)**

**CS1 (corresponds to NEI 99-01, CS1 and CS1)**

Provide further technical justification in deviations document (Attachment 5) for proposed modification to Mode 6 applicability by adding qualifier "with reactor vessel water level below the reactor vessel flange," which deviates from NEI 99-01 mode definitions, criteria guidance.

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary. In addition, Entergy revised CG1 EAL #2 to provide better agreement with NEI guidance for EAL #2.

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**Specific Comments (Cont'd):**

**NRC Comment #12:**

**CU4 (corresponds to NEI 99-01, CU5 / EAL 1)**

**SU9 (corresponds to NEI 99-01, SU4 / EAL 1)**

Clarify whether letdown monitor is currently disabled, and identify whether other radiation monitors would be available to monitor fuel clad degradation based on Technical Specification allowable limits. In addition, provide technical justification in deviations document (Attachment 5) for identifying elimination of radiation monitor criterion as a deviation, rather than difference, since proposed change eliminates a specific EAL criterion listed in NEI 99-01 guidance.

**Entergy Response:**

The letdown radiation monitor is currently disabled and is not used to monitor for fuel clad degradation. This monitor was removed from service by Waterford 3 design change DC-3432 in 1995. Control Room Operators do not use other radiation monitors to provide indication of fuel clad degradation exceeding Technical Specification allowable limits, but use chemistry sampling for this indication. The Waterford 3 difference was changed to a deviation.

**NRC Comment #13.a:**

**CU5 (corresponds to NEI 99-01, CU6 / EALs 1 & 2)**

**SU8 (corresponds to NEI 99-01, SU6 / EALs 1 & 2)**

Licensee includes cellular telephones under onsite and offsite communications capability in Tables C1/C2 and M1/M2. Clarify in deviations document (Attachment 5) whether implementing procedures address the use of cellular phones as a means of offsite communications as technical justification for consideration under these EALs. In addition, confirm that cellular phones will function effectively within or in close proximity to plant structures to be considered a means of onsite and/or offsite communications.

**Entergy Response:**

Entergy numbering for the cold shutdown IC was changed to CU8.

Cellular telephones have been removed from the EAL table.

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**Specific Comments (Cont'd):**

**NRC Comment #13.b:**

**CU5 (corresponds to NEI 99-01, CU6 / EALs 1 & 2)**

**SU8 (corresponds to NEI 99-01, SU6 / EALs 1 & 2)**

Licensee lists civil defense radios under offsite communications equipment in Tables C2 and M2, but NEI 99-01 CU6 / SU8 Basis describes radio transmissions as an extraordinary means of offsite communications. Clarify in deviations document (Attachment 5) whether implementing procedures address the use of civil defense radios as a back-up means of offsite communications, as technical justification for consideration under these EALs.

**Entergy Response:**

Entergy numbering for the cold shutdown IC was changed to CU8.

Deviations document revised to indicate that civil defense radios are addressed in Emergency Plan Implementing Procedure EP-002-010, Notifications and Communications as a backup means of offsite communications.

**NRC Comment #14:**

**CU6 (corresponds to NEI 99-01, CU7 / EAL 1)**

Provide change to address inconsistency with licensee SS4 for DC voltage indication (i.e., "<" 108 VDC in CU6 vs. "of" 108 VDC in SS4).

**Entergy Response:**

Voltage indication for CU6 changed to "< 108 volts" based on minimum design voltage of 105 volts. The value of 108 volts is used as an indicator because the lowest expected battery voltage on a loss of off site power after 4 hours is 107.4 volts.

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**Specific Comments (Cont'd):**

**NRC Comment #15.a:**

**CA1 / EAL 1 (corresponds to NEI 99-01, CA1 and CA2 / EAL 1)**

Licensee Basis states that the Bottom ID of the RCS loop is 11.8 ft. MSL, and that level monitoring systems in Modes 5 and 6 provide indication to 12.0 ft. Provide further technical justification in deviations document (Attachment 5) why the conservative use of 12.0 ft MSL or indication off-scale low would not be appropriate, rather than proposed deletion of EAL criterion, since level difference between the Bottom ID of the RCS loop and the lowest indication is only 0.2 ft.

**Entergy Response:**

This comment is now applicable to new Entergy IC CA2 as well. Entergy provides corrected information in this response. The bottom ID of the RCS loop (Hotleg) is determined in the Basis Document for CA2 to be 11.625 ft. MSL and not 11.8 ft. MSL. Entergy still concurs with this comment and has revised the EALs to provide use of the conservative 12 ft. MSL indication for CA2 with a difference taken in the deviations document. The EAL criterion is therefore not deleted. Entergy also provides Reactor Vessel Level Monitoring System (RVLMS) indication for this EAL as described in the EAL matrix and Basis Document.

**NRC Comment #15.b:**

**CA1 / EAL 1 (corresponds to NEI 99-01, CA1 and CA2 / EAL 1)**

Licensee identifies the consolidation of NEI 99-01 CA1 and CA2 under licensee CA1 as a difference, rather than a deviation. Provide technical justification for consolidation, including impact on overall NEI 99-01 EAL criteria, as a deviation in deviations document (Attachment 5).

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary. In addition, Entergy revised CG1 EAL #2 to provide better agreement with NEI guidance for EAL #2.

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**Specific Comments (Cont'd):**

**NRC Comment #16:**

**CA2 (corresponds to NEI 99-01, CA3)**

Licensee Basis discussion substitutes the term “available” in lieu of NEI 99-01 term “operable”, which is defined per technical specifications. Use of the term “available” is also inconsistent with licensee SS1 Basis, which uses term “operable”. Provide further technical justification for deviation from NEI 99-01 guidance in deviations document (Attachment 5) and define “available” in relation to technical specifications under Basis definitions, or provide changes to comply with NEI 99-01 guidance.

**Entergy Response:**

Entergy numbering for this IC was changed to CA5.

The term was changed to “operable” in accordance with the NEI 99-01 guidance.

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**Specific Comments (Cont'd):**

**NRC Comment #17:**

**CA2 Basis (corresponds to NEI 99-01, CA3 / EAL 1.b)**

**SA1 Basis (corresponds to NEI 99-01, SA5)**

**SS1 Basis (corresponds to NEI 99-01, SS1)**

**SG1 Basis (corresponds to NEI 99-01, SG1)**

Licensee Basis takes credit for temporary emergency diesels that may be used to supplement onsite AC power in the event emergency diesels are lost. Provide technical justification in deviations document (Attachment 5) for deviation from NEI 99-01 CA3 / EAL 1.b criterion, which requires licensee to list site-specific emergency diesel generators that are part of plant design and safety analysis, or provide change to comply with NEI 99-01 guidance. In addition, identify specific reference to where credit is taken for temporary diesel generators in safety analysis report accident analyses, station blackout coping analysis, or technical specifications for applicable operating modes (1 thru 6).

**Entergy Response:**

The Waterford 3 cold shutdown IC is now CA5.

CA5 and SS1 EALs were revised to provide better agreement with NEI 99-01 in the description of lost power sources. The cold shutdown applicable Unusual Event EAL (new Entergy number CU5) was also revised to provide better agreement with NEI 99-01 guidance.

Waterford 3 Technical Specification 3.8.1.1 ACTIONS b.(2).(a) and (b) credit temporary emergency diesel generators for Waterford 3 operation in modes 1 through 4. The NEI 99-01 basis for IC SS1 and SG1 refers to the reason for selection of this IC as "Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink." The NEI SS1 basis also goes on to state that "Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses." The NEI bases for the loss of power ICs present the basis for declaring the emergency condition as the loss of AC power to essential equipment and not the fact that certain equipment providing AC power was lost. Entergy uses temporary diesels for some planned maintenance activities in a capacity where the temporary diesel generator, at a minimum, is capable of supplying auxiliary power to required safe shutdown loads on the emergency diesel generator train removed from service for the maintenance outage.

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**Specific Comments (Cont'd):**

**NRC Comment #17 (Cont'd):**

**Entergy Response (Cont'd):**

This practice is acknowledged in the Waterford 3 Technical Specifications (and associated SER for Amendment 166) through the reference cited above. Entergy applies this concept to the SA1, SS1 and SG1 ICs. Entergy has removed reference to temporary emergency diesel generators in the CA5 basis as their use in modes 5 and 6 is not addressed in the Waterford 3 Technical Specifications.

**NRC Comment #18:**

**CA3 / EAL 3 (corresponds to NEI 99-01, CA4 / EAL 3)**

Provide discussion in licensee Basis that the 20 psig is the lowest RCS pressure that can be read on installed Control Room instrumentation (that is equal to or greater than 10 psig) per guidance in NEI 99-01 Basis for EAL 3. In addition, provide technical justification in deviations document (Attachment 5) for including qualifier, "...due to reactor vessel inventory temperature increase" in EAL 3 criterion, which is a deviation from NEI 99-01 guidance.

**Entergy Response:**

Entergy has changed this EAL value to 10 psig. The qualifier was removed. In addition, the added qualifying wording regarding containment status for the Waterford 3 EAL #3 was removed to provide better agreement with NEI 99-01.

**NRC Comment #19:**

**CS1 (corresponds to NEI 99-01, CS1 and CS2 / EAL 2.a)**

**CG1 (corresponds to NEI 99-01, CG1 / EAL 2.a)**

Licensee does not address NEI 99-01 criterion associated with RPV level corresponding to the top of active fuel (TOAF). This is inconsistent with licensee FCB3 and SG1, which defines TOAF as "RVLMS upper plenum level  $\leq$  20%." Provide further technical justification as deviation for the deletion of TOAF criterion in deviations document (Attachment 5), or provide changes in CS1 and CG1 to comply with NEI 99-01 guidance and criteria provided in licensee FCB3 and SG1.

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**Specific Comments (Cont'd):**

**NRC Comment #19 (Cont'd):**

**Energy Response:**

Corrected information is provided in this response: TOAF for Waterford 3 is not defined as RVLMS upper plenum level  $\leq 20\%$ . The upper plenum 20% level value is a level used in Waterford 3 EOPs as a safety function acceptance criteria and is clearly a value critical to functional recovery of RCS and core cooling, but the monitoring point for this level indication is 32.6" above the top of the fuel alignment plate. A lower monitoring point (corresponding to 0% RVLMS level) is provided at 12.6" above the top of the fuel alignment plate. Therefore, FCB3 and the associated basis have been revised to use 0% RVLMS level for the potential loss indicator in accordance with NEI 99-01 guidance. A deviation was also taken for FCB3. SG1 was revised to be consistent. CS1 and CG1 were not revised to address this comment because Waterford 3 can not measure level less than TOAF as indicated in the NEI 99-01 example EAL #2 for CS1 and CG1. Deviations were taken for CS1 and CG1.

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**Specific Comments (Cont'd):**

**NRC Comment #20.a:**

**CS1 (corresponds to NEI 99-01, CS1 and CS2)**

Licensee identifies the consolidation of NEI 99-01 CA1 and CA2 under licensee CA1 as a difference, rather than a deviation. Provide technical justification for consolidation, including impact on overall NEI 99-01 EAL criteria, as a deviation in deviations document (Attachment 5).

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary. In addition, Entergy revised CG1 EAL #2 to provide better agreement with NEI guidance for EAL #2.

**NRC Comment #20.b:**

**CS1 (corresponds to NEI 99-01, CS1 and CS2)**

Per NEI 99-01 guidance for CS1 / EAL 2.b, with CONTAINMENT CLOSURE established, the inability to monitor RPV level for > 30 minutes with EITHER an unexplained sump and tank level increases OR erratic source range monitor indication would require classification. Describe how in Mode 5 (cold shutdown) with CONTAINMENT CLOSURE established, criterion "erratic source range monitor indication with the inability to monitor RPV level for > 30 minutes" is met. In addition, provide technical justification as deviation in deviations document (Attachment 5), or provide change to licensee CS1 to address NEI 99-01 guidance.

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**Specific Comments (Cont'd):**

**NRC Comment #20.b (Cont'd):**

**Entergy Response:**

This comment was addressed as part of a more extensive revision to the Waterford 3 EALs. Revisions were made to separate the Entergy CU1, CA1, and CS1 ICs into two IC conditions for each emergency classification in accordance with NEI guidance. The ICs and EALs were further revised where applicable to reflect NEI guidance or deviations taken where appropriate. The Basis Document and deviations document were also revised to better reflect NEI guidance or justify a deviation where necessary. In addition, Entergy revised CG1 EAL #2 to provide better agreement with NEI guidance for EAL #2.

**NRC Comment #20.c:**

**CS1 (corresponds to NEI 99-01, CS1 and CS2)**

Licensee CS1 provides a valid high alarm on the Containment High Range Radiation Monitor, rather than exceeding a site-specific setpoint as established under NEI 99-01 Basis guidance for CS2 / EALs 1.b and 1.b. Licensees justification for this deviation is that this value was not calculated due to the range of unknowns involved, including time after shutdown and reactor vessel head installation status and installation of external structures. However, NEI 99-01 Basis guidance states that calculations should be performed to conservatively estimate a dose rate indicative of core uncover (i.e., level at TOAF), and in specifically required monitor reading for both CONTAINMENT CLOSURE established and not established to account for reactor vessel head installation status and installation of external structures. Provide site-specific setpoints for Containment High Range Radiation Monitor readings which indicate core uncover based on NEI 99-01 guidance for CONTAINMENT CLOSURE established and not established.

**Entergy Response:**

Values were provided and included in the EAL documentation for CS2 and CG1.

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**Specific Comments (Cont'd):**

**NRC Comment #20.d:**

**CS1 (corresponds to NEI 99-01, CS1 and CS2)**

Provide technical justification in deviations document (Attachment 5) for the designation of "Core Exit Thermocouple > 700°F" as a site-specific indication of core uncover, per NEI 99-01 guidance for CS2 / EALs 1.b and 1.b.

**Entergy Response:**

This value was changed to "indicate superheat" in the new Waterford 3 CS2 . The basis for this value is found in NEI 99-01.

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**Specific Comments (Cont'd):**

**NRC Comment #21:**

**CG1 / EAL 2 (corresponds to NEI 99-01, CG1 / EAL 2.b)**

Provide site-specific setpoint for Containment High Range Radiation Monitor reading within indicate core uncover based on NEI 99-01 guidance for CONTAINMENT CLOSURE established.

**Entergy Response:**

Values were provided in accordance with NEI guidance and included in the EAL documentation for CS2 and CG1.

**NRC Comment #22:**

**CG1 / EAL 3 (corresponds to NEI 99-01, CG1 / EAL 3)**

**CNB1 - Potential Loss (corresponds to NEI 99-01, Table 5-F-4: Containment Barrier Example EAL #2)**

Licensee states that a Containment H<sub>2</sub> >3.4%, though not representative of an explosive mixture of hydrogen and oxygen, is consistent with the concentration used in site EOPs as a safety function parameter following a LOCA. Describe EOP basis or intent for Containment H<sub>2</sub> >3.4%.

**Entergy Response:**

CG1 EAL #3 was changed to "explosive mixture inside containment" to be consistent with NEI 99-01 guidance. EAL CNB1 was changed to "explosive mixture exists" to be consistent with NEI 99-01 guidance.

**NRC Comment #23:**

**Proposed Emergency Plan Pages (Attachment 2) / Table 4-1 (Summary of Initiating Conditions)**

Under Unusual Event #1 and Alert #1, titles are inconsistent with Fission Product Barrier Degradation matrix (i.e., missing "Any" prior to "Loss or any potential loss...").

**Entergy Response:**

Corrections made to proposed Emergency Plan Table 4-1.

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**Specific Comments (Cont'd):**

**NRC Comment #24:**

**Fission Product Barrier Degradation (corresponds to NEI 99-01, Table 5-F-4: Fuel Clad Barrier Example EAL #6)**

Provide discussion in deviations document (Attachment 5) of evaluation performed to identify other site-specific indications of a loss or potential loss of the Fuel Clad Barrier per NEI 99-01 guidance.

**Entergy Response:**

Discussion provided in deviations document.

**NRC Comment #25:**

**RCB2 - Potential Loss (corresponds to NEI 99-01, Table 5-F-4: RCS Barrier Example EAL #2)**

Provide technical justification in deviations document (Attachment 5) for establishing a site-specific RCS leak rate versus NEI 99-01 guidance criterion statement of "...exceeding the capacity of one charging pump in the normal charging mode", since pump discharge rate may vary based on plant conditions, or provide change to comply with NEI 99-01 Table 5-F-4 criterion.

**Entergy Response:**

Discussion provided in deviations document.

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**Specific Comments (Cont'd):**

**NRC Comment #26:**

**CNB3 - Loss (corresponds to NEI 99-01, Table 5-F-4: Containment Barrier Example EAL #4)**

Provide EAL corresponding to NEI 99-01 criterion for a "RUPTURED S/G [*steam generator*] is also FAULTED outside the containment," per Basis definitions, or provide specific technical justification for deviation from NEI 99-01 guidance in deviations document (Attachment 5).

**Entergy Response:**

Corresponding EAL provided. In addition, basis document information was added to provide clarification of this event using NEI 99-01 definitions of "ruptured" and "faulted."

**NRC Comment #27:**

**Fission Product Barrier Degradation (corresponds to NEI 99-01, Table 5-F-4: Containment**

**Barrier Example EAL #7)** Provide discussion in deviations document (Attachment 5) of evaluation performed to identify other site-specific indications of a loss or potential loss of the Containment Barrier per NEI 99-01 guidance.

**Entergy Response:**

Discussion provided in deviations document.

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**Specific Comments (Cont'd):**

**NRC Comment #28:**

**HU6 / EAL 6** (corresponds to NEI 99-01, HU1 / EAL 6)

**HA6 / EAL 5** (corresponds to NEI 99-01, HA1 / EAL 5)

Clarify inconsistency between HU6 / EAL 6 and HA6 / EAL 5, regarding site-specific areas containing systems required for the safe shutdown of the plant, that are not designed to be wetted or submerged, that would be impacted by internal flooding per NEI 99-01 guidance (e.g., HU6 states -35 elevation areas vs. HA6 which states Reactor Auxiliary Building). In addition, identify the basis used for determining these areas (i.e., IPEEE, etc.).

**Entergy Response:**

HU6 and HA6 were revised to be consistent with one another. In addition, the listed areas were changed based on a review of the site-specific safe shutdown analysis criteria used for HA4 and application of NEI 99-01 guidance. The Waterford 3 IPEEE did not identify any particular areas of vulnerability for internal (or external flooding) other than some discussion provided on the Cooling Tower Areas. These areas are included in the Waterford 3 ICs. The Basis Document sections for HU6 and HA6 were revised to include the rationale for area selection.

Additional changes to HU6 and HA6 were made: Table H1 was deleted and specific criteria provided for each EAL. The term "significant" was removed from HU6 EAL #3. All EALs were revised as necessary to provide better compliance with NEI 99-01 guidance and the Waterford 3 post-fire safe shutdown analysis where NEI 99-01 guidance states for NEI 99-01 HA1 "EALs 2,3,4,5 should specify site-specific structures or areas containing systems and functions required for safe shutdown of the plant."

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**Specific Comments (Cont'd):**

**NRC Comment #29:**

**HA3 (corresponds to NEI 99-01, HA5 / EAL 1)**

**HS3 (corresponds to NEI 99-01, HS2 / EAL 1)**

Provide site-specific procedure or equivalent objective measure in EAL criteria, which upon entering procedure, initiating specific procedural step or action, or reaching criteria, would reflect requirement for control room evacuation. Entry into this procedure or meeting a designated procedural step or criteria is used under licensee HS3 to determine whether control of plant was established outside the control room within 15 minutes.

**Entergy Response:**

Site specific procedure provided for HA3 and HS3.

**NRC Comment #30:**

**HA4 (corresponds to NEI 99-01, HA2 / EAL 1)**

Discuss in the licensee Basis the logic used for determining site-specific areas containing functions and systems required for the safe shutdown of the plant (i.e., site-specific safe shutdown analysis, etc.).

**Entergy Response:**

Discussion provided in EAL Basis Document referring to the site-specific post-fire safe shutdown analysis. This IC was also revised to remove the Fuel handling Building and add the Cooling Tower Areas (Wet and Dry) to provide consistency with the safe shutdown analysis. The Cooling Tower Areas were also added to IC HU4.

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**Specific Comments (Cont'd):**

**NRC Comment #31:**

**HS3 / EAL 1 (corresponds to NEI 99-01, HS2 / EAL 1)**

Please provide technical justification in licensee Basis, based on site-specific analysis or assessments per NEI 99-01 guidance, as to how quickly control must be re-established to ensure that core uncovering and/or core damage will not occur with the 15 minute time threshold established.

**Entergy Response:**

Reference to the post-fire safe shutdown analysis for Waterford 3 was provided in the basis for HS3. Some actions are required to be performed outside the Control Room in 10 minutes or less, therefore an EAL was added for this site-specific requirement.

**NRC Comment #32:**

**SU3 (corresponds to NEI 99-01, SU3)**

**SA3 (corresponds to NEI 99-01, SA4)**

**SS3 (corresponds to NEI 99-01, SS6)**

Describe logic in licensee Basis and in deviations document (Attachment 5) for referencing Reg. Guide 1.97, rather than listing specific Control Room indicator panels containing safety system instrumentation per Table 3 to Reg. Guide 1.97. In addition, clarify how operators are trained to promptly recognize and quantify a loss of Reg. Guide 1.97 instrumentation or if specific measures are in place to label instrumentation to allow for the prompt classification of event.

**Entergy Response:**

The Entergy ICs are now SU6, SA6 and SS6.

Entergy has revised the SU6, SA6 and SS6 EALs to provide better agreement with NEI 99-01 by eliminating the reference to Reg. Guide 1.97, although the bases for these ICs and the EAL for SS3 have been revised to provide the critical safety functions listed in Table 3 of the Reg. Guide. Training Lesson Plan Power Point presentation MCD05 is provided in training given to Operators to recognize instruments in "categories" ("types" as used in Reg. Guide 1.97 Table 3) A, B, C (with the exception of rod position indicators) as those instruments designated by orange borders around the nameplate.

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**Specific Comments (Cont'd):**

**NRC Comment #32 (Cont'd):**

**Entergy Response (Cont'd):**

This is inclusive of the Reg. Guide 1.97 Table 3 Type B instruments that are defined as "Those variables that provide information to indicate whether plant safety functions are being accomplished."

Other changes were made to these EALs (and bases) to provide better agreement with NEI 99-01 guidance or better internal conformity within the EAL family including elimination of the 75% value in the EALs (retained in the basis) and added reference to the Plant Monitoring Computer indications for SS3. The SA6 IC was revised to match the NEI 99-01 corresponding IC.

**NRC Comment #33:**

**SU7 Basis (corresponds to NEI 99-01, SU5)**

**CU1 Basis (corresponds to NEI 99-01, CU1)**

Provide technical justification for licensee Basis statement, "[a]t Waterford 3, steam generator leakage is considered to be identified leakage." In addition, clarify why this statement would also not be applicable during cold shutdown mode per CU1.

**Entergy Response:**

The statement has been removed to provide better agreement with NEI 99-01 guidance.

**NRC Comment #34:**

**SU10 (corresponds to NEI 99-01, SU8)**

**CU7 (corresponds to NEI 99-01, CU8)**

Clarify use of terms "extended" vs. "sustained" for consistency with EAL thresholds and use of terms in licensee SU10 and CU7 Bases.

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**Specific Comments (Cont'd):**

**NRC Comment #34 (Cont'd):**

**Entergy Response:**

The Entergy cold shutdown IC is now CU8.

The term "extended" was replaced with the term "sustained" in the SU10 basis for internal consistency. Entergy also removed additional content in both EALs to provide better agreement with NEI 99-01.

**NRC Comment #35:**

**SA2 (corresponds to NEI 99-01, SA2)**

Clarify whether rod withdrawal would occur in hot standby (Mode 3), as part of a plant start-up, prior to entering Mode 2. If rod withdrawal would initiate in hot standby, prior to entering Mode 2 (Start-up), then provide change to address Mode 3 applicability per NEI 99-01 guidance. If not, then address deletion of Mode 3 applicability in deviations document (Attachment 5).

**Entergy Response:**

The Entergy IC is now SA3. SS2 and SG2 were also changed to SS3 and SG3 respectively.

Rod withdrawal will occur in hot standby (Mode 3) as part of a plant startup prior to entering Mode 2. EAL submittal documents were changed to address Mode 3 applicability per NEI 99-01 guidance.

ENERGY OPERATIONS, INC RESPONSES TO REQUESTS FOR ADDITIONAL  
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**Specific Comments (Cont'd):**

**NRC Comment #36:**

**SA2 Basis (corresponds to NEI 99-01, SA2)**

Intent of the NEI 99-01 IC is to address the failure of an automatic shutdown, whenever an automatic reactor trip is initiated. While steam generator high level per the Waterford 3 Technical Specifications does not correspond to a safety limit, its functional capability at the specified trip setting is required to enhance the overall reliability of the Reactor Protection System (RPS), and therefore, should be applicable to this IC. This is also applicable to RCS flow-low. Provide further technical justification in deviations document (Attachment 5) as to why not to address the failure to initiate or complete a reactor trip whenever any automatic reactor trip signal is initiated which would potentially create an Anticipated Transient Without Scram (ATWS) event, or provide change to comply with intent of NEI 99-01 guidance.

**Entergy Response:**

The Entergy IC is now SA3.

SA3 basis changed to comply with intent of NEI 99-01 guidance.

**NRC Comment #37:**

**SS3 (corresponds to NEI 99-01, SS6 / EAL 1.c)**

NEI 99-01 does not require that all Reg. Guide 1.97 indication be lost as reflected in licensee EAL criteria, but rather that indication is not available to monitor a required safety function(s). Provide further technical justification as deviation in deviations document (Attachment 5) or change to comply with NEI 99-01 guidance.

**Entergy Response:**

The Entergy IC is now SS6.

SS6 was revised to provide better conformance to NEI 99-01 guidance.

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**Specific Comments (Cont'd):**

**NRC Comment #38:**

**SS5 / EALs 1 and 2 (corresponds to NEI 99-01, SS4 / EAL 1)**

Licensee inserted qualifier, "...necessary to reach Hot Shutdown", in IC statement. Describe modification of IC and technical justification as a deviation vs. difference in deviations document (Attachment 5).

**Entergy Response:**

Qualifier and difference were removed. In addition, Entergy removed the EAL indicators to provide better agreement with NEI 99-01.

**NRC Comment #39:**

**SG2-EAL 2 (corresponds to NEI 99-01, SG2 / EAL 1.b)**

NEI 99-01 Basis guidance, and that provided in licensee Basis, state that an indication that heat removal is extremely challenged is "if emergency feedwater flow is insufficient to remove the amount of heat required by design from at least one steam generator ." (Underline added) However, licensee EAL criterion 2 states that "heat removal is extremely challenges by **BOTH** steam generators < 50% Wide Range and not feedwater available." Provide technical justification in deviations document (Attachment 5) for inconsistency between licensee EAL criterion and justification in NEI 99-01 and licensee Bases, or provide changes to EAL criterion to comply with NEI 99-01 guidance.

**Entergy Response:**

The Entergy IC is now SG3.

SG3 EALs and basis document were revised to conform to NEI 99-01 guidance with a deviation taken for the consideration of feedwater flow from systems other than emergency feedwater flow.

**Attachment 2**

**W3F1-2004-0120**

**Proposed Emergency Plan Pages – Changes Incorporated**

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1

## SUMMARY OF INITIATING CONDITIONS

### Category A – Abnormal Radiation Levels/Radiological Effluents

This category encompasses the spectrum of potential uncontrolled radionuclide releases via liquid or gaseous effluents for all modes of operation. It also includes other incidents related to high levels of radioactivity, but which may not result in a release to the environment. Potential sources of radionuclide releases are from the Reactor Auxiliary Building (RAB), Reactor Containment Building (RCB), and Fuel Handling Building (FHB). Monitored gaseous release paths include the plant vent stack, FHB exhaust plenums and secondary steam piping. Monitored liquid release paths include the liquid waste management discharge, circulating water discharge, dry cooling tower sumps and industrial waste sump. The ICs within this category are keyed to Radiation Monitoring System (RMS) indications, radiological survey results and offsite dose assessment calculations.

The initiating conditions within this category are as follows:

#### UNUSUAL EVENT

1. Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 times the radiological effluent ODCM limits for greater than or equal to 60 minutes.
2. Unexpected rise in plant radiation.

#### ALERT

1. Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM limits for greater than or equal to 15 minutes.
2. Damage to irradiated fuel or loss of water level that has or will result in uncovering of irradiated fuel outside the reactor vessel.
3. Release of radioactive material or rise in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown.

#### SITE AREA EMERGENCY

1. Exclusion Area Boundary (EAB) dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release.

#### GENERAL EMERGENCY

1. Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY C – Cold Shutdown/Refueling System Malfunction

This category encompasses the spectrum of events related to the reactor and its supporting systems that may occur in the shutdown and refueling modes. These include RCS leakage and loss of reactor vessel inventory events as well as those events dealing with power losses.

This category also encompasses events that directly affect the integrity of the reactor core when in cold shutdown or refueling. This includes inadvertent criticality and loss of decay heat removal capability.

The initiating conditions within this category are as follows:

#### UNUSUAL EVENT

1. RCS leakage.
2. Unplanned loss of RCS inventory with irradiated fuel in the reactor vessel.
3. Unplanned loss of decay heat removal capability with irradiated fuel in the reactor vessel.
4. Fuel clad degradation.
5. Loss of all offsite power to essential busses for greater than 15 minutes.
6. Unplanned loss of required DC power for greater than 15 minutes.
7. Inadvertent criticality.
8. Unplanned loss of all onsite or offsite communications capabilities.

#### ALERT

1. Loss of RCS inventory.
2. Loss of reactor vessel inventory with irradiated fuel in the reactor vessel.
3. Inability to maintain plant in cold shutdown with irradiated fuel in the reactor vessel.
4. Loss of all offsite power and loss of all onsite AC power to essential busses.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY C – Cold Shutdown/Refueling System Malfunction (Cont'd)

#### SITE AREA EMERGENCY

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

#### GENERAL EMERGENCY

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

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY F – Fission Product Barrier Degradation

This category addresses losses and potential losses of the three fission product barriers – fuel clad, RCS and containment. The category is designed for events in the power operations, startup, hot standby and hot shutdown modes of operation.

The initiating conditions within this category are as follows:

#### UNUSUAL EVENT

1. Any Loss or any potential loss of containment.

#### ALERT

1. Any Loss or any potential loss of either fuel clad or RCS.

#### SITE AREA EMERGENCY

1. Loss or potential loss of any two barriers.

#### GENERAL EMERGENCY

1. Loss of any two barriers and loss or potential loss of third barrier.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY H - Hazards and Other Conditions Affecting Plant Safety

This category encompasses the spectrum of man-caused or non-naturally occurring hazards that jeopardize the level of safety of the plant in all modes of operation. The ICs are keyed to offsite notifications or personal observation and assessment.

This category also encompasses the spectrum of naturally occurring events that jeopardize the level of safety of the plant. The ICs are keyed to specific instrument indications, offsite notifications or personal observation and assessment.

This category also encompasses the spectrum of security infractions as addressed in the Security Contingency Plan. The ICs are keyed to notification from the security force or another credible source of a site specific credible threat.

This category is the location for the miscellaneous ICs that are provided to allow for Emergency Coordinator/EOF Director judgment classifications.

The initiating conditions within this category are as follows:

#### UNUSUAL EVENT

1. Confirmed security event which indicates a potential degradation in the level of safety of the plant.
2. Other conditions existing which in the judgment of the Emergency Coordinator warrant declaration of an Unusual Event.
3. Fire within Protected Area not extinguished within 15 minutes of detection.
4. Release of toxic or flammable gases deemed detrimental to normal operation of the plant.
5. Natural and destructive phenomena affecting the Protected Area.

#### ALERT

1. Confirmed security event in a plant Protected Area.
2. Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of an Alert.
3. Control Room evacuation has been initiated.
4. Fire or Explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown.
5. Release of toxic or flammable gases within or contiguous to Vital Area which jeopardizes operation of systems required to maintain safe operations or establish or maintain safe shutdown.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY H - Hazards and Other Conditions Affecting Plant Safety (Cont'd)

#### ALERT (Cont'd)

6. Natural and destructive phenomena affecting the Vital Area.

#### SITE AREA EMERGENCY

1. Confirmed security event in a plant Vital Area.
2. Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of Site Area Emergency.
3. Control Room evacuation has been initiated and plant control cannot be established.

#### GENERAL EMERGENCY

1. Security event resulting in loss of physical control of the facility.
2. Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of General Emergency.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY S – System Malfunction

This category encompasses the spectrum of events related to the reactor and its supporting systems that may occur in the power operations, startup, hot standby and hot shutdown operating modes. In general, the ICs relate to equipment or system malfunctions or failures. The ICs include RCS leakage, loss of Control Room instrument indications and failure of the Reactor Protection System as well as those events dealing with power losses. This category also includes inadvertent criticality and loss of decay heat removal capability ICs.

The initiating conditions within this category are as follows:

#### UNUSUAL EVENT

1. Loss of all offsite power to essential busses for greater than 15 minutes.
2. Unplanned loss of most or all safety system annunciation or indication in the Control Room for greater than 15 minutes.
3. RCS Leakage.
4. Unplanned loss of all onsite or offsite communications capabilities.
5. Fuel clad degradation.
6. Inadvertent criticality.
7. Inability to reach required shutdown within Technical Specification time limits.

#### ALERT

1. AC power capability to essential busses reduced to a single power source greater than 15 minutes such that any additional single failure would result in station blackout.
2. Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was successful.
3. Unplanned loss of most or all safety system annunciation or indication in the Control Room greater than 15 minutes with either (1) a Significant Transient in progress, or (2) compensatory non-alarming indicators are unavailable.

# WATERFORD 3 PROPOSED EMERGENCY PLAN CHANGES

TABLE 4-1 (Continued)

## SUMMARY OF INITIATING CONDITIONS

### CATEGORY S – System Malfunction (Continued)

#### SITE AREA EMERGENCY

1. Loss of all offsite power and loss of all onsite AC power to essential busses.
2. Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was not successful.
3. Loss of all vital DC power.
4. Complete loss of heat removal capability necessary to reach hot shutdown.
5. Inability to monitor a Significant Transient in progress.

#### GENERAL EMERGENCY

1. Prolonged loss of all offsite power and prolonged loss of all onsite AC power to essential busses.
2. Failure of the Reactor Protection System to complete an automatic trip and manual trip was not successful and there is indication of an extreme challenge to the ability to cool the core.

**Attachment 3**

**W3F1-2004-0120**

**Proposed EALs – To Be Incorporated in Procedure**

**ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS**

**AG1** Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology. 1 2 3 4 5 6 D

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

**NOTE:** If dose assessment results are available at the time of declaration, then the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to more accurately characterize the nature of the release.

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

- CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+09$  uCi/sec
- FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+09$  uCi/sec
- PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+09$  uCi/sec

**OR**

2. Dose assessment using actual meteorology indicates doses  $> 1000$  mR TEDE or  $> 5000$  mR CDE Thyroid at or beyond the EAB.

**OR**

3. Field survey results indicate closed window dose rates  $> 1000$  mR/hr expected to continue for  $> one$  hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 5000$  mR for one hour of inhalation, at or beyond the EAB.

**AS1** Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release. 1 2 3 4 5 6 D

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

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

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

- CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+08$  uCi/sec
- FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+08$  uCi/sec
- PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+08$  uCi/sec

**OR**

2. Dose assessment using actual meteorology indicates doses  $> 100$  mR TEDE or  $> 500$  mR CDE Thyroid at or beyond the EAB.

**OR**

3. Field survey results indicate closed window dose rates  $> 100$  mR/hr expected to continue for  $> one$  hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 500$  mR for one hour of inhalation, at or beyond the EAB.

**AA1** Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM limits for  $\geq 15$  minutes. 1 2 3 4 5 6 D

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

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

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

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq 15$  minutes:

MONITOR	CONC.	EFFLUENT RATE
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.27E+07 uCi/sec
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE-3032, RE3032-4		2.35E+07 uCi/sec
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.27E+07 uCi/sec

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq 15$  minutes, in excess of 200 times ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

Table A1 TRM Limits		
	ALERT	UE
<b>Gaseous Release</b>		
Noble Gases: $\leq 500$ mrem/yr whole body	1.00E+05	1000
Noble Gases: $\leq 3000$ mrem/yr skin	6.00E+05	6000
I-131, I-133, H-3 and particulates with half-lives $> 8$ days: $\leq 1500$ mrem/year to any organ	3.00E+05	3000
<b>Liquid Release</b>		
Whole body: $< 1.50$ mrem/quarter	300	3
$< 3$ mrem/yr	600	6
Any Organ: $< 5$ mrem/quarter	1000	10
$< 10$ mrem/yr	2000	20

**AU1** Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 2 times the radiological effluent ODCM limits for  $\geq 60$  minutes. 1 2 3 4 5 6 D

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

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

1. VALID reading on any effluent monitor that exceeds 2 times the alarm setpoint established by a current radioactivity discharge permit for  $\geq 60$  minutes.

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq 60$  minutes:

MONITOR	CONC.	EFFLUENT RATE
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.27E+05 uCi/sec
FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL, PRM-IRE-5107A or B, RE5107A-1 or RE5107B-1	1.58E-02 uCi/cc	
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE-3032, RE3032-4		2.35E+05 uCi/sec
PLANT STACK PIG GAS CHANNEL PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1	2.89E-03 uCi/cc	
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.27E+05 uCi/sec
DRY COOLING TOWER SUMPS MONITOR, PRM-IRE-6775 or PRM-IRE-6776, RE6775-1 or RE6776-1	8.49E-04 uCi/ml	
TURBINE BUILDING INDUSTRIAL WASTE SUMP MONITOR, PRM-IRE-6778, RE6778-1	8.49E-04 uCi/ml	

\*Monitor reading not applicable if sump discharge is aligned to circulating water discharge.

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq 60$  minutes, in excess of 2 times ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

Radiological Effluents

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

Abnormal Radiation Levels

**AA2** Damage to irradiated fuel or loss of water level that has or will result in uncovering of irradiated fuel outside the reactor vessel. 1 2 3 4 5 6 D

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

1. VALID alarm or reading  $\geq$  HIGH alarm limits on one or more of the following radiation monitors:
  - CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)  $\geq$  HIGH alarm
  - CONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1)  $\geq$  HIGH alarm
  - REFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1)  $\geq$  HIGH alarm
  - FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, .3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)  $\geq$  1000 mR/hr
  - FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL, PRM-IRE-5107A OR B, RE5107A-1 OR RE5107B-1  $\geq$  HIGH alarm

**OR**

2. Valid indication of uncontrolled water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel uncovering.

**AA3** Release of radioactive material or rise in radiation levels within the facility that impedes operation of systems required to maintain safe operations or to establish or maintain cold shutdown. 1 2 3 4 5 6 D

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

1. VALID radiation level > 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions.
    - Main Control Room Area Radiation Monitor (ARM-IRE- 5001, RE5001-1) > 15 mR/hr
    - Radiation level in CAS >15 mR/hr
- OR**
2. VALID radiation level > 10 R/hr in plant vital areas requiring infrequent access to maintain plant safety functions.

**AU2** Unexpected rise in plant radiation. 1 2 3 4 5 6 D

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

1. a. VALID indication of uncontrolled water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal with all irradiated fuel assemblies remaining covered by water.
  - Level drop may be indicated by personnel observation, spent fuel pool level below level plate, refueling crew report.

**AND**

- b. Unplanned VALID Area Radiation Monitor rise on any of the following:

- FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, .3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)
- CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)

**OR**

2. Unplanned VALID Area Radiation Monitor readings indicate a rise in plant radiation levels by a factor of 1000 over normal levels (highest reading in the past 24 hours excluding the current peak value).

Plant Modes (white boxes indicate applicable modes)

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



GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION								
Loss of Decay Heat Removal				<b>CA3</b> Inability to maintain plant in Cold Shutdown with irradiated fuel in the reactor vessel. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>				<b>CU3</b> UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
				<b>Emergency Action Level(s):</b> (1 or 2 or 3) 1. With CONTAINMENT CLOSURE and RCS integrity not established, an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.  <u>OR</u> 2. With CONTAINMENT CLOSURE established and RCS integrity not established or RCS inventory reduced, an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for > 20 minutes <sup>1</sup> .  <u>OR</u> 3. An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for > 60 minutes <sup>1</sup> or results in an RCS pressure rise of > 10 psig.  <sup>1</sup> Note: If shutdown cooling is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.				<b>Emergency Action Level(s):</b> (1 or 2) 1. An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit  <u>OR</u> 2. Loss of all RCS temperature and reactor vessel level indication for > 15 minutes.
Fuel Clad Degradation							<b>CU4</b> Fuel clad degradation. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	
						<b>Emergency Action Level(s):</b> 1. RCS sample activity value indicates fuel clad degradation > Technical Specification allowable limits.  <u>OR</u> <ul style="list-style-type: none"> <li>• &gt;1.0 µCi/gm DEI</li> <li>• &gt;100/Ē µCi/gm</li> </ul>		

Plant Modes (white boxes indicate applicable modes)

Power Operations

Startup

Hot Standby

Hot Shutdown

Cold Shutdown

Refueling

Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION (cont.)								
Loss of Power				<b>CA5</b> Loss of all offsite power and loss of all onsite AC power to essential busses. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 <input type="checkbox"/> D				<b>CU5</b> Loss of all offsite power to essential busses > 15 minutes. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6
				<b>Emergency Action Level(s):</b> 1. a. Loss of power to all unit auxiliary and startup transformers  <b>AND</b> b. Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses  <b>AND</b> c. Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.				<b>Emergency Action Level(s):</b> 1. a. Loss of power to all unit auxiliary and startup transformers > 15 minutes.  <b>AND</b> b. At least emergency diesel generator 'A' or 'B' is supplying power to emergency busses.
Loss of DC Power							<b>CU6</b> UNPLANNED loss of required DC power > 15 minutes. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6	
						<b>Emergency Action Level(s):</b> 1. a. UNPLANNED loss of vital DC power to required DC busses based on bus voltage indication < 108 volts.  <b>AND</b> b. Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.		
Inadvertent Criticality							<b>CU7</b> Inadvertent criticality. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> 5 <input checked="" type="checkbox"/> 6	
						<b>Emergency Action Level(s):</b> 1. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.		

Plant Modes (white boxes indicate applicable modes)

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																							
<b>COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION (cont.)</b>																													
Loss of Communications	<table border="1"> <thead> <tr> <th>Table C1 Onsite Communications Equipment</th> </tr> </thead> <tbody> <tr> <td>Plant radio system</td> </tr> <tr> <td>Plant paging system</td> </tr> <tr> <td>In-plant telephones</td> </tr> <tr> <td>Sound powered phones</td> </tr> </tbody> </table>		Table C1 Onsite Communications Equipment	Plant radio system	Plant paging system	In-plant telephones	Sound powered phones	<table border="1"> <thead> <tr> <th>Table C2 Offsite Communications Equipment</th> </tr> </thead> <tbody> <tr> <td>All telephone lines (commercial and microwave)</td> </tr> <tr> <td>Industrial Hot Line</td> </tr> <tr> <td>ENS</td> </tr> <tr> <td>Civil Defense Radios</td> </tr> <tr> <td>Operational Hotline</td> </tr> </tbody> </table>		Table C2 Offsite Communications Equipment	All telephone lines (commercial and microwave)	Industrial Hot Line	ENS	Civil Defense Radios	Operational Hotline			<table border="1"> <tr> <td>CU8 UNPLANNED loss of all onsite or offsite communications capabilities.</td> <td style="text-align: right;">5 6</td> </tr> <tr> <td colspan="2"><u>Emergency Action Level(s):</u> (1 or 2)</td> </tr> <tr> <td colspan="2">1. Loss of all Table C1 onsite communications systems affecting the ability to perform routine operations.</td> </tr> <tr> <td colspan="2"><u>OR</u></td> </tr> <tr> <td colspan="2">2. Loss of all Table C2 offsite communications systems.</td> </tr> </table>		CU8 UNPLANNED loss of all onsite or offsite communications capabilities.	5 6	<u>Emergency Action Level(s):</u> (1 or 2)		1. Loss of all Table C1 onsite communications systems affecting the ability to perform routine operations.		<u>OR</u>		2. Loss of all Table C2 offsite communications systems.	
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Plant Modes (white boxes indicate applicable modes)

1 Power Pperations     2 Startup

3 Hot Standby     4 Hot Shutdown     5 Cold Shutdown     6 Refueling     D Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
<b>FISSION PRODUCT BARRIER DEGRADATION</b>							
FG1	Loss of ANY two Barriers AND Loss or Potential Loss of Third barrier	FS1	Loss or Potential Loss of ANY two Barriers	FA1	ANY loss or ANY Potential Loss of EITHER Fuel Clad or RCS	FU1	ANY loss or ANY Potential Loss of Containment.
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Plant Modes (white boxes indicate applicable modes)

- Power Operations  
 Startup  
 Hot Standby  
 Hot Shutdown  
 Cold Shutdown  
 Refueling  
 Defueled

Note: Determine which combination of the three barriers are lost or have a potential loss and use the above key to classify the event. Also an event or multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent (i.e., within 1 to 2 hours). In this imminent loss situation use judgment and classify as if the thresholds are exceeded.

**SEE FOLLOWING PAGE FOR EALS FOR BARRIER LOSS AND POTENTIAL LOSS**

Fuel Clad Barrier EALs	
LOSS	POTENTIAL LOSS
<b>1. Primary Coolant Activity Level (FCB1)</b>	
RCS Dose Equivalent Iodine > 300 µCi/gm as indicated by:  a. Dose Rate at one foot from Primary Sample Panel > 950 mR/hr  <u>OR</u>  b. -4 RAB RADIOCHEMISTRY LAB area radiation monitor (ARM-IRE-5020) > 125 mR/hr  <u>OR</u>  c. Chemistry sample results	Not Applicable
<b>2. Core Exit Thermocouple Readings (FCB2)</b>	
≥ 1200 degrees F	≥ 700 degrees F
<b>3. Reactor Vessel Water Level (FCB3)</b>	
Not applicable.	RVLMS upper plenum level 0%.
<b>4. Containment Radiation Monitoring (FCB4)</b>	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr.	Not Applicable
<b>5. Emergency Coordinator/EOF Director Judgment (FCB5)</b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Fuel Clad barrier.	

RCS Barrier EALs	
LOSS	POTENTIAL LOSS
<b>1. RCS Leak Rate (RCB1)</b>	
GREATER THAN available makeup capacity as indicated by RCS subcooling < 28° F.	Unisolable RCS leak > 44 gpm.
<b>2. SG Tube Rupture (RCB2)</b>	
SGTR that results in an ECCS (SI) actuation	Not Applicable
<b>3. Containment Radiation Monitoring (RCB3)</b>	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr.	Not Applicable
<b>4. Other Indications (RCB4)</b>	
Not Applicable	RCS pressure dropping due to primary relief not reseating
<b>5. Emergency Coordinator/EOF Director Judgment (RCB5)</b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the RCS barrier.	

Containment Barrier EALs	
LOSS	POTENTIAL LOSS
<b>1. Containment Pressure (CNB1)</b>	
a. Rapid unexplained drop following initial rise <u>OR</u> b. Containment parameters not consistent with LOCA conditions	a. Containment pressure 50 PSIA and rising <u>OR</u> b. Explosive mixture exists <u>OR</u> c. Containment pressure > 17.7 PSIA with LESS THAN one full train of Containment Spray operating (1750 gpm)
<b>2. Core Exit Thermocouple Readings (CNB2)</b>	
Not Applicable	Core exit thermocouples >1200 degrees F and restoration procedures not effective within 15 minutes <u>OR</u> Core exit thermocouples > 700 degrees F with RVLMS upper plenum level equal to 0% or LOWER and restoration procedures not effective within 15 minutes
<b>3. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)</b>	
Ruptured S/G is also faulted outside of containment <u>OR</u> Primary-to-Secondary leakage >10 gpm with nonisolable steam release from affected S/G to the environment	Not Applicable
<b>4. Containment Isolation Valve Status After Containment Isolation (CNB4)</b>	
Unisolable breach of containment with a direct release path to the environment following containment isolation actuation.	Not Applicable
<b>5. Significant Radioactive Inventory in Containment (CNB5)</b>	
Not Applicable	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 4000 R/hr.
<b>6. Emergency Coordinator/EOF Director Judgment (CNB6)</b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Containment barrier.	

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY							
Security	<p><b>HG1</b> Security event resulting in loss of physical control of the facility. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.</p>	<p><b>HS1</b> Confirmed security event in a plant VITAL AREA. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b> (1 or 2)</p> <p>1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.</p> <p><b>OR</b></p> <p>2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision.</p>	<p><b>HA1</b> Confirmed security event in a plant PROTECTED AREA. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b> (1 or 2)</p> <p>1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.</p> <p><b>OR</b></p> <p>2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision</p>	<p><b>HU1</b> Confirmed security event which indicates a potential degradation in the level of safety of the plant. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b> (1 or 2)</p> <p>1. Security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision</p> <p><b>OR</b></p> <p>2. A credible site specific security threat notification.</p>			
	<p><b>HG2</b> Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of General Emergency. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Other conditions exist which in the judgment of the Emergency Coordinator/EOF Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.</p>	<p><b>HS2</b> Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of Site Area Emergency. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Other conditions exist which in the judgment of the Emergency Coordinator/EOF Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the Exclusion Area Boundary.</p>	<p><b>HA2</b> Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of an Alert. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Other conditions exist which in the judgment of the Emergency Coordinator/EOF Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</p>	<p><b>HU2</b> Other conditions existing which in the judgment of the Emergency Coordinator warrant declaration of an Unusual Event. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Other conditions exist which, in the judgment of the Emergency Coordinator, indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.</p>			
	<p><b>Main Control Room Evacuation</b></p>	<p><b>HS3</b> Control Room evacuation has been initiated and plant control cannot be established. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Control Room evacuation has been initiated</p> <p><b>AND</b></p> <p>a. Time critical steps required to be performed by OP-901-502, Evacuation of Control Room &amp; Subsequent Plant Shutdown outside the Control Room within 10 minutes not completed <math>\leq</math>10 minutes</p> <p><b>OR</b></p> <p>b. Control of the plant cannot be established in accordance with OP-901-502, Evacuation of Control Room &amp; Subsequent Plant Shutdown within 15 minutes.</p>	<p><b>HA3</b> Control Room evacuation has been initiated. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b></p> <p>1. Entry into OP-901-502, Evacuation of Control Room &amp; Subsequent Plant Shutdown.</p>				

Plant Modes (white boxes indicate applicable modes)

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

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY				
Fire			<p>HA4 FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level(s):</u></p> <p>1. FIRE or EXPLOSION in the Reactor Auxiliary Building, Containment or Cooling Tower Areas</p> <p><u>AND</u></p> <p>Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.</p>	<p>HU4 FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level(s):</u></p> <p>1. FIRE in or contiguous to Condensate Polisher Building, Containment, Fuel Handling Building, Reactor Auxiliary Building, Cooling Tower Areas or Turbine Building not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm.</p>
			<p>HA5 Release of toxic or flammable gases within or contiguous to VITAL AREA which jeopardizes operation of systems required to maintain safe operations or establish or maintain safe shutdown. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level(s): (1 or 2)</u></p> <p>1. Report or detection of toxic gases within or contiguous to VITAL AREA in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).</p> <p><u>OR</u></p> <p>2. Report or detection of gases in concentration &gt; LOWER FLAMMABILITY LIMIT within or contiguous to VITAL AREA.</p>	<p>HU5 Release of toxic or flammable gases deemed detrimental to normal operation of the plant. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><u>Emergency Action Level(s): (1 or 2)</u></p> <p>1. Report or detection of toxic or flammable gases that has or could enter the Exclusion Area Boundary in amounts that can affect NORMAL PLANT OPERATIONS.</p> <p><u>OR</u></p> <p>2. Report by St. Charles Parish for evacuation or sheltering of site personnel based on an offsite event.</p>
Toxic Gas				

Plant Modes (white boxes indicate applicable modes)

1

Power Operations

2

Startup

3

Hot Standby

4

Hot Shutdown

5

Cold Shutdown

6

Refueling

D

Defueled

GENERAL EMERGENCY		SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY				
Natural Events		<p><b>HA6</b> Natural and destructive phenomena affecting the plant VITAL AREA. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b> (1 or 2 or 3 or 4 or 5)</p> <p>1 RED LIGHT on the seismic monitor panel indicates a VALID Seismic Event &gt; Operating Basis Earthquake (OBE).</p> <p><u>OR</u></p> <p>2. Tomado or high winds &gt; 100 mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures/equipment or Control Room indication of degraded performance of those systems.</p> <ul style="list-style-type: none"> <li>• Containment</li> <li>• Reactor Auxiliary Building</li> <li>• Cooling Tower Areas</li> </ul> <p><u>OR</u></p> <p>3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or Control Room indication of degraded performance of those systems.</p> <ul style="list-style-type: none"> <li>• Containment</li> <li>• Reactor Auxiliary Building</li> <li>• Cooling Tower Areas</li> </ul> <p><u>OR</u></p> <p>4. Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas.</p> <ul style="list-style-type: none"> <li>• Containment</li> <li>• Reactor Auxiliary Building</li> <li>• Cooling Tower Areas</li> </ul> <p><u>OR</u></p> <p>5. Uncontrolled flooding in the Reactor Auxiliary Building or Cooling Tower Areas that results in degraded safety system performance as indicated in the Control Room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.</p>	<p><b>HU6</b> Natural and destructive phenomena affecting the PROTECTED AREA. <input type="checkbox"/>1<input type="checkbox"/>2<input type="checkbox"/>3<input type="checkbox"/>4<input type="checkbox"/>5<input type="checkbox"/>6<input type="checkbox"/>D</p> <p><b>Emergency Action Level(s):</b> (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)</p> <p>1. Earthquake felt in plant and detected on station seismic instrumentation.</p> <p><u>OR</u></p> <p>2. Report by plant personnel of tornado or high winds &gt; 100 mph striking within PROTECTED AREA boundary.</p> <p><u>OR</u></p> <p>3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.</p> <p><u>OR</u></p> <p>4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.</p> <p><u>OR</u></p> <p>5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.</p> <p><u>OR</u></p> <p>6. Uncontrolled flooding in Reactor Auxiliary Building or Cooling Tower Areas that has the potential to affect safety related equipment needed for the current operating mode.</p> <p><u>OR</u></p> <p>7. Site predicted to experience a hurricane with hurricane force winds (<math>\geq 74</math> mph) on site in <math>\leq 12</math> hours as projected by the National Weather Service.</p> <p><u>OR</u></p> <p>8. River water level at the intake structure &gt; +27 FT MSL.</p>	

Plant Modes (white boxes indicate applicable modes)

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
<b>SYSTEM MALFUNCTION</b>							
Loss of AC Power	<b>SG1</b> Prolonged loss of all offsite power and prolonged loss of all onsite AC power to essential busses. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Loss of power to all unit auxiliary and startup transformers.</p> <p><u>AND</u></p> <p>Failure of both 'A' and 'B' emergency diesel generators to supply power to emergency busses.</p> <p><u>AND</u></p> <p>Either of the following: (a or b)</p> <p>a. Restoration of at least one emergency bus within 4 hours is not likely</p> <p><u>OR</u></p> <p>b. FA1 entry conditions met.</p>	<b>SS1</b> Loss of all offsite power and loss of all onsite AC power to essential busses. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Loss of power to all unit auxiliary and startup transformers</p> <p><u>AND</u></p> <p>Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses</p> <p><u>AND</u></p> <p>Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.</p>	<b>SA1</b> AC power capability to essential busses reduced to a single power source > 15 minutes such that any additional single failure would result in station blackout. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. AC power capability to essential busses reduced to a single power source &gt; 15 minutes.</p> <p><u>AND</u></p> <p>Any additional single failure will result in station blackout.</p>	<b>SU1</b> Loss of all offsite power to essential busses > 15 minutes. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Loss of power to all unit auxiliary and startup transformers &gt; 15 minutes.</p> <p><u>AND</u></p> <p>At least 'A' and 'B' emergency diesel generators supplying power to emergency busses.</p>			
	<b>SG3</b> Failure of the Reactor Protection System to complete an automatic trip and manual trip was NOT successful and there is indication of an extreme challenge to the ability to cool the core. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Indications exist that automatic and manual trip were not successful.</p> <p><u>AND</u></p> <p>Either of the following: (a or b)</p> <p>a. Indication(s) exists that core cooling is extremely challenged as indicated by CET temperatures &gt; 1200° F</p> <p><u>OR</u></p> <p>b. Indication(s) exists that heat removal is extremely challenged as indicated by inability to maintain at least one steam generator &gt; 50% wide range.</p>	<b>SS3</b> Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was NOT successful. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Indication(s) exist that automatic and manual trip were not successful.</p>	<b>SA3</b> Failure of Reactor Protection System instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection System setpoint has been exceeded and manual trip was successful. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> <p><u>Emergency Action Level(s):</u></p> <p>1. Indication(s) exist that indicate that the Reactor Protection System setpoint was exceeded and automatic trip did not occur and a successful manual trip occurred.</p>				
Failure of Reactor Protection System							

Plant Modes (white boxes indicate applicable modes)

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
SYSTEM MALFUNCTION							
Loss of DC	Heat Sink	<b>SS4</b> Loss of all vital DC power <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6					
		<u>Emergency Action Level(s):</u> 1. Loss of all Vital DC power based on bus voltage indications < 108 volts for > 15 minutes.					
Loss of Annunciators	Heat Sink	<b>SS5</b> Complete loss of heat removal capability. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6					
		<u>Emergency Action Level(s):</u> 1. Loss of core cooling and heat sink.					
Loss of Annunciators	Loss of Annunciators	<b>SS6</b> Inability to monitor a SIGNIFICANT TRANSIENT in progress. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6		<b>SA6</b> UNPLANNED loss of most or all safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory non-alarming indicators are unavailable. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6		<b>SU6</b> UNPLANNED loss of most or all safety system annunciation or indication in the Control Room > 15 minutes. <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	
		<u>Emergency Action Level(s):</u> 1. a. Loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators associated with safety systems.  <u>AND</u> b. Compensatory non-alarming indications are unavailable  <u>AND</u> c. Indications needed to monitor safety functions (reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity) are unavailable  <u>AND</u> d. SIGNIFICANT TRANSIENT in progress		<u>Emergency Action Level(s):</u> 1. UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.  <u>AND</u> Either of the following (a or b): a. SIGNIFICANT TRANSIENT is in progress.  <u>OR</u> b. Compensatory non-alarming indications are unavailable.		<u>Emergency Action Level(s):</u> 1. UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.	

Plant Modes (white boxes indicate applicable modes)

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT			
SYSTEM MALFUNCTION									
RCS Leakage						SU7	RCS leakage <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
						<b>Emergency Action Levels:</b> (1 or 2) 1. Unidentified or pressure boundary leakage > 10 gpm. <u>OR</u> 2. Identified leakage > 25 gpm			
Loss of Communications	<table border="1"> <tr> <td style="text-align: center;"> <b>Table M1</b>  <b>Onsite Communications Equipment</b>            Plant radio system            Plant paging system            In-plant telephones            Sound powered phones         </td> <td style="text-align: center;"> <b>Table M2</b>  <b>Offsite Communications Equipment</b>            All telephone lines (commercial and microwave)            Industrial Hot Line            ENS            Civil Defense Radios            Operational Hotline         </td> </tr> </table>					<b>Table M1</b> <b>Onsite Communications Equipment</b> Plant radio system Plant paging system In-plant telephones Sound powered phones	<b>Table M2</b> <b>Offsite Communications Equipment</b> All telephone lines (commercial and microwave) Industrial Hot Line ENS Civil Defense Radios Operational Hotline	SU8	Unplanned loss of all onsite or offsite communications capabilities. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>Table M1</b> <b>Onsite Communications Equipment</b> Plant radio system Plant paging system In-plant telephones Sound powered phones	<b>Table M2</b> <b>Offsite Communications Equipment</b> All telephone lines (commercial and microwave) Industrial Hot Line ENS Civil Defense Radios Operational Hotline								
						<b>Emergency Action Levels:</b> (1 or 2) 1. Loss of all Table M1 onsite communications equipment affecting the ability to perform routine operations. <u>OR</u> 2. Loss of all Table M2 offsite communications capability			
Fuel Clad Degredation						SU9	Fuel clad degradation. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
						<b>Emergency Action Level(s):</b> 1. Reactor coolant sample activity value indicating fuel clad degradation > Technical Specification allowable limits. <ul style="list-style-type: none"> <li>&gt;1.0 µCi/gm DEI</li> </ul> <u>OR</u> <ul style="list-style-type: none"> <li>&gt;100/Ē µCi/gm</li> </ul>			
Inadvertent Criticality						SU10	Inadvertent criticality. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
						<b>Emergency Action Level(s):</b> 1. An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.			
Tech. Spec. Shutdown						SU11	Inability to reach required shutdown within Technical Specification limits. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
						<b>Emergency Action Level(s):</b> 1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time.			

Plant Modes (white boxes indicate applicable modes)       Power Operations     Startup     Hot Standby     Hot Shutdown     Cold Shutdown     Refueling     Defueled

**Attachment 4**

**W3F1-2004-0120**

**Proposed EAL Bases – To Be Incorporated in Procedure**

# **WATERFORD 3 EAL BASIS DOCUMENT**

WATERFORD 3 EAL BASIS DOCUMENT

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## General Notes on Basis Document Use

### Plant Operating Mode Usage for Waterford 3 EALs:

Mode 1 = Power Operations – Reactor Power > 5%,  $K_{eff} \geq 0.99$

Mode 2 = Startup – Reactor Power  $\leq 5\%$ ,  $K_{eff} \geq .99$

Mode 3 = Hot Standby – RCS  $\geq 350^\circ$  F,  $K_{eff} < .99$

Mode 4 = Hot Shutdown –  $200^\circ$  F < RCS <  $350^\circ$  F,  $K_{eff} < .99$

Mode 5 = Cold Shutdown – RCS <  $200^\circ$  F,  $K_{eff} < .99$

Mode 6 = Refueling – RCS <  $140^\circ$  F,  $K_{eff} < .95$ , Fuel in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed

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 Waterford 3 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 indicated in red font 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.

## DEFINITIONS

The following definitions are taken from NEI 99-01 and applicable to the Waterford 3 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."

**BOMB:** refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

**CIVIL DISTURBANCE:** is a group of persons violently protesting station operations at the site.

**CONFINEMENT BOUNDARY:** is the barrier(s) between areas containing radioactive substances and the environment.

**CONTAINMENT CLOSURE:** Those actions taken by procedure within acceptable times as specified by procedure to close containment when in modes 5 or 6. Reference OP-901-131, Shutdown Cooling Malfunction, Attachment 7.1.

**CONTAINMENT INTEGRITY:** refers to that condition of the containment described in Technical Specifications definition 1.7.

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

## DEFINITIONS

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

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

**EXCLUSION AREA BOUNDARY (EAB):** For Waterford 3 EALs, the Emergency Plan Exclusion Area Boundary is the site boundary. The term "Exclusion Area Boundary" or "EAB" is used throughout the Waterford 3 EALs as the site boundary. The Emergency Plan defines the Exclusion Area Boundary (EAB) as "The border of the EXCLUSION AREA or an area corresponding to a distance of 914 meters from the Waterford 3 reactor."

**EXPLOSION:** is a rapid, violent, unconfined combustion, or catastrophic failure of pressurized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

**EXTORTION:** is an attempt to cause an action at the station by threat of force.

**FAULTED:** in a steam generator, the existence of secondary side leakage that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized.

**FIRE:** is 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.

**HOSTAGE:** is a person(s) held as leverage against the station to ensure that demands will be met by the station.

**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.

## DEFINITIONS

**IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):** A condition that either poses an immediate threat to life and health or an immediate threat of severe exposure to contaminants which are likely to have adverse delayed effects on health.

**INITIATING CONDITION (IC):** One of a predetermined subset of nuclear power plant conditions where either the potential exists for a radiological emergency, or such an emergency has occurred.

**INTRUSION / INTRUDER:** is 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.

**LOWER FLAMMABILITY LIMIT (LFL):** The minimum concentration of a combustible substance that is capable of propagating a flame through a homogenous mixture of the combustible and a gaseous oxidizer.

**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.

**PROTECTED AREA:** The area encompassed by physical barriers (the security fence) and to which access is controlled into the VITAL AREAS of the plant.

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

**SABOTAGE:** is 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.

**SIGNIFICANT TRANSIENT:** is 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%.

## **DEFINITIONS**

**STRIKE ACTION:** is 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.

**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, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

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

**VITAL AREA:** is 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 RADIATION  
LEVELS/RADIOLOGICAL EFFLUENTS**

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AU1**

### **Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 2 times the radiological effluent ODCM limits for  $\geq 60$  minutes.

**Operating Mode Applicability: All**

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

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

1. VALID reading on any effluent monitor that exceeds 2 times the alarm setpoint established by a current radioactivity discharge permit for  $\geq 60$  minutes.

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq 60$  minutes:

- CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 1.27E+05$  uCi/sec.
- FUEL HANDLING BUILDING EXHAUST PIG GAS CHANNEL (PRM-IRE-5107A or B, RE5107A-1 or RE5107B-1). FHB Normal Exhaust has not been isolated AND monitor indicates  $> 1.58E-02$  uCi/cc ( $2.35E+05$  uCi/sec on FHB Emergency Exhaust WRGM release rate channel – channel 4, if in service).
- PLANT STACK PIG GAS CHANNEL (PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1) indicates  $> 2.89E-03$  uCi/cc ( $1.27E+05$  uCi/sec on Plant Stack WRGM release rate channel – channel 4).
- <sup>1</sup>DRY COOLING TOWER SUMPS MONITOR ( PRM-IRE-6775 or PRM-IRE-6776, RE6775-1 or RE6776-1). The release path is not isolated AND monitor indicates  $> 8.49E-04$  uCi/ml.
- <sup>1</sup>TURBINE BUILDING INDUSTRIAL WASTE SUMP MONITOR (PRM-IRE-6778, RE6778-1). The release path is not isolated AND monitor indicates  $> 8.49E-04$  uCi/ml.

<sup>1</sup>Monitor reading not applicable if sump discharge is aligned to circulating water discharge.

**OR**

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AU1**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq 60$  minutes, in excess of 2 times ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

Table A1 TRM Limits		
	ALERT	UE
<b>Gaseous Release</b>		
Noble Gases: $\leq 500$ mrem/yr whole body	1.00E+05	1000
Noble Gases: $\leq 3000$ mrem/yr skin	6.00E+05	6000
I-131, I-133, H-3 and particulates with half-lives $> 8$ days: $\leq 1500$ mrem/year to any organ	3.00E+05	3000
<b>Liquid Release</b>		
Whole body: $< 1.50$ mrem/quarter	300	3
$< 3$ mrem/yr	600	6
Any Organ: $< 5$ mrem/quarter	1000	10
$< 10$ mrem/yr	2000	20

### **Basis:**

This IC addresses a potential or actual decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. Waterford 3 SES incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. These controls are located in the Offsite Dose Calculation Manual (ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of 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.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AU1**

The ODCM contains the specific release limits and appropriate surveillance requirements which normally monitor these limits. Releases should not be prorated or averaged over 60 minutes. For example, a release exceeding 4 times ODCM limits for 30 minutes does not meet the threshold for this event classification. The one-hour time period allows sufficient time to isolate any release after exceeding ODCM limits. Releases continuing for more than one hour represent inability to isolate or control the release. The Emergency Coordinator should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, then the Emergency Coordinator should, in the absence of data to the contrary, assume that the release has exceeded 60 minutes and make the emergency declaration.

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

EAL #1 addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed two times the Technical Specification limit and releases are not terminated within 60 minutes. In all cases, the applicable monitor is expected to be in high alarm, but AU1 and AA1 EAL #1 are based on the reading on the monitor and not its alarm status. The emergency classification is not made simply on the basis that the monitor has been in high alarm for 60 minutes. This alarm setpoint may be associated with a planned batch release, or a continuous release path. In either case, the setpoint is established by the ODCM to warn of a release that is not in compliance. Indexing the EAL threshold to the ODCM setpoints in this manner insures that the EAL threshold will never be less than the setpoint established by a specific discharge permit.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AU1**

EAL #2 is similar to EAL #1, but is intended to address effluent or accident radiation monitors on release pathways for which a discharge permit would not be prepared for a non-routine release. The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default source terms from the UFSAR and, for gaseous releases, prescribes the use of pre-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. These monitor reading EALs have been determined using this methodology. The values used on the Dry Cooling Tower and Turbine Building sump discharge are based on the release pathway being aligned to the Storm Water System or Discharge Canal vice the circulating water system and are not applicable if the pathway is aligned to the circulating water system. Grab sample analysis of the circulation water discharge, IAW EAL #3, would be necessary to determine the appropriate action.

EAL #3 addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, leakage into Mississippi river water system, etc.

Calculation HP-CALC-2003-001, "Emergency Action Levels (EALs) Abnormal Rad Levels and Radiological Effluent Basis Calculation Document" and its August 2004 supplement provide the basis for the radiation monitor readings selected for AU1, AA1, AS1 and AG1. The guidance from NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A were used for these calculations. The calculations assume the same meteorology (annual average meteorology) and source term (UFSAR table normal and expected radionuclide concentrations) for all four emergency classifications. The back calculation methodology for the Site Area and General Emergency values utilizes the dose assessment method used by responders in emergency facilities to determine offsite doses and its corresponding dose factors and iodine to noble gas ratios. The NEI 99-01 Appendix A caution regarding overly conservative iodine to noble gas ratios was also considered in the calculation with an appropriate ratio correction factor selected.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AU2**

### **Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

Unexpected rise in plant radiation.

**Operating Mode Applicability: All**

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

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

- Level drop may be indicated by personnel observation, spent fuel pool level below level plate, refueling crew report, indication on area security camera, RWSP level drop due to makeup demands.

### **AND**

b. Unplanned VALID Area Radiation Monitor rise on any of the following:

- FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, .3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)
- CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (RE5024-1, RE5025-1, RE5026-1 or RE5027-1)

### **OR**

2. Unplanned VALID Area Radiation Monitor readings indicate a rise in plant radiation levels by a factor of 1000 over normal levels (highest reading in the past 24 hours excluding the current peak value).

### **Basis:**

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

## **ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS**

**AU2**

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 EAL #1 is appropriate given their potential for increased doses to plant staff. Classification as an Unusual Event is warranted as a precursor to a more serious event.

Specific indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level instrumentation, the declaration may be based on indications of water makeup rate or decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level. Credit should not be taken for inventory additions to maintain level above the threshold.

While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered. For example, the reading on an area radiation monitor located on the refueling bridge may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the refuel mast. 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 reactor vessel flange, classification would be via CU2. This event escalates to an Alert per AA2 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Matrix for events in operating modes 1-4.

EAL #2 addresses UNPLANNED increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. Normal levels can be considered as the HIGHEST reading in the past twenty-four hours excluding the current peak value.

This event escalates to an Alert in accordance with AA3 if the increase in dose rates impedes personnel access necessary for safe operations.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AA1**

### **Initiating Condition – ALERT**

Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM limits for  $\geq 15$  minutes.

**Operating Mode Applicability: All**

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

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

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

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq 15$  minutes:

- CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 1.27E+07$  uCi/sec.
- FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates  $> 2.35E+07$  uCi/sec.
- PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates  $> 1.27E+07$  uCi/sec.

**OR**

**ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS**

**AA1**

- 3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq 15$  minutes, in excess of 200 times ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

Table A1 TRM Limits		
	ALERT	UE
Gaseous Release		
Noble Gases: $\leq 500$ mrem/yr whole body	1.00E+05	1000
Noble Gases: $\leq 3000$ mrem/yr	6.00E+5	6000
I-131, I-133, H-3 and particulates with half-lives $> 8$ days: $\leq 1500$ mrem/year to any organ	3.00E+05	3000
Liquid Release		
Whole body: $< 1.50$ mrem/quarter	300	3
$< 3$ mrem/yr	600	6
Any Organ: $< 5$ mrem/quarter	1000	10
$< 10$ mrem/yr	2000	20

**Basis:**

This IC addresses a potential or actual decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time. Waterford 3 SES incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. These controls are located in the ODCM. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of degradation in these features and/or controls.

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

Releases should not be prorated or averaged. For example, a release exceeding 100 times ODCM limits for 30 minutes does not meet the threshold for this event classification.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

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

EAL #1 addresses radioactivity releases that for whatever reason cause effluent radiation monitor readings that exceed 200 times the alarm setpoint established by the radioactivity discharge permit. In all cases, the applicable monitor is expected to be in alarm, but AU1 and AA1 EAL #1 are based on the reading on the monitor and not its alarm status. The emergency classification is not made simply on the basis that the monitor has been in high alarm for 15 minutes. This alarm setpoint may be associated with a planned batch release, or a continuous release path. In either case, the setpoint is established by the ODCM to warn of a release that is not in compliance. Indexing the EAL threshold to the ODCM setpoints in this manner insures that the EAL threshold will never be less than the setpoint established by a specific discharge permit.

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

EAL #3 addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, leakage into Mississippi river water system, etc.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AA1**

Calculation HP-CALC-2003-001, "Emergency Action Levels (EALs) Abnormal Rad Levels and Radiological Effluent Basis Calculation Document" and its August 2004 supplement provide the basis for the radiation monitor readings selected for AU1, AA1, AS1 and AG1. The guidance from NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A were used for these calculations. The calculations assume the same meteorology (annual average meteorology) and source term (UFSAR table normal and expected radionuclide concentrations) for all four emergency classifications. The back calculation methodology for the Site Area and General Emergency values utilizes the dose assessment method used by responders in emergency facilities to determine offsite doses and its corresponding dose factors and iodine to noble gas ratios. The NEI 99-01 Appendix A caution regarding overly conservative iodine to noble gas ratios was also considered in the calculation with an appropriate ratio correction factor selected.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AA2**

### **Initiating Condition – ALERT**

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

**Operating Mode Applicability: All**

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

1. VALID alarm or reading  $\geq$  HIGH alarm limits on one or more of the following radiation monitors:
  - CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)  $\geq$  HIGH alarm
  - CONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1)  $\geq$  HIGH alarm
  - REFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1)  $\geq$  HIGH alarm
  - FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, 3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)  $\geq$  1000 mR/hr
  - FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL , PRM-IRE-5107A OR B, RE5107A-1 OR RE5107B-1  $\geq$  HIGH alarm

### **OR**

2. Valid indication of uncontrolled water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel uncovering.

### **Basis:**

This IC addresses specific events that have resulted, or may result, in unexpected increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent 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.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA2

Uncontrolled water level decrease may be detected by visual observation, increased radiation levels or various other symptoms that are considered valid indicators of the event. Fuel uncover may be expected based on abnormal radiation levels, visual observation, or best judgment of the Emergency Coordinator/EOF Director based on present and past trends.

EAL #1 addresses radiation monitor indications of fuel uncover and/or fuel damage. Increased readings on ventilation monitors may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Increased background at the monitor due to water level decrease may mask increased ventilation exhaust airborne activity and needs to be considered. While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered. For example, the monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Application of these Initiating Conditions requires understanding of the actual radiological conditions present in the vicinity of the monitor.

In EAL #2, 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 decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level.

Escalation, if appropriate, would occur via AS1 or AG1 or Emergency Coordinator/EOF Director Judgment.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA3

### Initiating Condition – ALERT

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

Operating Mode Applicability: All

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

1. VALID radiation level > 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions.
  - Main Control Room Area Radiation Monitor (ARM-IRE- 5001, RE5001-1) > 15 mR/hr
  - Radiation level in CAS >15 mR/hr

### OR

2. VALID radiation level > 10 R/hr in plant vital areas requiring infrequent access to maintain plant safety functions.

### Basis:

The radiation levels in the EALs for this IC may be identified by a radiation monitor value or direct survey.

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

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. Nor is it intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.).

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AA3**

The value of 15mR/hr is derived from the GDC 19 value of 5 Rem in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737, "*Clarification of TMI Action Plan Requirements*", provides that the 15 mR/hr value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an Alert.

For areas requiring infrequent access, the single value of 10 R/hr was selected because it is a value that would result in exposure control measures intended to maintain doses within normal occupational guidelines and limits (i.e., 10CFR20), and in doing so, will impede necessary access. A 10 R/hr area may require multiple entries with multiple personnel to accomplish a task to prevent exceeding Entergy administrative limits or will require the extension of those administrative limits. Entergy establishes an administrative limit of 2000 mrem/yr TEDE. The value selected for this EAL yields a dose rate of ~ 170 mR/minute, requiring a restrictive stay time of less than 12 minutes to remain within the Entergy administrative limit of 2000 mR/yr. As used here, *impede*, includes hindering or interfering provided that the interference or delay is sufficient to significantly threaten the safe operation of the plant.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

**AS1**

### **Initiating Condition – SITE AREA EMERGENCY**

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

**Operating Mode Applicability: All**

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

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

1. VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for  $\geq 15$  minutes:
  - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+08$   $\mu\text{Ci}/\text{sec}$
  - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+08$   $\mu\text{Ci}/\text{sec}$
  - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+08$   $\mu\text{Ci}/\text{sec}$

**OR**

2. Dose assessment using actual meteorology indicates doses  $> 100$  mR TEDE or  $> 500$  mR CDE Thyroid at or beyond the EAB.

**OR**

3. Field survey results indicate closed window dose rates  $> 100$  mR/hr expected to continue for  $> one$  hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 500$  mR for one hour of inhalation, at or beyond the EAB.

## **ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS**

**AS1**

### **Basis:**

This IC addresses radioactivity releases that result in doses at or beyond the EAB that exceed a small fraction of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public. While these failures may be addressed by other ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone, e.g., fuel handling accident in spent fuel building.

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

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

The monitor list in EAL #1 includes monitors on the primary potential release pathways (Plant stack, Primary/Secondary leak, Fuel Handling Accident) for Waterford 3. 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 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 in EPA-400R-92-001 provides for the use of adult thyroid dose conversion factors.

The monitor reading EALs were determined using a dose assessment method that back calculates from the dose values specified in the IC. Calculation HP-CALC-2003-001, "Emergency Action Levels (EALs) Abnormal Rad Levels and Radiological Effluent Basis Calculation Document" and its August 2004 supplement provide the basis for the radiation monitor readings selected for AU1, AA1, AS1 and AG1. The guidance from NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A were used for these calculations. The calculations assume the same meteorology (annual average meteorology) and source term (UFSAR normal and expected radionuclide concentrations) for all four emergency classifications. The back calculation methodology for the Site Area and General Emergency values utilizes the dose assessment method used by responders in emergency facilities to determine offsite doses and its corresponding dose factors and iodine to noble gas ratios. The NEI 99-01 Appendix A caution regarding overly conservative iodine to noble gas ratios was also considered in the calculation with an appropriate ratio correction factor selected.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AS1

Since doses are generally not monitored in real-time, a release duration of one hour was assumed, and the EALs are based on a EAB (or beyond) dose of 100 mR/hour whole body or 500 mR/hour thyroid, whichever is more limiting (as was done for EALs #2 and #3). If analyses indicate a longer or shorter duration for the period in which the substantial portion of the activity is released, the longer duration should be used.

Since dose assessment in EALs #2 and #3 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, decision makers should ensure performance of dose assessments using actual meteorology and release information are performed in a timely manner when release conditions are detected. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), then the dose assessment results override the monitor reading EALs. However, classification should not be delayed pending the results of these dose assessments. If dose assessment team calculations can not be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

Field team surveys in EAL #3 are performed at or beyond the EAB and at the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is one hour for the basis of the EAL. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Sampling of radioiodine by adsorption on a charcoal cartridge should determine the iodine value.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AG1

### Initiating Condition – GENERAL EMERGENCY

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid 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: If dose assessment results are available at the time of declaration, then the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to more accurately characterize the nature of the release.*

1. VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for  $\geq 15$  minutes:
  - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+09$  uCi/sec
  - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+09$  uCi/sec
  - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+09$  uCi/sec

OR

2. Dose assessment using actual meteorology indicates doses  $> 1000$  mR TEDE or  $> 5000$  mR CDE Thyroid at or beyond the EAB.

OR

3. Field survey results indicate closed window dose rates  $> 1000$  mR/hr expected to continue for  $> one$  hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 5000$  mR for one hour of inhalation, at or beyond the EAB.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AG1

### Basis:

This IC addresses radioactivity releases that result in doses at or beyond the EAB that exceed the EPA Protective Action Guides (PAGs). Public protective actions are required. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage. While these failures are addressed by other 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 Emergency Coordinator/EOF Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes.

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

The monitor list in EAL #1 includes monitors on potential gaseous effluent release pathways (Plant stack, Primary/Secondary Leak, Fuel Handling Accident). The EPA PAGs are expressed in terms of the sum of the effective *dose equivalent (EDE)* and the *committed effective dose equivalent (CEDE)*, or as the thyroid *committed dose equivalent (CDE)*. For the purpose of these 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 in EPA-400R-92-001 provides for the use of adult thyroid dose conversion factors.

The monitor reading EALs were determined using a dose assessment method that back calculates from the dose values specified in the IC. Calculation HP-CALC-2003-001, "Emergency Action Levels (EALs) Abnormal Rad Levels and Radiological Effluent Basis Calculation Document" and its August 2004 supplement provide the basis for the radiation monitor readings selected for AU1, AA1, AS1 and AG1. The guidance from NEI 99-01 (Basis for Radiological Effluent Initiating Conditions) and Appendix A were used for these calculations. The calculations assume the same meteorology (annual average meteorology) and source term (UFSAR normal and expected radionuclide concentrations) for all four emergency classifications. The back calculation methodology for the Site Area and General Emergency values utilizes the dose assessment method used by responders in emergency facilities to determine offsite doses and its corresponding dose factors and iodine to noble gas ratios. The NEI 99-01 Appendix A caution regarding overly conservative iodine to noble gas ratios was also considered in the calculation with an appropriate ratio correction factor selected.

## ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AG1

Since doses are generally not monitored in real-time, a release duration of one hour was assumed, and the EALs are based on a EAB (or beyond) dose of 1000 mR/hour whole body or 5000 mR/hour thyroid, whichever is more limiting (as was done for EALs #2 and #3). If analyses indicate a longer or shorter duration for the period in which the substantial portion of the activity is released, the longer duration should be used.

Since dose assessment in EALs #2 and #3 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, decision makers should ensure performance of dose assessments using actual meteorology and release information are performed in a timely manner when release conditions are detected. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), then the dose assessment results override the monitor reading EALs. However, classification should not be delayed pending the results of these dose assessments. If dose assessment team calculations can not be completed in 15 minutes, then valid monitor readings should be used for emergency classification.

Field team surveys in EAL #3 are performed at or beyond the EAB and at the most accurate indicator of the condition. Field data are independent of release elevation and meteorology. The assumed release duration is one hour for the basis of the EAL. Expected post accident source terms would be dominated by noble gases providing the dose rate value. Sampling of radioiodine by adsorption on a charcoal cartridge should determine the iodine value.

**COLD SHUTDOWN/REFUELING SYSTEM  
MALFUNCTION**

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU1

### Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

RCS leakage.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)

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

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

### OR

2. Identified leakage > 25 gpm .

### **Basis:**

This IC is included as a NOUE because it is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is sufficiently large to be observable via normally installed instrumentation (e.g., Pressurizer level, RCS loop level instrumentation, etc.) or reduced inventory instrumentation such as level hose indication. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances). The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. Prolonged loss of RCS inventory may result in escalation to the Alert level via either CA1 or CA3.

The difference between CU1 and CU2 deals with the RCS conditions that exist between cold shutdown and refueling mode applicability. In cold shutdown, the RCS will normally be intact and RCS inventory and level monitoring means such as Pressurizer level indication and makeup volume control tank levels are normally available. In the refueling mode, the RCS is not intact and reactor vessel level and inventory are monitored by different means.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

### Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

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

Operating Mode Applicability:                      Refueling (Mode 6)

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

1. UNPLANNED RCS level drop below the vessel flange for  $\geq 15$  minutes

### OR

2. a. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

### AND

b. Reactor vessel level cannot be monitored

### **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. Refueling evolutions that decrease RCS water level below the reactor vessel flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level decreasing below the reactor vessel flange warrants declaration of a NOUE due to the reduced inventory that is available to keep the core covered. The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists. Continued loss of Inventory will result in escalation to the Alert level via either CA2 or CA3.

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 reactor vessel level and inventory are monitored by different means.

In the refueling mode, normal means of core temperature indication and RCS level indication may not be available. Redundant means of reactor vessel level indication will normally be installed (including the ability to monitor level visually) to assure that the

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

**CU2**

ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing containment sump and reactor drain tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage. Escalation to Alert would be via either CA2 or RCS heatup via CA3.

EAL 1 involves a decrease in RCS level below the top of the reactor vessel flange that continues for 15 minutes due to an UNPLANNED event. This EAL is not applicable to decreases in flooded reactor cavity level (covered by AU2 EAL1) until such time as the level decreases to the level of the vessel flange. If reactor vessel level continues to decrease and reaches the Bottom ID of the RCS Loop (12 ft. MSL for these ICs), then escalation to CA2 would be appropriate.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

### **Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

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

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

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

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

### **OR**

2. Loss of all RCS temperature and reactor vessel level indication for > 15 minutes.

### **Basis:**

This IC is included as a NOUE because it may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown, the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Temporary instrumentation and jumpers are maintained in service such that the operators are able to monitor RCS temperature and reactor vessel level so that escalation to the alert level via CA3 or CA1 will occur if required.

Loss of forced decay heat removal at reduced inventory may result in more rapid increases in reactor coolant temperatures depending on the time since shutdown. Escalation to the Alert level via CA3 is provided dependent upon containment closure and RCS integrity conditions.

Redundant means of reactor vessel level indication are procedurally installed in accordance with OP-001-003, Reactor Coolant System Drain Down, 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 either temperature or level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA1 based on an inventory loss or CA3 based on exceeding RCS temperature criteria. The Emergency Coordinator must remain attentive to events or conditions that lead to the conclusion that exceeding the EAL threshold is imminent. If, in the judgment of the Emergency Coordinator, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU4

### Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Fuel clad degradation.

Operating Mode Applicability: Cold Shutdown (Mode 5)

### Emergency Action Level(s):

1. RCS sample activity value indicates fuel clad degradation > Technical Specification allowable limits.

- >1.0  $\mu\text{Ci/gm}$  DEI

OR

- >100/ $\bar{E}$   $\mu\text{Ci/gm}$

### **Basis:**

The condition noted in this EAL is considered to be a potential degradation in the level of safety of the plant and potential precursors of more serious problems. The EAL addresses coolant samples exceeding coolant technical specifications for iodine spike that are indicative of fuel clad integrity.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU5

### Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite power to essential busses > 15 minutes.

Operating Mode Applicability:           Cold Shutdown (Mode 5)  
  Refueling (Mode 6)

### Emergency Action Level(s):

1. a. Loss of power to all unit auxiliary and startup transformers > 15 minutes.

### AND

b. At least emergency diesel generator 'A' or 'B' is supplying power to emergency busses.

### **Basis:**

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power (e.g. station blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Credit for Temporary Emergency Diesel Generators (TEDs) may NOT be taken because they are not a credited power source in the Technical Specifications for modes 5 and 6.





**COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION**

**CU8**

**Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

UNPLANNED loss of all onsite or offsite communications capabilities.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

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

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

**OR**

2. Loss of all Table C2 offsite communications systems.

**Basis:**

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems to offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72. The availability of one method of ordinary offsite communications is sufficient to inform state and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

<b>Table C1 Onsite Communications Equipment</b>
Plant radio system Plant paging system In-plant telephones Sound powered phones

<b>Table C2 Offsite Communications Equipment</b>
All telephone lines (commercial and microwave) Industrial Hot Line ENS Civil Defense Radios Operational Hotline

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

### Initiating Condition – ALERT

Loss of RCS inventory.

Operating Mode Applicability: Cold Shutdown (Mode 5)

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

1. Loss of RCS inventory as indicated by RVLMS upper plenum level  $\leq$  20%.

### OR

2. a. Loss of RCS inventory as indicated by unexplained containment sump level or reactor drain tank level rise

### AND

b. RCS level cannot be monitored > 15 minutes

### Basis:

These EALs serve as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further reactor vessel level decrease and potential core uncover. This condition will result in a minimum classification of Alert. The Reactor Vessel Level Monitoring System (RVLMS) provides a reading in percentage level remaining in the upper plenum. Procedure OP-001-003, Reactor Coolant System Drain Down, Attachment 11.4 lists the RVLMS sensing element elevations. The area corresponding to 20 % level is at 11.80 ft. MSL (bottom ID of RCS loop determined to be 11.625 ft. MSL from basis for CA2). Therefore a level equal to or below 20% indicates that level has dropped to an area at (or below) the low point of the RCS loop. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for typically 100 hours or longer after the reactor has been shutdown. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). The above forms the basis for needing both a cold shutdown specific IC (CA1) and a refueling specific IC (CA2).

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

### CA1

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will normally be available. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage. The 15-minute duration for the loss of level indication was chosen because it is half of the CS1 Site Area Emergency EAL duration. The 15-minute duration allows CA1 to be an effective precursor to CS1. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour in accordance with the analysis referenced in the CS1 basis. Therefore this EAL meets the definition for an Alert emergency.

The difference between CA1 and CA2 deals with the RCS conditions that exist between cold shutdown and refueling mode applicability. 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 reactor vessel level and inventory are monitored by different means.

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

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA2

### Initiating Condition – ALERT

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

Operating Mode Applicability:                      Refueling (Mode 6)

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

1. Loss of reactor vessel inventory as indicated by reactor vessel level at 12 ft.

### OR

2. a. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

### AND

b. Reactor vessel level cannot be monitored > 15 minutes

### Basis:

These EALs serve as precursors to a loss of heat removal. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further reactor vessel level decrease and potential core uncover. The bottom ID of the RCS Loop is chosen for this IC because at this level remote RCS level indication is lost and loss of normal suction for the shutdown cooling system will occur below this point. RVLMS is not used as an indicator for this EAL because it is not expected to be in service in Mode 6. The bottom ID of the RCS loop is determined to be at 11.625 ft. MSL by the following: The centerline elevation of the RCS hot leg is 13.375' MSL (from drawing 1564-G146), the hot leg piping inside diameter is 42" (from UFSAR section 5.4.3.2), therefore 13.375' – 21" = bottom ID of RCS loop = elevation 11.625' MSL. Other reactor vessel level monitoring systems for mode 6 provide lowest indication in the Control Room at 12.0 ft. MSL (from RCS System Description SD-RCS). Thus the level corresponding to a loss of suction to decay heat removal systems (bottom ID of the RCS loop) for upgrade to an Alert is taken to be 12 ft. MSL for this IC. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for typically 100 hours or longer after the reactor has been shutdown.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

### CA2

Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). The above forms the basis for needing both a cold shutdown specific IC (CA1) and a refueling specific IC (CA2).

In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage. The 15-minute duration for the loss of level indication was chosen because it is half of the CS2 Site Area Emergency EAL duration. The 15-minute duration allows CA2 to be an effective precursor to CS2. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour in accordance with the analysis referenced in the CS2 basis. Therefore this EAL meets the definition for an Alert.

The difference between CA1 and CA2 deals with the RCS conditions that exist between cold shutdown and refueling mode applicability. 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 reactor vessel level and inventory are monitored by different means.

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



## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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

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

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

EAL 3 addresses complete loss of functions required for core cooling for > 60 minutes during refueling and cold shutdown modes when RCS integrity is established. As in EAL 1 and 2, RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition to be pressurized (e.g., no freeze seals or nozzle dams). The status of CONTAINMENT CLOSURE in this EAL is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety. The 10 psig pressure increase covers situations where, due to high decay heat loads, the time provided to restore temperature control should be less than 60 minutes. The RCS pressure setpoint can be read on installed control board instrumentation. Note 1 indicates that EAL 3 is not applicable if actions are successful in restoring a shutdown cooling system to operation and RCS temperature is being reduced within the 60 minute time frame **assuming that the RCS pressure increase has remained LESS THAN 10 psig.**

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

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA5

### Initiating Condition – ALERT

Loss of all offsite power and loss of all onsite AC power to essential busses.

Operating Mode Applicability:            Cold Shutdown (Mode 5)  
   Refueling (Mode 6)  
   Defueled

### Emergency Action Level(s):

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

### AND

b. Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses

### AND

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

### Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including shutdown cooling, emergency core cooling, containment cooling, spent fuel pool cooling and the ultimate heat sink. When in cold shutdown, refueling, or defueled mode the event can be classified as an Alert, because of the significantly reduced decay heat and lower temperature and pressure which allow increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. Escalating to Site Area Emergency, if appropriate, is by Abnormal Radiation Levels / Radiological Effluents (AS1), or Emergency Coordinator/EOF Director Judgment EALs.

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

Credit for Temporary Emergency Diesel Generators (TEDs) may NOT be taken because they are not a credited power source in the Technical Specifications for modes 5 and 6.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

**CS1**

### **Initiating Condition – SITE AREA EMERGENCY**

Loss of reactor vessel inventory affecting core decay heat removal capability.

**Operating Mode Applicability: Cold Shutdown (Mode 5)**

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

#### **1. With CONTAINMENT CLOSURE not established:**

- a. Reactor vessel inventory as indicated by RVLMS upper plenum level 0%.

#### **OR**

- b. Reactor vessel level cannot be monitored > 30 minutes with a loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise.

#### **OR**

#### **2. With CONTAINMENT CLOSURE established:**

Reactor vessel level cannot be monitored > 30 minutes with a loss of reactor vessel inventory as indicated by either:

- Unexplained containment sump or reactor drain tank level rise.
- Erratic Source Range Monitor indication.

### **Basis:**

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

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for typically 100 hours or longer after the reactor has been shutdown. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). The above forms the basis for needing both a cold shutdown specific IC (CS1) and a refueling specific IC (CS2).

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

In the cold shutdown mode, normal RCS level and reactor vessel level indication systems will normally be available. However, if all reactor vessel level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing containment sump level or reactor drain tank level changes. Containment sump level or reactor drain tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

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

The Reactor Vessel Level Monitoring System (RVLMS) provides a reading in percentage level remaining in the upper plenum. A 0% level is the first observable point below 6" below the bottom ID of the RCS loop penetration in the reactor vessel (NEI 99-01 guidance) but is at a point higher than the Top of Active Fuel (TOAF) at its location 12.6" above the fuel alignment plate (from RCS System Description SD-RCS). Procedure OP-001-003, Reactor Coolant System Drain Down, Attachment 11.4 lists the RVLMS sensing element elevations. The area corresponding to 0% level is at 10.10 ft. MSL (bottom ID of RCS loop determined to be 11.625 ft. MSL from basis for CA2 with 6" below that point at 11.125 ft. MSL). Therefore a 0% level indicates that level has dropped to an area at (or below) the low point of the RCS loop. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the RCS barrier.

The 30-minute duration allowed when CONTAINMENT CLOSURE is established allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative given that level is being monitored via CS1 and CS2. Effluent release is not expected with closure established.

Escalation to a General Emergency is via CG1 or radiological effluent IC AG1.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

**CS2**

### **Initiating Condition – SITE AREA EMERGENCY**

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

**Operating Mode Applicability:** Refueling (Mode 6)

### **Emergency Action Level(s):**

1. Reactor vessel level cannot be monitored WITH indication of core uncover as evidenced by one or more of the following:
  - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS)  $\geq 10R/hr$
  - Erratic Source Range Monitor indication
  - Core Exit Thermocouples indicate superheat

### **Basis:**

Under the conditions specified by this IC, continued decrease in reactor vessel level is indicative of a loss of inventory control. Inventory loss may be due to a reactor vessel breach or continued boiling in the reactor vessel.

In cold shutdown the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the refueling mode. Entry into cold shutdown conditions may be attained within hours of operating at power or hours after refueling is completed. Entry into the refueling mode procedurally may not occur for typically 100 hours or longer after the reactor has been shutdown. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the reactor vessel (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). The above forms the basis for needing both a cold shutdown specific IC (CS1) and a refueling specific IC (CS2).

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

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS2

Normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted.

RVLMS is not used as an indicator for this EAL because it is not expected to be in service in Mode 6. Other reactor vessel level monitoring systems for mode 6 provide lowest indication at 12.0 ft. MSL which is slightly above the bottom ID of the RCS loop penetration to the reactor vessel. Therefore, an indication that the water level has dropped to any point below the bottom of the RCS loop penetration in the reactor vessel is not available in mode 6 and an EAL is selected that uses inability to monitor reactor vessel level.

As water level in the reactor vessel lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in up-scaled Containment High Range Monitor indication and possible alarm. A reading of greater than or equal to 10 R/hr may be indicative of fuel damage. The basis for 10 R/hr is that it is sufficiently above the normal indication of 0.74 R/hr (nominal shutdown) to avoid an unnecessary entry into the EAL. The 10 R/hr is also high enough to be indicative of potential fuel uncover. Additionally, post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

Effluent release is not expected if containment closure is established.

Escalation to a General Emergency is via CG1 or radiological effluent IC AG1.

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

**CG1**

### **Initiating Condition – GENERAL EMERGENCY**

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

**Operating Mode Applicability:**

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

**Emergency Action Level(s):** (1 and 2 and 3)

1. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

**AND**

2. Reactor vessel level cannot be monitored with indication of core uncover > 30 minutes as evidenced by one or more of the following:
  - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS)  $\geq 10R/hr$
  - Erratic Source Range Monitor indication
  - Core Exit Thermocouples indicate superheat

**AND**

3. Indication of CONTAINMENT challenged as indicated by one or more of the following:
  - Explosive mixture inside containment
  - Containment pressure > 50 PSIA
  - CONTAINMENT CLOSURE not established

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

### **Basis:**

During an outage, installed RCS level and REACTOR VESSEL level instrumentation systems will normally be available when the RCS is filled and redundant means of REACTOR VESSEL level indication will be normally installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted when the RCS is not filled. EAL #1 assumes, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that REACTOR VESSEL inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

EAL 2 represents the inability to restore and maintain reactor vessel level to above the top of active fuel. Fuel damage is probable if reactor vessel level cannot be restored, as available decay heat will cause boiling, further reducing the reactor vessel level.

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

As water level in the reactor vessel lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in up-scaled Containment High Range Monitor indication. The basis for 10 R/hr is that it is sufficiently above the normal indication of 0.74 R/hr (nominal shutdown) to avoid an unnecessary entry into the EAL. The 10 R/hr is also high enough to be indicative of potential fuel uncovering. Additionally, post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

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

## COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

In the context of EAL 3, CONTAINMENT CLOSURE is the action taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant (shutdown) conditions. Site shutdown contingency plans provide for re-establishing CONTAINMENT CLOSURE following a loss of heat removal or RCS inventory functions. If the closure is re-established prior to exceeding the temperature or level thresholds of the RCS Barrier and Fuel Clad Barrier EALs, then escalation to GE would not occur.

The pressure at which CONTAINMENT is considered challenged is based on the condition of the CONTAINMENT. If the CONTAINMENT is fully intact, then the CONTAINMENT will be challenged at the design pressure of 44 psig (~59 psia). Because the EOPs use 50 psia as a safety function parameter following a LOCA, this is the value used in the EAL. This is consistent with the owner's groups Emergency Response Procedures. If CONTAINMENT CLOSURE is established, the EAL setpoint is based on an estimate of the pressure CONTAINMENT CLOSURE would be able to sustain. Waterford estimates this pressure to be the design pressure because of the closure actions taken.

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. Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists.

# **FISSION PRODUCT BARRIER DEGRADATION**

**FISSION PRODUCT BARRIER DEGRADATION**

**FU1 – Initiating Condition – NOTIFICATION OF UNUSUAL EVENT**

ANY loss or ANY Potential Loss of Containment.

<b>Operating Mode Applicability:</b>	<b>Power Operations (Mode 1)</b> <b>Startup (Mode 2)</b> <b>Hot Standby (Mode 3)</b> <b>Hot Shutdown (Mode 4)</b>
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**FA1 – Initiating Condition – Alert**

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

<b>Operating Mode Applicability:</b>	<b>Power Operations (Mode 1)</b> <b>Startup (Mode 2)</b> <b>Hot Standby (Mode 3)</b> <b>Hot Shutdown (Mode 4)</b>
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**FS1 – Initiating Condition – Site Area Emergency**

Loss or Potential Loss of ANY two Barriers

<b>Operating Mode Applicability:</b>	<b>Power Operations (Mode 1)</b> <b>Startup (Mode 2)</b> <b>Hot Standby (Mode 3)</b> <b>Hot Shutdown (Mode 4)</b>
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**FG1 – Initiating Condition – General Emergency**

Loss of ANY two Barriers AND Loss or Potential Loss of Third barrier

<b>Operating Mode Applicability:</b>	<b>Power Operations (Mode 1)</b> <b>Startup (Mode 2)</b> <b>Hot Standby (Mode 3)</b> <b>Hot Shutdown (Mode 4)</b>
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## **FISSION PRODUCT BARRIER DEGRADATION**

### **General Bases:**

The logic used for these Initiating Conditions reflects the following considerations:

- The Fuel Clad Barrier and the RCS Barrier are weighted more heavily than the Containment Barrier. Unusual Event ICs associated with RCS and Fuel Clad Barriers are addressed under System Malfunction (S) ICs.
- 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 offsite dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS "Potential Loss" EALs existed, the Emergency Coordinator/EOF Director would have more assurance that there was no immediate need to escalate to a General Emergency.
- 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.
  - a. Fission Product Barrier ICs must be capable of addressing event dynamics. Thus, the Note associated with the ICs in the EAL Matrix provides guidance that imminent (i.e., within 1 to 2 hours) Loss or Potential Loss should result in a classification as if the affected threshold(s) are already exceeded, particularly for the higher emergency classes.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Fuel Clad Barrier Emergency Action Levels:**

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

### **Primary Coolant Activity Level (FCB1)**

**Loss:** RCS Dose Equivalent Iodine > 300  $\mu\text{Ci/gm}$  as indicated by:

a. Dose Rate at one foot from Primary Sample Panel > 950 mR/hr

**OR**

b. -4 RAB RADIOCHEMISTRY LAB area radiation monitor (ARM-IRE-5020)  
> 125 mR/hr

**OR**

c. Chemistry sample results

**Potential Loss:** Not Applicable

### **Basis:**

The radiation monitor values given are assumed valid when the primary sample panel valves are open receiving flow from the RCS.

The radiation monitor values were determined by calculating various coolant radionuclide concentrations postulated to result from a 10% gap inventory release at Waterford 3. This alternate method to PASS sampling of determining fuel degradation was developed in HP-CALC-2001-001, PASS Elimination and accepted by NRC when Waterford 3 eliminated the PASS. 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.

There is no equivalent "Potential Loss" EAL for this item.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Fuel Clad Barrier Emergency Action Levels:**

#### **Core Exit Thermocouple Readings (FCB2)**

**Loss:** Core Exit Thermocouple readings  $\geq 1200$  degrees F

**Potential Loss:** Core Exit Thermocouple readings  $\geq 700$  degrees F

#### **Basis:**

The Loss EAL of  $\geq 1200^\circ$  F is consistent with the NEI 99-01. The elevated temperature corresponds to significant superheating of the coolant and is indicative of a loss of the Fuel Clad Barrier. Other references (EC-S98-001, "EOP Action Value Bases" and CE-NPSD-241, "Development of the Comprehensive Procedure Guideline for Core Damage Assessment," Task 467) indicate that clad rupture due to high temperature is not expected for CET temperature readings of less than  $1200^\circ$  F.

The Potential Loss setpoint of CET temperatures  $\geq 700^\circ$  F is consistent with Emergency Operating Procedures (EOPs) and is used as an indication of a loss of subcooling conditions in the RCS. It is consistent with the criteria developed in NEI 99-01. The elevated temperature corresponds to a loss of subcooling and is indicative of a Potential Loss of the Fuel Clad Barrier. This criteria is supplemented by further plant specific criteria for diagnosis of loss of subcooling given in Potential Loss EAL FCB3.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Fuel Clad Barrier Emergency Action Levels:**

#### **Reactor Vessel Water Level (FCB3)**

**Loss:** Not Applicable

**Potential Loss:** RVLMS upper plenum level 0%.

#### **Basis:**

There is no "Loss" EAL corresponding to this item because it is better covered by the other Fuel Clad Barrier "Loss" EALs.

As part of its Inadequate Core Cooling Instrumentation, Waterford 3 uses a Reactor Vessel Level Monitoring System (RVLMS) that is displayed to the operators and can measure water level from near the top of the active fuel. The lowest point where monitoring is provided in this system is 12.6" above the fuel alignment plate. This monitoring point is equal to 0% upper plenum RVLMS level. This is consistent with the EOPs as follows: The Waterford 3 EOPs, in OP-902-008, Functional Recovery, use an acceptance criteria for RCS and core heat removal of RVLMS upper plenum level  $\geq 20\%$ . If the level is below 20%, then contingency actions must be taken and the criteria is considered not met. The next discrete measurement point below 20 % upper plenum level is 0% level.

## FISSION PRODUCT BARRIER DEGRADATION

### Fuel Clad Barrier Emergency Action Levels:

#### Containment Radiation Monitoring (FCB4)

**Loss:** Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr.

**Potential Loss:** Not Applicable

#### Basis:

This reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300  $\mu\text{Ci/gm}$  dose equivalent I-131 into the containment atmosphere. Reference Waterford 3 Engineering Calculation EC-S03-008. Source documents are HP-CALC-93-005, "Containment Atmosphere Radiation Monitor Setpoint Calculation," NUREG 1228, "Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents" and EC-S98-002, "Waterford 3 Chapter 15 Non-LOCA Dose Calculation." It assumes normal (NUREG 1228) gas gap fractions, leak into RCS and then into containment, and containment spray initiation impact. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within Technical Specifications and are therefore indicative of fuel damage. This radiation monitor value is higher than that specified for RCS barrier Loss EAL RCB3. Thus, this EAL indicates a loss of both the fuel clad barrier and a loss of the RCS barrier.

There is no "Potential Loss" EAL associated with this item.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Fuel Clad Barrier Emergency Action Levels:**

#### **Emergency Coordinator/EOF Director Judgment (FCB5)**

Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Fuel Clad Barrier.

#### **Basis:**

This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the Fuel Clad barrier is lost or potentially lost. An event or multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent (i.e., within 1 to 2 hours). In this imminent loss situation, use judgment and classify as if the thresholds are exceeded. In addition, the inability to monitor the barrier is also incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgment that the barrier may be considered lost or potentially lost. *(See also SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)*

## **FISSION PRODUCT BARRIER DEGRADATION**

### **RCS Barrier Emergency Action Levels:**

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

### **RCS Leak Rate (RCB1)**

**Loss:** RCS leak rate GREATER THAN available makeup capacity as indicated by  
RCS subcooling < 28° F.

**Potential Loss:** Unisolable RCS leak > 44 gpm.

### **Basis:**

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

The "Potential Loss" EAL is based on the inability to maintain normal liquid inventory within the RCS by normal operation of the Chemical and Volume Control System which is considered as one charging pump discharging to the charging header. A second charging pump being required is indicative of a substantial RCS leak.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **RCS Barrier Emergency Action Levels:**

#### **SG Tube Rupture (RCB2)**

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

**Potential Loss:** Not Applicable

#### **Basis:**

This EAL is intended to address the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment Barrier "Loss" EAL CNB3 and Fuel Clad Barrier EALs. The "Loss" EAL addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent to the RCS Barrier "Potential Loss" EAL RCB1. By itself, this EAL will result in the declaration of an Alert. However, if the SG is also FAULTED (i.e., two barriers failed), the declaration escalates to a Site Area Emergency in accordance with Containment Barrier "Loss" EAL CNB3.

There is no "Potential Loss" EAL.

## FISSION PRODUCT BARRIER DEGRADATION

### RCS Barrier Emergency Action Levels:

#### Containment Radiation Monitoring (RCB3)

**Loss:** Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr.

**Potential Loss:** Not Applicable

#### Basis:

The specific radiation monitor reading is a value which indicates the release of reactor coolant to the containment. The reading was calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i.e., within Technical Specifications) into the containment atmosphere. Reference Waterford 3 Engineering Calculation EC-S03-008. Source documents used for the determination of this monitor reading are NUREG 1228, "Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents" and EC-S98-002, "Waterford 3 Chapter 15 Non-LOCA Dose Calculation." This reading is less than that specified for Fuel Clad Barrier EAL FCB4. Thus, this EAL is indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad Barrier EAL FCB4, then fuel damage is indicated.

There is no "Potential Loss" EAL associated with this item.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **RCS Barrier Emergency Action Levels:**

#### **Other Indications (RCB4)**

**Loss:** Not Applicable

**Potential Loss:** RCS pressure dropping due to primary relief not reseating

#### **Basis:**

The setpoint for the pressurizer code safety valves is 2500 psia +/- 3%. Their purpose is to provide RCS overpressure protection. The safety valves pass sufficient pressurizer steam to limit the RCS pressure to 2750 psia (110 % of design) following a complete loss of turbine generator load without simultaneous reactor trip. In the event of a primary relief valve lifting and not reseating the loss of mass inventory of the RCS is large enough to uncover the core in a short period of time.

Source document: Technical Specifications sections 3.4.2.1 and 3.4.2.2.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **RCS Barrier Emergency Action Levels:**

#### **Other Indications (RCB4)**

#### **Emergency Coordinator/EOF Director Judgment (RCB5)**

Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the RCS Barrier.

#### **Basis:**

This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the RCS barrier is lost or potentially lost. An event or multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent (i.e., within 1 to 2 hours). In this imminent loss situation, use judgment and classify as if the thresholds are exceeded. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgment that the barrier may be considered lost or potentially lost. (See also SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

The Containment Barrier includes the containment building, its connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

### **Containment Pressure (CNB1)**

**Loss:** Rapid unexplained drop following initial rise

**OR**

Containment parameters not consistent with LOCA conditions

### **Potential Loss:**

Containment pressure 50 PSIA and rising

**OR**

Explosive mixture exists

**OR**

Containment pressure > 17.7 PSIA with LESS THAN one full train of Containment Spray operating (1750 gpm)

### **Basis:**

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

The Containment pressure used for potential loss of containment is based on the containment design pressure. Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. This EAL is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier following a LOCA.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **Containment Pressure (CNB1)**

The last potential loss EAL represents a potential loss of containment in that the containment heat removal/depressurization system (Containment Spray, but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated or Containment Spray pump providing LESS THAN 1750 gpm flow. Credit is not taken for Containment Fan Coolers in this EAL as mitigating Containment Spray losses.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **Core Exit Thermocouples (CNB2)**

**Loss:** Not Applicable

#### **Potential Loss:**

Core exit thermocouples >1200 degrees F and restoration procedures not effective within 15 minutes

#### **OR**

Core exit thermocouples > 700 degrees F with RVLMS upper plenum level equal to 0% or LOWER and restoration procedures not effective within 15 minutes

#### **Basis:**

In this EAL, the functional restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Coordinator/EOF Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

The conditions in this potential loss EAL represent an imminent core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and Heat Sink criteria in the Fuel and RCS barrier columns, this EAL would result in the declaration of a General Emergency – loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, then there is no “success” path.

There is no “Loss” EAL associated with this item.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **SG Secondary Side Release With Primary to Secondary Leakage (CNB3)**

**Loss:** Ruptured S/G is also faulted outside containment

#### **OR**

**Loss:** Primary-to-Secondary leakrate >10 gpm with nonisolable steam release from affected S/G to the environment

**Potential Loss:** Not Applicable

#### **Basis:**

This "loss" EAL recognizes that SG tube leakage can represent a bypass of the containment barrier as well as a loss of the RCS barrier. The first "loss" EAL addresses the condition in which a RUPTURED (primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection) steam generator is also FAULTED (secondary side leakage that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized). This condition represents a bypass of the RCS and containment barriers. In conjunction with RCS Barrier "loss" EAL RCB2, this would always result in the declaration of a Site Area Emergency.

The second "loss" EAL addresses SG tube leaks that exceed 10 gpm in conjunction with a nonisolable release path to the environment from the affected steam generator. The threshold for establishing the nonisolable secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SGTR with concurrent loss of offsite power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve or failed open atmospheric dump valve).

If the main condenser is available, then there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. Also, releases from the Steam Driven Emergency Feedwater Pump Turbine result in a very small minor release that can be isolated with the MS-401A and B valves. These pathways do not meet the intent of a nonisolable release path to the environment. These minor releases are assessed using Abnormal Radiation Levels / Radiological Effluents EALs.

A pressure boundary leakage of 10 gpm was used as the threshold in SU7 and is deemed appropriate for this EAL. For smaller breaks, not exceeding the normal

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **SG Secondary Side Release With Primary to Secondary Leakage (CNB3)**

charging capacity threshold in RCS Barrier "Potential Loss" EAL RCB1 (RCS Leak Rate) or not resulting in ECCS actuation in EAL RCB2 (SG Tube Rupture), this EAL results in a NOUE. For larger breaks, RCS barrier EALs RCB1 and RCB2 would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this EAL would exist in conjunction with RCS barrier "Loss" EAL RCB2 and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **Containment Isolation Valve Status After Containment Isolation (CNB4)**

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

**Potential Loss:** Not Applicable

#### **Basis:**

This EAL is intended to address incomplete containment isolation that allows direct release to the environment. It represents a loss of the containment barrier.

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 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. Therefore, a failure of a containment penetration in the annulus with frequent cycling of the shield building ventilation system (a filtered release path) meets the loss criteria of this EAL and constitutes a loss of the containment barrier.

There is no "Potential Loss" EAL associated with this item.

## FISSION PRODUCT BARRIER DEGRADATION

### Containment Barrier Emergency Action Levels:

#### Significant Radioactive Inventory in Containment (CNB5)

Loss: Not Applicable

Potential Loss: Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 4000 R/hr.

#### Basis:

The containment high range radiation monitor reading is a value which indicates significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of RCS Barriers. A major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted. Because the monitor reading exceeds the readings for Fuel Clad Barrier loss in FCB4 and RCS Barrier loss in RCB3, the Emergency Coordinator/EOF Director should declare a General Emergency when this value on the Containment High Range Radiation Monitor is exceeded as a loss of two barriers (fuel clad and RCS) and potential loss of the third (containment). NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%. The radiation monitor reading specified corresponds to approximately 20% fuel clad damage. Reference Waterford 3 Engineering Calculation EC-S03-008.

There is no "Loss" EAL associated with this item.

## **FISSION PRODUCT BARRIER DEGRADATION**

### **Containment Barrier Emergency Action Levels:**

#### **Emergency Coordinator/EOF Director Judgment (CNB6)**

Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Containment barrier.

#### **Basis:**

This EAL addresses any other factors that are to be used by the Emergency Coordinator/EOF Director in determining whether the Containment barrier is lost or potentially lost. An event or multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent (i.e., within 1 to 2 hours). In this imminent loss situation, use judgment and classify as if the thresholds are exceeded. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Coordinator/EOF Director judgment that the barrier may be considered lost or potentially lost. (See also SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

**HAZARDS AND OTHER CONDITIONS  
AFFECTING PLANT SAFETY**

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HU1**

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

**Operating Mode Applicability:** All

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

1. Security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision

### OR

2. A credible site specific security threat notification.

### **Basis:**

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 Security Contingency Plan.

EAL 1 is based on the Security Contingency Plan. Security events which do not represent a potential degradation in the level of safety of the plant, are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Examples of security events that indicate Potential Degradation in the Level of Safety of the Plant are provided below for consideration.

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

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

The intent of EAL 2 is to ensure that appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made through use of information found in the Safeguards Contingency Plan. In general, this EAL is for a credible threat notification received from, or validated by, a trustworthy source (FBI, NRC, Federal or State Office of Homeland Security, St. Charles Parish officials, plant management, site security, etc.) Example: A report from site security of an unauthorized attempted PA entry should be considered a credible threat.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HU1**

A higher initial classification could be made based upon the nature and timing of the threat and potential consequences. Consideration shall be given to upgrading the emergency response status and emergency classification in accordance with the Safeguards Contingency Plan and Emergency Plan.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HU2**

Other conditions existing which in the judgment of the Emergency Coordinator warrant declaration of an Unusual Event.

**Operating Mode Applicability:** All

### Emergency Action Level(s):

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

### **Basis:**

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

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

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection.

Operating Mode Applicability: All

### Emergency Action Level(s):

1. FIRE in or contiguous to Condensate Polisher Building, Containment, Fuel Handling Building, Reactor Auxiliary Building, Cooling Tower Areas or Turbine Building not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm.

### **Basis:**

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

The intent of this 15-minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). The buildings listed are limited and ONLY include buildings and areas contiguous (in actual contact with or immediately adjacent) to plant VITAL AREAs or other significant buildings or areas. The intent of this EAL is not to include buildings (i.e., MSB, Service Building, Construction Support Building, Chiller Building, etc.) or areas that are not contiguous to plant VITAL AREAs. This IC excludes FIRES within administration buildings, waste-basket FIRES, and other small FIRES of no safety consequence.

Escalation to a higher emergency class is by IC HA4, "FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown."

**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

**HU5**

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

**Operating Mode Applicability:** All

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

1. Report or detection of toxic or flammable gases that has or could enter the Exclusion Area Boundary in amounts that can affect NORMAL PLANT OPERATIONS.

**OR**

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

**Basis:**

This IC is based on the existence of uncontrolled releases of toxic or flammable gas that may enter the EAB and affect normal plant operations. It is intended that releases of toxic or flammable gases are of sufficient quantity, and the release point of such gases is such that normal plant operations would be affected. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation. The EALs are intended to not require significant assessment or quantification. The EALs assume an uncontrolled process that has the potential to affect plant operations or personnel safety. Information from a neighboring plant provided over the Taft Industrial Complex Communication (TICC) radio in the Control Room meets the intent of the term "report" as used in EAL #1 and is considered to be information from a credible source.

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

**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

**HU6**

Natural and destructive phenomena affecting the PROTECTED AREA

**Operating Mode Applicability: All**

**Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)**

1. Earthquake felt in plant and detected on station seismic instrumentation.

**OR**

2. Report by plant personnel of tornado or high winds > 100 mph striking within PROTECTED AREA boundary.

**OR**

3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.

**OR**

4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.

**OR**

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

**OR**

6. Uncontrolled flooding in Reactor Auxiliary Building or Cooling Tower Areas that has the potential to affect safety related equipment needed for the current operating mode.

**OR**

7. Site predicted to experience a hurricane with hurricane force winds ( $\geq 74$  mph) on site in  $\leq 12$  hours as projected by the National Weather Service.

**OR**

8. River water level at the intake structure > +27 FT MSL.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

### **Basis:**

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

EAL #1 is based on damage that may be caused to some portions of the site, but should not affect ability of safety functions to operate. The method of detection is based on instrumentation, validated by a reliable source, or operator assessment.

As defined in the EPRI sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is: 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. As part of the validation process, decision makers may call the offsite experts listed in Emergency Planning documentation or local authorities to preclude declaration based on an anomaly caused by something other than a VALID earthquake.

EAL #2 is based on the assumption that a tornado striking (touching down) or high winds within the PROTECTED AREA may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. The high wind value in EAL#2 is based on the FSAR design basis 100 year recurrence interval projected wind velocity of 100 miles per hour. The actual site design basis for Seismic Class one structures is 200 mph. If damage is confirmed visually or by other plant indications, then the event may be escalated to Alert.

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant. Minor accidents involving smaller vehicles or golf carts where the potential for significant damage to site structures is not a concern or "fender bender" type accidents do not warrant declaration under this EAL. If the crash is confirmed to affect a plant VITAL AREA, the event may be escalated to Alert.

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

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

### HU6

EAL #5 is based on main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIREs and flammable gas build up are appropriately classified via HU4 and HU5. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant. This EAL is consistent with the definition of a NOUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or in conjunction with a steam generator tube rupture. The latter event would be classified by the radiological EALs or Fission Product Barrier EALs.

EAL #6 is based on the effect of flooding caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The areas noted include those areas that contain systems required for safe shutdown of the plant, and that are not designed to be wetted or submerged. Site specific areas containing functions and systems required for safe shutdown of the plant are taken from the Waterford 3 Post-Fire Safe Shutdown Analysis, EC-F00-026 for this EAL. These areas are reflected in FP-001-022, Design Change Fire Protection/Safe Shutdown Review. The Containment Building is not included in the EAL because of the guidance in the NEI 99-01 basis that this EAL applies to areas not designed to be wetted or submerged. Escalation of the emergency classification is based on the damage caused or by access restrictions that prevent necessary plant operations or systems monitoring.

EAL #7 addresses the potential for the site to experience high level (hurricane force) winds and associated flooding and storm surge over an extended period of time (usually several hours). This EAL is selected because it will generally be associated with significant levels of site severe weather response such as a potential precautionary shutdown, diesel testing, staff call-outs, etc. The site experiencing a hurricane can also be a precursor of more serious events. It is not necessary to declare this event based on issuance of a Hurricane Warning for St. Charles Parish alone.

EAL #8 addresses Mississippi River flooding. The levee system is designed to protect people and property from the most severe effects of river flooding. The Waterford 3 UFSAR section 2.4 indicates that a flood less severe than the Probable Maximum Flood (PMF) but more severe than the Project Design Flood (PDF) may pose the greatest threat to the site in the event of a nearby levee failure. The UFSAR refers to Mississippi River water level of +27 ft. MSL as that corresponding level for such an event that includes appropriate conservatism. Therefore, this level of flooding can also be a precursor of more serious events and is used as an EAL here.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HA1**

### **Initiating Condition -- ALERT**

Confirmed security event in a plant PROTECTED AREA

**Operating Mode Applicability:** All

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

1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.

**OR**

2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision

### **Basis:**

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

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

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

The Security Shift Supervisor is the designated person on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Security Plan.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA2

### Initiating Condition -- ALERT

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

### **Basis:**

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

**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. Entry into OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown.

**Basis:**

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

## 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 in the Reactor Auxiliary Building, Containment or Cooling Tower Areas

### AND

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

### Basis:

Site specific areas containing functions and systems required for safe shutdown of the plant are taken from the Waterford 3 Post-Fire Safe Shutdown Analysis, EC-F00-026 for this IC. These areas are reflected in FP-001-022, Design Change Fire Protection/Safe Shutdown Review.

This EAL addresses a FIRE / EXPLOSION and not the degradation in performance of affected systems. System degradation is addressed in the System Malfunction (S) EALs. The reference to damage of systems is used to identify the magnitude of the FIRE / EXPLOSION and to discriminate against minor FIRES / EXPLOSIONs. The reference to safety systems is included to discriminate against FIRES/EXPLOSIONs in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE / EXPLOSION was large enough to cause damage to these systems. Thus, the designation of a single train was intentional and is appropriate when the FIRE / EXPLOSION is large enough to affect more than one component.

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

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HA4**

The inclusion of a "report of VISIBLE DAMAGE" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the EXPLOSION with reports of evidence of damage is sufficient for declaration. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Coordinator/EOF Director with the resources needed to perform these damage assessments. The Emergency Coordinator/EOF Director also needs to consider any security aspects of the EXPLOSIONs, if applicable.

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F), Abnormal Radiation Levels / Radiological Effluents (A), or Emergency Coordinator/EOF Director Judgment EALs (H...2).

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

### Initiating Condition -- ALERT

Release of toxic or flammable gases within or contiguous to VITAL AREA which jeopardizes operation of systems required to maintain safe operations or establish or maintain safe shutdown.

Operating Mode Applicability: All

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

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

### OR

2. Report or detection of gases in concentration > LOWER FLAMMABILITY LIMIT within or contiguous to VITAL AREA.

### Basis:

This IC is based on gases that affect the safe operation of the plant. These EALs apply to buildings and areas contiguous to plant VITAL AREAs or other significant buildings or areas. The intent of these EALs is not to include buildings (e.g., warehouses, MSB, Construction Support Building, etc.) or other areas that are not contiguous or immediately adjacent to plant VITAL AREAs. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred.

EAL #1 is met if measurement of toxic gas concentration results in an atmosphere that is IDLH within a VITAL AREA or any area or building contiguous to a VITAL AREA. Exposure to an IDLH atmosphere will result in immediate harm to unprotected personnel, and would preclude access to any such affected areas.

EAL #2 is met when the flammable gas concentration in a VITAL AREA or any building or area contiguous to a VITAL AREA exceeds the LOWER FLAMMABILITY LIMIT. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL addresses concentrations at which gases can ignite/support combustion. An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Once it has been determined that an uncontrolled release is occurring, then sampling must be done to determine if the concentration of the released gas is within this range.

**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

**HA5**

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F), Abnormal Rad Levels / Radioactive Effluent (A), or Emergency Coordinator/EOF Director Judgment EALs (H...2).

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HA6**

### **Initiating Condition -- ALERT**

Natural and destructive phenomena affecting the plant VITAL AREA.

**Operating Mode Applicability:** All

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

- 1 RED LIGHT on the seismic monitor panel indicates a VALID Seismic Event > Operating Basis Earthquake (OBE).

### **OR**

2. Tornado or high winds > 100 mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures/equipment or Control Room indication of degraded performance of those systems.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

### **OR**

3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or Control Room indication of degraded performance of those systems.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

### **OR**

4. Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

### **OR**

5. Uncontrolled flooding in the Reactor Auxiliary Building or Cooling Tower Areas that results in degraded safety system performance as indicated in the Control Room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

### Basis:

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

EAL #1 is based on seismic events of a magnitude that can result in a plant VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. See EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on seismic event categories. As part of the validation process, decision makers may call the offsite experts listed in Emergency Planning documentation or local authorities to preclude declaration based on an anomaly caused by something other than a VALID earthquake.

EAL #2 is based on based on the FSAR design basis 100 year recurrence interval projected wind velocity of 100 miles per hour. Wind loads of this magnitude can cause significant damage to site structures, and is well below the actual site design basis for Seismic Class One structures of 200 mph.

EAL #3 is intended to address crashes of **vehicle types large enough** to cause **significant damage** to plant structures containing functions and systems required for safe shutdown of the plant. Minor accidents involving smaller vehicles or golf carts where significant damage to site structures is not a concern or "fender bender" type accidents do not warrant declaration under this EAL. If the crash is confirmed to affect a plant VITAL AREA with significant **VISIBLE DAMAGE**, then the Alert should be declared.

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

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

**HA6**

EAL #5 is intended to address the effect of internal flooding (OR external flooding that is of such magnitude that it affects the Reactor Auxiliary Building or Cooling Tower Areas) that has resulted in degraded performance of systems affected by the flooding, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to operate or monitor safety equipment represents a potential for substantial degradation of the level of safety of the plant. This flooding may have been caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The areas include those areas that contain systems required for safe shutdown of the plant that are not designed to be wetted or submerged. Site specific areas containing functions and systems required for safe shutdown of the plant are taken from the Waterford 3 Post-Fire Safe Shutdown Analysis, EC-F00-026 for this EAL. These areas are reflected in FP-001-022, Design Change Fire Protection/Safe Shutdown Review. The Containment Building is not included in the EAL because of the guidance in the NEI 99-01 basis that this EAL applies to areas not designed to be wetted or submerged.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS1

### Initiating Condition – SITE AREA EMERGENCY

Confirmed security event in a plant VITAL AREA

Operating Mode Applicability: All

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

1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.

OR

2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision.

### **Basis:**

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

Consideration should be given to the following types of events when evaluating an event against the criteria of the site specific Security Contingency Plan: SABOTAGE and HOSTAGE / EXTORTION. The Safeguards Contingency Plan identifies numerous events/conditions that constitute a threat/compromise to Waterford 3 security. Only those events that involve actual or likely major failures of plant functions needed for protection of the public need to be considered. A specific example would be an armed adversary that has gained entry into the VITAL AREA. The following events would not normally meet this requirement: Failure by a member of the Security Force to carry out an assigned/required duty, internal disturbances, loss/compromise of safeguards materials, or strike actions.

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

The Security Shift Supervisor is the designated person on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Security Plan.

**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

**HS2**

**Initiating Condition – SITE AREA EMERGENCY**

Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of Site Area Emergency.

**Operating Mode Applicability:** All

**Emergency Action Level(s):**

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

**Basis:**

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

## 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. Control Room evacuation has been initiated

### **AND**

- a. Time critical steps required to be performed by OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown outside the Control Room within 10 minutes not completed  $\leq$  10 minutes

### **OR**

- b. Control of the plant cannot be established in accordance with OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown within 15 minutes.

### **Basis:**

The Waterford 3 Post-Fire Safe Shutdown Analysis, EC-F00-026 provides the basis for these EALs.

Expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. The determination of whether or not control is established at the remote shutdown panel is based on Emergency Coordinator/EOF Director judgment. The Emergency Coordinator/EOF Director is expected to make a reasonable, informed judgment within 15 minutes that control of the plant from the remote shutdown panel has been established. SAFETY

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

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation (F), Abnormal Radiation Levels/Radiological Effluents (A), or Emergency Coordinator/EOF Director Judgment (H...2) EALs.

## HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HG1

### Initiating Condition – GENERAL EMERGENCY

Security event resulting in loss of physical control of the facility

Operating Mode Applicability: All

### Emergency Action Level(s):

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

### Basis:

This EAL encompasses conditions under which a HOSTILE FORCE has taken physical control of VITAL AREAs (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment can not be transferred to and operated from another location. These safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) RCS inventory (ability to cool the core), and decay heat removal (ability to maintain a heat sink). If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the above initiating condition is not met.

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

Loss of physical control of the Control Room or LCP-43 (remote shutdown panel) capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability, the location of the transfer switches and areas of the plant where physical control has been lost should be taken into account.

**HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY**

**HG2**

**Initiating Condition – GENERAL EMERGENCY**

Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of General Emergency.

**Operating Mode Applicability:**

**All**

**Emergency Action Level(s):**

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

**Basis:**

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

# **SYSTEM MALFUNCTION**

**SYSTEM MALFUNCTION**

**SU1**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Loss of all offsite power to essential busses > 15 minutes.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Loss of power to all unit auxiliary and startup transformers > 15 minutes.

**AND**

At least 'A' and 'B' emergency diesel generators supplying power to emergency busses.

**Basis:**

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC power (e.g., Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Loss of all offsite power varies depending on the plant mode and source transformers. If the unit is back feeding via the unit Auxiliary Transformers and offsite power is lost, declaration of an Unusual Event is warranted.

## SYSTEM MALFUNCTION

**SU6**

### **Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

UNPLANNED loss of most or all safety system annunciation or indication in the Control Room > 15 minutes.

#### **Operating Mode Applicability:**

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

#### **Emergency Action Level(s):**

UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.

#### **Basis:**

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

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

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

Quantification of "Most" is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected.

It is not intended that Operations personnel perform a detailed count of the instrumentation lost, but use the value as a judgment threshold for determining the severity of plant conditions.

These EALs also recognize that redundant safety system indication powered from separate uninterruptible power supplies is provided. 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.

## SYSTEM MALFUNCTION

**SU6**

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, then the UNUSUAL EVENT is based on SU6 "Inability to reach required shutdown within Technical Specification time limits."

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no EAL is indicated during these modes of operation.

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

**SYSTEM MALFUNCTION**

**SU7**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

RCS Leakage.

**Operating Mode Applicability:**

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

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

1. Unidentified or pressure boundary leakage > 10 gpm.

**OR**

2. Identified leakage > 25 gpm.

**Basis:**

This IC is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances). The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage.

Escalation to the Alert level is via Fission Product Barrier Degradation (F) EALs.

**SYSTEM MALFUNCTION**

**SU8**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

UNPLANNED loss of all onsite or offsite communications capabilities.

**Operating Mode Applicability:**

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

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

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

**OR**

2. Loss of all Table M2 offsite communications capability

<b>Table M1 Onsite Communications Equipment</b>	<b>Table M2 Offsite Communications Equipment</b>
Plant radio system Plant paging system In-plant telephones Sound powered phones	All telephone lines (commercial and microwave) Industrial Hot Line ENS Civil Defense Radios Operational 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 problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

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

**SYSTEM MALFUNCTION**

**SU9**

**Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT**

Fuel clad degradation.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Reactor coolant sample activity value indicating fuel clad degradation > Technical Specification allowable limits.
- >1.0  $\mu\text{Ci/gm DEI}$

**OR**

- >100/ $\bar{E}$   $\mu\text{Ci/gm}$

**Basis:**

This IC is included as an Unusual Event because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. The EAL addresses coolant samples exceeding coolant Technical Specifications for iodine spike that are indicative of fuel clad integrity. Escalation to the Alert level is via the Fission Product Barrier Degradation Monitoring (F) ICs. The companion to SU9 for the Cold Shutdown/Refueling modes is CU4.

A declaration of an Unusual Event is required whenever the RCS Dose Equivalent Iodine exceeds the Technical Specification 3.4.7a value without regard to the 48 hours allowed by the Technical Specification whether or not a plant shutdown has been initiated.

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

## SYSTEM MALFUNCTION

SU10

### Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality.

Operating Mode Applicability:

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

### Emergency Action Level(s):

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

### **Basis:**

This IC addresses inadvertent criticality events. While the primary concern is criticality events that occur in Cold Shutdown or Refueling modes (NUREG 1449, Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States), the IC is applicable in other modes in which inadvertent criticalities are possible. This IC indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification. This IC excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated). This IC corresponds to Cold Shutdown/Refueling CU7.

This condition can be identified using the startup rate meter. The term "sustained" is used in order to allow exclusion of expected short term positive startup rates from planned control rod movements (such as shutdown bank withdrawal). These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

Escalation would be by the Fission Product Barrier Matrix (F), as appropriate to the operating mode at the time of the event, or by Emergency Coordinator Judgment.

## SYSTEM MALFUNCTION

SU11

### Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inability to reach required shutdown within Technical Specification time limits.

#### Operating Mode Applicability:

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

#### 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 shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one-hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An **immediate UNUSUAL EVENT** is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under Technical Specifications and is not related to how long a condition may have existed. Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other System Malfunction (S), Hazards (H), or Fission Product Barrier Degradation (F) EALs.

**SYSTEM MALFUNCTION**

**SA1**

**Initiating Condition -- ALERT**

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

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. AC power capability to essential busses reduced to a single power source > 15 minutes.

**AND**

Any additional single failure will result in station blackout.

**Basis:**

This IC and its associated EAL is intended to provide an escalation from IC SU1. The condition indicated by this IC is the degradation of the offsite and onsite power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of all offsite power with a concurrent failure of 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 the onsite emergency diesel generators with only one train of emergency busses being backfed from the unit main generator, or the loss of onsite emergency diesels with only one train of emergency busses being backfed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with SS1, "Loss of All Offsite and Loss of All Onsite AC Power to Essential Busses."

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for essential busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed.

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

## SYSTEM MALFUNCTION

SA3

### Initiating Condition -- ALERT

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

### Operating Mode Applicability:

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

### Emergency Action Level(s):

Indication(s) exist that indicate that the Reactor Protection System setpoint was exceeded and automatic trip did not occur and a successful manual trip occurred.

### Basis:

This condition indicates failure of the automatic protection system to trip the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded. An Alert is indicated because conditions exist that lead to potential loss of fuel clad or RCS. Reactor protection system setpoint being exceeded, rather than limiting safety system setpoint being exceeded, is specified here because failure of the automatic protection system is the issue. A manual trip is any set of actions by the reactor operator(s) at the reactor control panel which causes control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., reactor trip button, DRTS buttons). Failure of manual trip would escalate the event to a Site Area Emergency. Opening the A32 and B32 Bus Feeders to facilitate insertion of all CEAs requires declaration of a Site Area Emergency under SS2. If the RPS, Automatic Reactor trip, fails and a manual reactor trip is initiated, the EAL is satisfied and an Alert must be declared.

## SYSTEM MALFUNCTION

SA6

### Initiating Condition -- ALERT

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

#### Operating Mode Applicability:

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

#### Emergency Action Level(s):

1. UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.

#### AND

Either of the following (a or b):

- a. SIGNIFICANT TRANSIENT is in progress.

#### OR

- b. Compensatory non-alarming indications are unavailable.

#### **Basis:**

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

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

Quantification of "Most" is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected.

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

## SYSTEM MALFUNCTION

SA6

It is not intended that Operators 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 redundant safety system indication powered from separate uninterruptible power supplies is provided. 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 is 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, then the UNUSUAL EVENT is based on SU6 "Inability to Reach Required Shutdown Within Technical Specification Limits."

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

This Alert will be escalated to a Site Area Emergency if the operating crew can not monitor a transient in progress.

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

## SYSTEM MALFUNCTION

SS1

### Initiating Condition -- SITE AREA EMERGENCY

Loss of all offsite power and loss of all onsite AC power to essential busses.

#### Operating Mode Applicability:

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

#### Emergency Action Level(s):

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

#### AND

Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses

#### AND

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

#### **Basis:**

Loss of all AC power compromises all plant safety systems requiring electric power including Shutdown Cooling, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will cause core uncovering and loss of containment integrity, thus this event can escalate to a General Emergency.

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC 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 essential busses. Even though an essential bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus, then the bus should not be considered operable for this IC. If this bus was the only energized bus, then a Site Area Emergency in accordance with SS1 should be declared.

## SYSTEM MALFUNCTION

**SS1**

Loss of all offsite power varies depending on the plant mode and source transformers. If the unit is back feeding via the unit Auxiliary Transformers and offsite power is lost in conjunction with loss of onsite AC power from the emergency diesel generators, then declaration of a Site Area Emergency is warranted.

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for essential busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed, provided the TED powers necessary loads as described above.

**SYSTEM MALFUNCTION**

**SS3**

**Initiating Condition -- SITE AREA EMERGENCY**

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

**Operating Mode Applicability:**

**Power Operations (Mode 1)  
Startup (Mode 2)**

**Emergency Action Level(s):**

Indication(s) exist that automatic and manual trip were not successful.

**Basis:**

Automatic and manual trip are not considered successful if action away from the reactor control console was required to trip the reactor. For example, opening the A32 and B32 Bus Feeders to facilitate insertion of all CEAs requires declaration of a Site Area Emergency.

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS. Although this may be viewed as redundant to the Fission Product Barrier Degradation (F) EALs, its inclusion is necessary to better assure timely recognition and emergency response. Escalation of this event to a General Emergency would be via Fission Product Barrier Degradation (FG1) or Emergency Coordinator/EOF Director Judgment EALs (HG2).

**SYSTEM MALFUNCTION**

**SS4**

**Initiating Condition -- SITE AREA EMERGENCY**

Loss of all vital DC power.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

- 1. Loss of all Vital DC power based on bus voltage indications < 108 volts 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. The minimum voltage necessary, based on plant design, is 105 volts; however, the lowest battery voltage attained on a loss of off site power at the end of the 4 hour period is 107.4 volts on the 'B' battery bank. 108 volts is used for the EAL indication because the Control Room instrumentation reads in 2 volt increments. Reference calculations ECE91-058, "Battery 3A-S "A Train" Calculation for Station Blackout "and ECE91-059, "Battery 3B-S "B Train" Calculation for Station Blackout."

Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluents (AG1), Fission Product Barrier Degradation (FG1), or Emergency Coordinator/EOF Director Judgment (HG2) EALs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

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

**SYSTEM MALFUNCTION**

**SS5**

**Initiating Condition -- SITE AREA EMERGENCY**

Complete loss of heat removal capability.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Loss of core cooling and heat sink.

**Basis:**

This EAL addresses complete loss of functions, including ultimate heat sink, required to attain and maintain Hot Shutdown (Mode 4) with the reactor at pressure and temperature. Reactivity control is addressed in other EALs.

Under these conditions, there is an actual major failure of systems intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Abnormal Radiation Levels / Radiological Effluents (AG1), Emergency Coordinator/EOF Director Judgment (HG2), or Fission Product Barrier Degradation (FG1) EALs.

Steam Generator levels and natural circulation may be used as indicators because RCS temperatures in Mode 4 will be high enough to use Steam Generators as a heat sink. The inability to makeup to the RCS will prevent establishing or maintaining Hot Shutdown due to the inability to maintain adequate RCS inventory.

**SYSTEM MALFUNCTION**

**SS6**

**Initiating Condition -- SITE AREA EMERGENCY**

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. a. Loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators associated with safety systems.

**AND**

- b. Compensatory non-alarming indications are unavailable

**AND**

- c. Indications needed to monitor safety functions (reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity) are unavailable

**AND**

- d. SIGNIFICANT TRANSIENT in progress

**Basis:**

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

Waterford 3 has defined "most" for the first indicator in the EAL to be a loss of 75% or more of annunciator cabinets C, D, H, K, M, N, SA, SB annunciators. Loss of these annunciator cabinet annunciators or instrumentation has been identified as having the greatest impact on normal operations and safe shutdown of the plant. It is not intended that Operations personnel perform a detailed count of the instrumentation lost, but use the value as a judgment threshold for determining the severity of 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.

## SYSTEM MALFUNCTION

SS6

"Compensatory non-alarming indications" in this context includes computer based information such as SPDS, QSPDS, COLSS, etc. This includes all computer systems available for this use.

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity. Indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

"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.

This event is required to be declared regardless of the length of time equipment is out of service and whether or not equipment is unavailable due to failure or planned maintenance or testing.

## SYSTEM MALFUNCTION

SG1

### Initiating Condition -- GENERAL EMERGENCY

Prolonged loss of all offsite power and prolonged loss of all onsite AC power to essential busses.

#### Operating Mode Applicability:

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

#### Emergency Action Level(s):

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

#### AND

Failure of both 'A' and 'B' emergency diesel generators to supply power to emergency busses.

#### AND

Either of the following: (a or b)

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

#### OR

- b. FA1 entry conditions met.

#### Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including Shutdown Cooling, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will lead to loss of fuel clad, RCS, and containment.

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. The 4 hours to restore AC power is based the site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout."

## SYSTEM MALFUNCTION

**SG1**

Appropriate allowance for offsite emergency response, including evacuation of surrounding areas has been considered. Although this EAL may be viewed as redundant to the Fission Product Barrier Degradation (FG1) EALs, its inclusion is necessary to better assure timely recognition and emergency response.

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for essential busses in the event diesels are lost, they are credited in this EAL.

In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Coordinator/EOF 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, then 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 Coordinator/EOF Director judgment as it relates to imminent Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers using the barrier indicators in section F of the EALs.

## SYSTEM MALFUNCTION

**SG3**

### **Initiating Condition -- GENERAL EMERGENCY**

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

**Operating Mode Applicability:**

**Power Operations (Mode 1)  
Startup (Mode 2)**

### Emergency Action Level(s):

1. Indications exist that automatic and manual trip were not successful.

### AND

Either of the following: (a or b)

- a. Indication(s) exists that core cooling is extremely challenged as indicated by CET temperatures > 1200° F

### OR

- b. Indication(s) exists that heat removal is extremely challenged as indicated by inability to maintain at least one steam generator > 50% wide range.

### **Basis:**

Automatic and manual trip are not considered successful if action away from the reactor control console was required to trip the reactor. For example, opening the A32 and B32 Bus Feeders to facilitate insertion of all CEAs requires is NOT considered as a successful manual trip under this IC.

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

For Waterford 3, the extreme challenge to the ability to cool the core means that core exit thermocouple temperatures are at or approaching 1200 degrees F. Another consideration is the inability to initially remove heat during the early stages of this sequence.

## SYSTEM MALFUNCTION

**SG3**

If feedwater flow is insufficient to remove the amount of heat required by design (SG level less than 50% Wide Range) from at least one steam generator, then an extreme challenge should be considered to exist. This level is taken from OP-902-002, Loss of Coolant Accident Recovery Procedure.

In the event either of these challenges exist at a time that the reactor has not been brought below the power associated with the safety system design (typically 3 to 5% power) a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum offsite intervention time.

**Attachment 5**

**W3F1-2004-0120**

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

**WATERFORD 3 SES  
NEI EAL DIFFERENCES DOCUMENT**

**GENERAL COMMENTS ON DIFFERENCES AND DEVIATIONS:**

Waterford 3 makes use of formatting such as all caps, bold and underline to aid the user in applying these EALs. Formatting choices may also involve minor grammatical differences between the Waterford 3 EALs and NEI 99-01 such as "that exceeds" vice "exceeding" or use of "if, then" statements for conditional statements or the use of symbols (>, <). Such formatting differences between the Waterford 3 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.

The words rise and drop have been inserted into the EALs and ICs for increase and decrease respectively to eliminate confusion.

For Waterford 3 EALs, the Emergency Plan Exclusion Area Boundary is the site boundary. The term "Exclusion Area Boundary" or "EAB" is used throughout the Waterford 3 EALs as the site boundary.

At Waterford 3, the terms Notification of Unusual Event, NOUE, Unusual Event and UE are used interchangeably.

## **NEI 99-01: AU1**

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

**Operating Mode Applicability:** All

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

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

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

## WATERFORD 3: AU1

Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 2 times the radiological effluent ODCM limits for  $\geq 60$  minutes.

**Operating Mode Applicability:** All

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

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

1. VALID reading on any effluent monitor that exceeds 2 times the alarm setpoint established by a current radioactivity discharge permit for  $\geq 60$  minutes.

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq 60$  minutes:

MONITOR	CONC.	EFFLUENT RATE
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.27E+05 uCi/sec
FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL, PRM-IRE-5107A or B, RE5107A-1 or RE5107B-1	1.58E-02 uCi/cc	
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE-3032, RE3032-4		2.35E+05 uCi/sec
PLANT STACK PIG GAS CHANNEL PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1	2.89E-03 uCi/cc	
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.27E+05 uCi/sec
*DRY COOLING TOWER SUMPS MONITOR, PRM-IRE-6775 or PRM-IRE- 6776, RE6775-1 or RE6776-1	8.49E-04 uCi/ml	
*TURBINE BUILDING INDUSTRIAL WASTE SUMP MONITOR, PRM-IRE- 6778, RE6778-1	8.49E-04 uCi/ml	

\*Monitor reading not applicable if sump discharge is aligned to circulating water discharge.

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq 60$  minutes, in excess of 2 times Radiological Effluent Technical Specifications ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

## **WATERFORD 3: AU1 (Cont'd)**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance because EALs #4 and #5 are not included in the Waterford 3 proposed EAL scheme. Waterford 3 does not have a telemetered perimeter radiation monitoring system or an automatic real-time dose assessment capability. Waterford 3 has not decreased the effectiveness of the proposed EALs nor failed to meet the NEI guidance because other EALs are provided in accordance with the NEI guidance that will allow timely event classification using available instrumentation and capability. In addition, the NEI guidance implies through parenthetical statements in both example EALs that sites without the applicable capability are not expected to provide a corresponding EAL.

### **Differences:**

Waterford 3 Radiological Effluent Technical Specifications are based on the Offsite Dose Calculation Manual (ODCM), hence the additional ODCM reference not found in the NEI Initiating Condition or EALs.

## **NEI 99-01: AU2**

Unexpected Increase in Plant Radiation.

**Operating Mode Applicability:** All

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

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

**AND**

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

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

## **WATERFORD 3: AU2**

Unexpected rise in plant radiation.

**Operating Mode Applicability:** All

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

1. a. VALID indication of uncontrolled water level drop in the reactor refueling cavity, spent fuel pool, or fuel transfer canal with all irradiated fuel assemblies remaining covered by water.
  - Level drop may be indicated by personnel observation, spent fuel pool level below level plate, refueling crew report.

### **AND**

- b. Unplanned VALID Area Radiation Monitor rise on any of the following:
  - FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, .3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)
  - CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)

### **OR**

2. Unplanned VALID Area Radiation Monitor readings indicate a rise in plant radiation levels by a factor of 1000 over normal levels (highest reading in the past 24 hours excluding the current peak value).

### **Deviations:**

None

### **Differences:**

None

## **NEI 99-01: AA1**

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

**Operating Mode Applicability:** All

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

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

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

# WATERFORD 3: AA1

Any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM limits for  $\geq$  15 minutes.

**Operating Mode Applicability:** All

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

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

1. VALID reading on any effluent monitor that exceeds 200 times the alarm setpoint established by a current radioactivity discharge permit  $\geq$  15 minutes.

**OR**

2. VALID reading on one or more of the following radiation monitors that exceeds the reading shown for  $\geq$  15 minutes:

MONITOR	CONC.	EFFLUENT RATE
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.27E+07 uCi/sec
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE-3032, RE3032-4		2.35E+07 uCi/sec
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.27E+07 uCi/sec

**OR**

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of  $\geq$  15 minutes, in excess of 200 times ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

Table A1 TRM Limits		
	ALERT	UE
<b>Gaseous Release</b>		
Noble Gases: $\leq$ 500 mrem/yr whole body	1.00E+05	1000
Noble Gases: $\leq$ 3000 mrem/yr skin	6.00E+05	6000
I-131, I-133, H-3 and particulates with half-lives $>$ 8 days: $\leq$ 1500 mrem/year to any organ	3.00E+05	3000
<b>Liquid Release</b>		
Whole body: $<$ 1.50 mrem/quarter	300	3
$<$ 3 mrem/yr	600	6
Any Organ: $<$ 5 mrem/quarter	1000	10
$<$ 10 mrem/yr	2000	20

## **WATERFORD 3: AA1 (Cont'd)**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance because EALs #4 and #5 are not included in the Waterford 3 proposed EAL scheme. Waterford 3 does not have a telemetered perimeter radiation monitoring system or an automatic real-time dose assessment capability. Waterford 3 has not decreased the effectiveness of the proposed EALs nor failed to meet the NEI guidance because other EALs are provided in accordance with the NEI guidance that will allow timely event classification using available instrumentation and capability. In addition, the NEI guidance implies through parenthetical statements in both example EALs that sites without the applicable capability are not expected to provide a corresponding EAL.

### **Differences:**

Waterford 3 Radiological Effluent Technical Specifications are based on the Offsite Dose Calculation Manual (ODCM), hence the additional ODCM reference not found in the NEI Initiating Condition or EALs.

## **NEI 99-01: AA2**

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

**Operating Mode Applicability:** All

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

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

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

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

## **WATERFORD 3: AA2**

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

**Operating Mode Applicability:** All

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

1. VALID alarm or reading  $\geq$  HIGH alarm limits on one or more of the following radiation monitors:

- CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)  $\geq$  HIGH alarm
- CONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1)  $\geq$  HIGH alarm
- REFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1)  $\geq$  HIGH alarm
- FHB AREA RADIATION MONITORS (ISOLATION), (ARM-IRE-0300.1S, .2S, .3S OR .4S, RE0300.1-1, RE0300.2-1, RE0300.3-1, OR RE0300.4-1)  $\geq$  1000 mR/hr
- FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL , PRM-IRE-5107A OR B, RE5107A-1 OR RE5107B-1  $\geq$  HIGH alarm

OR

2. Valid indication of uncontrolled water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel uncovering.

## **WATERFORD 3: AA2 (Cont'd)**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance because a water level in feet is not provided for EAL #2 that will result in irradiated fuel uncover. Waterford 3 does not have installed level indication in the spent fuel pool that would allow direct reading of a level that would uncover irradiated fuel. For the other locations, there is a variation in the level that could result in fuel uncover depending on the location of the fuel (refueling cavity storage racks, refuel mast, fuel transfer canal) and plant conditions at the time. Therefore a site specific level indication in feet is not used for EAL #2 and a differently worded EAL #2 is provided. Waterford 3 does provide specific guidance in the Basis Document (corresponding to NEI 99-01 basis guidance) that provides discussion on methods a drop in water level of this magnitude may be assessed other than a direct level measurement. The effectiveness of the Waterford 3 EAL scheme is not decreased because the NEI IC intent is retained by the Waterford 3 EAL #2, but the EAL changed to account for specific plant design and because attempting to provide a specific level indication applicable to all fuel locations for all conditions may result in an inappropriate classification or a failure to classify when the conditions for classification are present.

### **Differences:**

Waterford 3 provides a listing of monitors for EAL #1 corresponding to those in NEI 99-01. A difference is noted in that Waterford 3 uses additional monitors to those listed in NEI 99-01 by referencing the Containment Purge Isolation monitors (corresponding to Refuel Floor area monitors). Two of these area monitors are located on the Refuel Floor elevation (+46 MSL) of containment, while two others are located on the +21 elevation. These monitors are provided as EAL indication because they are referenced in Operations procedures governing response to a fuel handling incident and would be considered as a valid indicator of activity released from the fuel. In addition, these monitors by design are provided to monitor increased containment radioactivity and their design function includes containment purge isolation, indicating their applicability as an indicator of increased containment radioactivity that could result from a fuel handling incident. Using the same analysis, Waterford 3 lists Fuel Handling Building Area Radiation Monitors as corresponding to Fuel Handling Building ventilation monitors because the selected monitors perform a design function of detecting radioactivity released from a fuel handling incident and isolating normal Fuel Handling Building ventilation. These monitors are also referenced in the Operations procedure for response to a fuel handling incident. These differences taken by Waterford 3 in the monitor listings are not deviations because they do not change the intent of the EAL or IC and in fact Waterford 3 provides an EAL and IC corresponding directly to NEI 99-01 but differs in providing some additional monitor indication in accordance with plant design.

## **NEI 99-01: AA3**

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

**Operating Mode Applicability:** All

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

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

(Site-specific) list

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

(Site-specific) list

## Waterford 3: AA3

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

**Operating Mode Applicability:** All

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

1. VALID radiation level > 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions.
  - Main Control Room Area Radiation Monitor (ARM-IRE- 5001, RE5001-1) > 15 mR/hr
  - Radiation level in CAS >15 mR/hr

OR

2. VALID radiation level > 10 R/hr in plant vital areas requiring infrequent access to maintain plant safety functions.

### Deviations:

Waterford 3 deviates from NEI 99-01 guidance for EAL #1 because the NEI 99-01 Basis Document area of radwaste control room is not addressed in the Waterford 3 EALs or Basis Document . Waterford 3 does not have a radwaste control room, therefore this location does not apply. This deviation does not decrease the effectiveness of the Waterford 3 EAL scheme because an EAL that complies with NEI 99-01 guidance is still provided but is adjusted for plant specific design and operation.

Waterford 3 deviates from NEI 99-01 guidance for EAL #1 by using the term "radiation level" vice "radiation monitor readings." This is because the threshold for the EAL may be detected by a radiation monitor or a radiation survey requiring the declaration of an Alert. A radiation monitor is not provided in the CAS. Therefore, the threshold value must come from a radiation survey to determine if the EAL has been exceeded. This deviation does not decrease the effectiveness of the Waterford 3 EAL scheme because an EAL that complies with NEI 99-01 guidance is still provided but is adjusted for plant specific design. In addition, the selected EAL provides clear guidance and flexibility to the decision maker for those instances where a radiation survey may be the indication that the EAL value is exceeded.

## **Waterford 3: AA3 (Cont'd)**

### **Deviations (Cont'd):**

Waterford 3 deviates from NEI 99-01 guidance for EAL #2 because a site specific list of areas and radiation monitors is not provided for this EAL. The decision maker will have to take into consideration the plant configuration and the ability to access areas necessary to maintain safe operation or perform a safe shutdown for the conditions present. This deviation does not decrease the effectiveness of the Waterford 3 EALs since the possible plant conditions and configuration are very diverse that could require entry into this EAL, therefore providing an exhaustive list of areas and conditions could cause an untimely or inappropriate classification.

### **Differences:**

None

## **NEI 99-01: AS1**

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

**Operating Mode Applicability:** All

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

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

(site-specific list)

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

## **WATERFORD 3: AS1**

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

**Operating Mode Applicability:** All

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

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

1. VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for  $\geq 15$  minutes:
  - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+08$  uCi/sec
  - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+08$  uCi/sec
  - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+08$  uCi/sec

### **OR**

2. Dose assessment using actual meteorology indicates doses  $> 100$  mR TEDE or  $> 500$  mR CDE Thyroid at or beyond the EAB.

### **OR**

3. Field survey results indicate closed window dose rates  $> 100$  mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 500$  mR for one hour of inhalation, at or beyond the EAB.

## **WATERFORD 3: AS1 (Cont'd)**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance because EAL #3 is not included in the Waterford 3 proposed EAL scheme. Waterford 3 does not have a telemetered perimeter radiation monitoring system. Waterford 3 has not decreased the effectiveness of the proposed EALs nor failed to meet the NEI guidance because other EALs are provided in accordance with the NEI guidance that will allow timely event classification using available instrumentation and capability. In addition, the NEI guidance implies through parenthetical statements in the example EAL that sites without the applicable capability are not expected to provide a corresponding EAL.

### **Differences:**

None

## **NEI 99-01: AG1**

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

**Operating Mode Applicability:** All

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

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

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

(site-specific list)

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

## **WATERFORD 3: AG1**

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid 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:** *If dose assessment results are available at the time of declaration, then the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to more accurately characterize the nature of the release.*

1. VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for  $\geq 15$  minutes:
  - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate  $> 2.20E+09$  uCi/sec
  - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate  $> 4.00E+09$  uCi/sec
  - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate  $> 2.08E+09$  uCi/sec

**OR**

2. Dose assessment using actual meteorology indicates doses  $> 1000$  mR TEDE or  $> 5000$  mR CDE Thyroid at or beyond the EAB.

**OR**

3. Field survey results indicate closed window dose rates  $> 1000$  mR/hr expected to continue for  $> one$  hour; or analyses of field survey samples indicate CDE Thyroid  $\geq 5000$  mR for one hour of inhalation, at or beyond the EAB.

## **WATERFORD 3: AG1 (Cont'd)**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance because EAL #3 is not included in the Waterford 3 proposed EAL scheme. Waterford 3 does not have a telemetered perimeter radiation monitoring system. Waterford 3 has not decreased the effectiveness of the proposed EALs nor failed to meet the NEI guidance because other EALs are provided in accordance with the NEI guidance that will allow timely event classification using available instrumentation and capability. In addition, the NEI guidance implies through parenthetical statements in the example EAL that sites without the applicable capability are not expected to provide a corresponding EAL.

### **Differences:**

The NOTE associated with the Example Emergency Action Levels was changed at Waterford 3 to refer to the reason for performing prompt dose assessments at a General Emergency as "... in order to more accurately characterize the nature of the release" vice "...in order to determine if the classification should be subsequently escalated" because a General Emergency is the highest emergency classification. This difference retains the intent to perform timely dose assessments and better describes the reason for doing so.

## **NEI 99-01: CU1**

Reactor Coolant System Leakage

**Operating Mode Applicability:** Cold 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.

## **WATERFORD 3: CU1**

RCS leakage.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)

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

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

**OR**

2. Identified leakage > 25 gpm.

### **Deviations**

None

### **Differences**

None

## **NEI 99-01: CU2**

UNPLANNED Loss of RCS Inventory with Irradiated Fuel in the RPV

**Operating Mode Applicability:**                      **Refueling**

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

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

**AND**

- b. RPV level cannot be monitored

## **WATERFORD 3: CU2**

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

**Operating Mode Applicability:**      **Refueling (Mode 6)**

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

1. UNPLANNED RCS level drop below the vessel flange for  $\geq$  15 minutes

**OR**

2. a. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

**AND**

- b. Reactor vessel level cannot be monitored

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: CU4**

UNPLANNED Loss of Decay Heat Removal Capability with Irradiated Fuel in the reactor vessel.

**Operating Mode Applicability:**                      **Cold Shutdown  
Refueling**

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

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

## **WATERFORD 3: CU3**

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

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

**(1 or 2)**

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

**OR**

2. Loss of all RCS temperature and reactor vessel level indication for > 15 minutes.

**Deviations:**

None

**Differences:**

NEI 99-01 **CU4** is renumbered to Waterford 3 **CU3** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: CU5**

Fuel Clad Degradation.

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Example Emergency Action Levels:**

**(1 or 2)**

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

## **WATERFORD 3: CU4**

Fuel clad degradation.

**Operating Mode Applicability:**

**Cold Shutdown (Mode 5)**

**Emergency Action Level(s):**

1. RCS sample activity value indicates fuel clad degradation > Technical Specification allowable limits.

- >1.0  $\mu\text{Ci/gm DEI}$

**OR**

- >100/ $\bar{E}$   $\mu\text{Ci/gm}$

**Deviations:**

Waterford 3 does not provide a radiation monitor reading equivalent to NEI EAL #1. Waterford 3 does not use the letdown radiation monitor as a failed fuel monitor due to its inability to qualitatively assess the amount of failed fuel. The letdown radiation monitor was disabled in 1995. Dose Equivalent Iodine limits are used to indicate high RCS activity for this IC. The Waterford 3 EAL scheme is not decreased because RCS sampling is regularly performed and if RCS activity is approaching Technical Specification limits, the sampling frequency is increased, providing timely and accurate indication of the condition for the Unusual Event level. Waterford 3 deviates from NEI 99-01 guidance in that this EAL is not applicable in Refueling Mode. This is because Waterford 3 Technical Specification limits does not apply in Refueling Mode.

**Differences:**

NEI 99-01 **CU5** is renumbered to Waterford 3 **CU4** for formatting purposes based on site preference for order of ICs alone.

## **NEI 99-01: CU3**

Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes.

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Example Emergency Action Level:**

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

**AND**

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



**NEI 99-01: CU7**

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

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Example Emergency Action Level:**

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

**AND**

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



## **NEI 99-01: CU8**

Inadvertent Criticality.

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Example Emergency Action Levels:**

**(1 or 2)**

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

## **WATERFORD 3: CU7**

Inadvertent criticality.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

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

**Deviations:**

Waterford 3 deviates from NEI 99-01 guidance by not using one of the example EALs. Waterford 3 does not have a period meter, therefore the EAL for extended positive period is not used. The startup rate meter is used as the only EAL for this IC. This deviation does not decrease the effectiveness of the Waterford 3 EAL scheme because the NEI intent is retained through the use of the NEI 99-01 IC and EAL for startup rate as written and the deviation is in accordance with plant design.

**Differences:**

NEI 99-01 **CU8** is renumbered to Waterford 3 **CU7** for formatting purposes based on site preference for order of ICs alone.

## **NEI 99-01: CU6**

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities.

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Example Emergency Action Levels:**

(1 or 2)

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

## **WATERFORD 3: CU8**

UNPLANNED loss of all onsite or offsite communications capabilities.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

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

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

**OR**

2. Loss of all Table C2 offsite communications systems.

**Deviations:**

None

**Differences:**

Loss of all of the communications systems listed in the EAL referenced Table 1 is determined by Waterford 3 to represent a sufficient challenge to plant operations to warrant the Unusual Event declaration, therefore the NEI 99-01 EAL #1 terminology "affecting the ability to perform routine operations" is not included in the Waterford EAL. This is not a deviation because the NEI 99-01 example EAL is used and the intent of the NEI 99-01 EAL is unchanged in that both the Waterford 3 and NEI EALs refer to site-specific losses regardless of the use of the modifying term "affecting the ability to perform routine operations." In addition, the Civil Defense Radios are listed in Table C2 because they are identified in Emergency Plan Implementing Procedure EP-002- 010, Notifications and Communications as a backup means of offsite communications. Therefore listing them complies with NEI 99-01 guidance and is not a deviation.

NEI 99-01 CU6 is renumbered to Waterford 3 CU8 for formatting purposes based on site preference for order of ICs alone.



## **WATERFORD 3: CA1**

Loss of RCS inventory.

**Operating Mode Applicability:**

**Cold Shutdown (Mode 5)**

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

1. Loss of RCS inventory as indicated by RVLMS upper plenum level  $\leq$  20%.

**OR**

2. a. Loss of RCS inventory as indicated by unexplained containment sump level or reactor drain tank level rise

**AND**

b. RCS level cannot be monitored > 15 minutes

**Deviations:**

None

**Differences:**

Waterford 3 differs from the NEI 99-01 guidance in the level used to indicate bottom ID of the RCS loop. The Reactor Vessel Level Monitoring System (RVLMS) provides a reading in percentage level remaining in the upper plenum. Procedure OP-001-003, Reactor Coolant System Drain Down, Attachment 11. 4 lists the RVLMS sensing element elevations. The location corresponding to 20% level is at 11.80 ft. MSL (bottom ID of RCS loop determined to be 11.625 ft. MSL from basis for CA2). The sensing element elevation is slightly above the NEI 99-01 EAL value. Using the 20% sensing element for this EAL does not change the intent of the NEI IC to declare an Alert for a precursor to a loss of ability to adequately cool the fuel or decrease the effectiveness of the Waterford 3 EAL scheme as the indication represents a significant loss of inventory available to provide cooling with indication that attempts to makeup this inventory have not been effective and may not be capable of preventing further loss and potential core uncover (shutdown cooling suction assumed lost with an additional loss of .175 ft. of water level). This is not considered a deviation because the 99-01 EAL and intent is maintained with a corresponding value, the difference is minimal and the value selected represents a readily observable parameter in the Control Room.



## **WATERFORD 3: CA2**

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

**Operating Mode Applicability:**

**Refueling (Mode 6)**

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

1. Loss of reactor vessel inventory as indicated by reactor vessel level at 12 ft.

**OR**

2. a. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

**AND**

- b. Reactor vessel level cannot be monitored > 15 minutes

**Deviations:**

None

**Differences:**

Waterford 3 differs from NEI 99-01 guidance because a level corresponding to the bottom ID of the RCS loop is not used but a level slightly above this value. The bottom ID of the RCS loop is taken to be 11.625 ft. MSL from the Basis Document. Available level instrumentation provides bottom of scale indication at 12 ft. MSL. Using the 12 ft. MSL indication for this EAL does not change the intent of the NEI IC to declare an Alert for a precursor condition to a loss of heat removal or decrease the effectiveness of the Waterford 3 EAL scheme as the 12 ft. indication represents a significant loss of inventory available to provide cooling with indication that attempts to makeup this inventory have not been effective and may not be capable of preventing further loss and potential core uncover (shutdown cooling suction assumed lost with an additional loss of .375 ft. of water level). In addition, the use of the 12 ft. MSL value provides an EAL that can be readily observed by Control Room personnel. This is not considered a deviation because the 99-01 EAL and intent is maintained with a corresponding value, the difference is minimal and the value selected represents a readily observable parameter in the Control Room.

## **NEI 99-01: CA4**

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

**Operating Mode Applicability:** Cold Shutdown  
Refueling

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

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

<sup>1</sup>Note: if an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

## **WATERFORD 3: CA3**

Inability to maintain plant in Cold Shutdown with irradiated fuel in the reactor vessel.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)  
Refueling (Mode 6)

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

1. With CONTAINMENT CLOSURE and RCS integrity not established, an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.

**OR**

2. With CONTAINMENT CLOSURE established and RCS integrity not established or RCS inventory reduced, an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for > 20 minutes<sup>1</sup>.

**OR**

3. An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for > 60 minutes<sup>1</sup> or results in an RCS pressure rise of > 10 psig.

<sup>1</sup>Note: If shutdown cooling is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

**Deviations:**

None

**Differences:**

NEI 99-01 CA4 is renumbered to Waterford 3 CA3 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: CA3**

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

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling  
Defueled**

**Example Emergency Action Level:**

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

**AND**

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

**AND**

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

## **WATERFORD 3: CA5**

### **Initiating Condition – ALERT**

Loss of all offsite power and loss of all onsite AC power to essential busses.

**Operating Mode Applicability:**            **Cold Shutdown (Mode 5)**  
   **Refueling (Mode 6)**  
   **Defueled**

### **Emergency Action Level(s):**

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

#### **AND**

- 
- b. Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses

#### **AND**

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

### **Deviations:**

None

### **Differences:**

NEI 99-01 CA3 is renumbered to Waterford 3 CA5 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: CS1**

Loss of RPV Inventory Affecting Core Decay Heat Removal Capability.

**Operating Mode Applicability:** **Cold Shutdown**

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

1. With CONTAINMENT CLOSURE not established:

- a. RPV inventory as indicated by RPV level less than {site-specific level}  
(6" below the low-low ECCS actuation setpoint) (BWR)  
(6" below the bottom ID of the RCS loop) (PWR)

**OR**

- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

2. With CONTAINMENT CLOSURE established

- a. RPV inventory as indicated by RPV level less than TOAF

**OR**

- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by either:
- Unexplained {site-specific} sump and tank level increase
  - Erratic Source Range Monitor Indication

## **WATERFORD 3: CS1**

### **Initiating Condition – SITE AREA EMERGENCY**

Loss of reactor vessel inventory affecting core decay heat removal capability.

**Operating Mode Applicability:** Cold Shutdown (Mode 5)

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

1. With CONTAINMENT CLOSURE not established:

- a. Reactor vessel inventory as indicated by RVLMS upper plenum level 0%.

**OR**

- b. Reactor vessel level cannot be monitored > 30 minutes with a loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise.

**OR**

2. With CONTAINMENT CLOSURE established:

Reactor vessel level can not be monitored > 30 minutes with a loss of reactor vessel inventory as indicated by either:

- Unexplained containment sump or reactor drain tank level rise.
- Erratic Source Range Monitor indication.

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance in that a level for reactor vessel inventory less than Top of Active Fuel is not provided for EAL #2. This is because the Waterford 3 RVLMS does not provide monitoring below the level of 12.6" above the fuel alignment plate. NEI 99-01 EAL 2.b is used solely for this EAL. This deviation, although resulting in Waterford 3 not using an NEI 99-01 example EAL, does not reduce the effectiveness of the Waterford 3 EAL scheme and meets the intent of NEI 99-01 because another EAL corresponding to NEI 99-01 guidance is used that provides adequate information on when to enter the Site Area Emergency classification when containment closure is established (EAL 2.b) and this alternative appears to be acceptable due to the NEI treatment of use of EAL 2.b instead of EAL 2.a (by use of the term "**OR**") when reactor vessel level can not be monitored. In this case, Waterford 3's plant design is such that NEI EAL 2.b applies because the capability to monitor for EAL 2.a is not available.

## **WATERFORD 3: CS1**

### **Differences:**

Waterford 3 differs from NEI 99-01 guidance in the level used to indicate 6" below the bottom ID of the RCS loop. The Reactor Vessel Level Monitoring System (RVLMS) provides a reading in percentage level remaining in the upper plenum. A 0% level is the first observable point below 6" below the bottom ID of the RCS loop penetration in the reactor vessel (NEI 99-01 guidance) but is at a point higher than the Top of Active Fuel (TOAF) at its sensor location 12.6" above the fuel alignment plate (from RCS System Description SD-RCS). Procedure OP-001-003, Reactor Coolant System Drain Down, Attachment 11.4 lists the RVLMS sensing element elevations. The area corresponding to 0% level is at 10.10 ft. MSL (bottom ID of RCS loop determined to be 11.625 ft. MSL from basis for CA2 with 6" below that point at 11.125 ft. MSL). Using the 0% sensing element for this EAL does not change the intent of the NEI IC to declare a Site Area Emergency for a loss of inventory control or decrease the effectiveness of the Waterford 3 EAL scheme as the indication represents a significant loss of inventory available to provide cooling with indication that attempts to makeup this inventory have not been effective and are not capable of preventing further loss and core uncover because shutdown cooling suction is lost. This is not considered a deviation because: 1. The NEI 99-01 EAL and intent is maintained with a corresponding value, and the value selected represents a readily observable parameter in the Control Room; and 2. Waterford 3 follows the NEI 99-01 guidance on page 5-C-21 that states "If PWRs RVLIS is unable to distinguish 6" below the bottom ID of the RCS loop penetration, then the first observable point below the bottom ID of the loop should be chosen as the setpoint" because 0% level is the first observable point on RVLMS below the bottom of the RCS loop.

## NEI 99-01: CS2

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

**Operating Mode Applicability:**

**Refueling**

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

1. With CONTAINMENT CLOSURE not established:

- a. RPV inventory as indicated by RPV level less than {site-specific level}  
(6" below the low-low ECCS actuation setpoint) (BWR)  
(6" below the bottom ID of the RCS loop) (PWR)

**OR**

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

2. With CONTAINMENT CLOSURE established

- a. RPV inventory as indicated by RPV level less than TOAF

**OR**

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

## **WATERFORD 3: CS2**

### **Initiating Condition – SITE AREA EMERGENCY**

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

**Operating Mode Applicability:** Refueling (Mode 6)

#### **Emergency Action Level(s):**

1. Reactor vessel level cannot be monitored WITH indication of core uncover as evidenced by one or more of the following:
  - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS)  $\geq 10R/hr$
  - Erratic Source Range Monitor indication
  - Core Exit Thermocouples  $> 700^{\circ} F$

#### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance in that corresponding EALs are not provided for NEI 99-01 example EALs 1.a and 2.a. Waterford 3 does not have a reactor vessel level monitoring system that measures level below 12 ft. MSL that is considered available in mode 6. The NEI EAL guidance for EAL 1.a provides for level indication 6" below the bottom ID of the RCS loop. From the basis for Waterford 3 CA2, this bottom of the RCS loop level is determined to be 11.625 ft. MSL with 6" below that at 11.125 ft. MSL. Level measurement systems in use in mode 6 do not measure below 12 ft. MSL. Waterford 3 does not provide an EAL corresponding to NEI 99-01 EAL 2.a for level below the Top of Active Fuel (TOAF) for the same reason (level indication not available below 12 ft. MSL). Waterford 3 follows the NEI 99-01 guidance on page 5-C-23 that states "If PWRs RVLIS is unable to distinguish 6" below the bottom ID of the RCS loop penetration, then the first observable point below the bottom ID of the loop should be chosen as the setpoint. If a RVLIS is not available such that the PWR EAL setpoint cannot be determined, then EAL 1.b should be used to determine if the IC has been met." Upon examination, NEI 99-01 EALs 1.b and 2.b are alike when the levels in 1.a and 2.a can not be determined. Therefore, Waterford uses one EAL for this IC that corresponds directly to NEI 99-01 EALs 1.b and 2.b. Although two NEI EALs are not selected for use at Waterford 3, the Waterford 3 EAL scheme effectiveness is not decreased because NEI guidance is followed when level can not be determined and a Site Area Emergency classification is provided for conditions in the refueling mode that constitute continued decrease in reactor vessel level indicating a loss of inventory control.

#### **Differences:**

None

## **NEI 99-01: CG1**

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

**Operating Mode Applicability:**

**Cold Shutdown  
Refueling**

**Emergency Action Levels: (1 and 2 and 3)**

1. Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase
2. RPV Level:
  - a. less than TOAF for > 30 minutes

**OR**

- b. cannot be monitored with Indication of core uncover for > 30 minutes as evidenced by one or more of the following:
      - Containment High Range Radiation Monitor reading > {site-specific} setpoint
      - Erratic Source Range Monitor Indication
      - Other {site-specific} indications
3. {Site specific} indication of CONTAINMENT challenged as indicated by one or more of the following:
  - Explosive mixture inside containment
  - Pressure above {site specific} value
  - CONTAINMENT CLOSURE not established
  - Secondary Containment radiation monitors above {site specific} value (BWR only)

## **WATERFORD 3: CG1**

### **Initiating Condition – GENERAL EMERGENCY**

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

**Operating Mode Applicability:**

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

**Emergency Action Level(s): (1 and 2 and 3)**

1. Loss of reactor vessel inventory as indicated by unexplained containment sump level or reactor drain tank level rise

**AND**

2. Reactor vessel level cannot be monitored with indication of core uncover > 30 minutes as evidenced by one or more of the following:
  - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS)  $\geq 10R/hr$
  - Erratic Source Range Monitor indication
  - Core Exit Thermocouples indicate superheat

**AND**

3. Indication of CONTAINMENT challenged as indicated by one or more of the following:
  - Explosive mixture inside containment
  - Containment pressure > 50 PSIA
  - CONTAINMENT CLOSURE not established

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance in that a level for reactor vessel inventory less than Top of Active Fuel is not provided for EAL #2. This is because Waterford 3 does not have the capability to monitor below the level of 12.6" above the fuel alignment plate. NEI 99-01 EAL 2.b is used solely for this EAL. This deviation, although resulting in Waterford 3 not using an NEI 99-01 example EAL, does not reduce the effectiveness of the Waterford 3 EAL scheme and meets the intent of NEI 99-01 because another EAL corresponding to NEI 99-01 guidance is used that provides adequate information on when to enter the Site Area Emergency classification (EAL 2.b) and this alternative appears to be acceptable due to the NEI treatment of use of EAL 2.b instead of EAL 2.a (by use of the term "OR") when reactor vessel level can not be monitored. In this case, Waterford 3's plant design is such that NEI EAL 2.b applies because the capability to monitor for EAL 2.a is not available.

## **WATERFORD 3: CG1 (Cont'd)**

**Differences:**

None

## **NEI 99-01: FU1**

ANY Loss or ANY Potential Loss of Containment.

**Operating Mode Applicability:**

**Power Operations  
Startup  
Hot Standby  
Hot Shutdown**

## **WATERFORD 3: FU1**

ANY loss or ANY potential loss of containment.

**Operating Mode Applicability:**

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

**Deviations:**

None

**Differences:**

None

## **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**

## **WATERFORD 3: FA1**

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

**Operating Mode Applicability:**

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

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: FS1**

Loss or Potential Loss of ANY Two Barriers

**Operating Mode Applicability:**

**Power Operations  
Startup  
Hot Standby  
Hot Shutdown**

## **WATERFORD 3: FS1**

Loss or potential loss of ANY two barriers

**Operating Mode Applicability:**

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

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: FG1**

Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier

**Operating Mode Applicability:**

**Power Operations  
Startup  
Hot Standby  
Hot Shutdown**

## **WATERFORD 3: FG1**

Loss of ANY two barriers AND Loss or Potential Loss of Third barrier

**Operating Mode Applicability:**

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

**Deviations:**

None

**Differences:**

None

# FUEL CLAD BARRIER

## NEI 99-01: EXAMPLE EALS

<u>Fuel Clad Barrier Example EALs</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<b><u>1. Critical Safety Function Status</u></b>	
Core Cooling - Red	Core Cooling – Orange OR Heat Sink - Red
OR	
<b><u>2. Primary Coolant Activity Level</u></b>	
Coolant Activity GREATER THAN (site-specific) Value	Not Applicable
OR	
<b><u>3. Core Exit Thermocouple Readings</u></b>	
GREATER THAN (site-specific) degrees F	GREATER THAN (site-specific) degrees F
OR	
<b><u>4. Reactor Vessel Water Level</u></b>	
Not Applicable	Level LESS than (site-specific) value
OR	
<b><u>5. Containment Radiation Monitoring</u></b>	
Containment rad monitor reading GREATER THAN (site-specific) R/hr	Not Applicable
OR	
<b><u>6. Other (Site-Specific) Indications</u></b>	
(Site-specific) as applicable	(Site-specific) as applicable
OR	
<b><u>7. Emergency Director Judgment</u></b>	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier	

# FUEL CLAD BARRIER

## WATERFORD 3: EALS

Fuel Clad Barrier EALs	
LOSS	POTENTIAL LOSS
<b>1. Primary Activity Level (FCB1)</b>	
RCS Dose Equivalent Iodine > 300 $\mu$ Ci/gm as indicated by:  a. Dose Rate at one foot from Primary Sample Panel > 950 mR/hr <b>OR</b> b. -4 RAB RADIOCHEMISTRY LAB area radiation monitor (ARM-IRE5020) > 125 mR/hr <b>OR</b> c. Chemistry sample results	Not Applicable
<b>2. Core Exit Thermocouple Readings (FCB2)</b>	
$\geq$ 1200 degrees F	$\geq$ 700 degrees F
<b>3. Reactor Vessel Water Level (FCB3)</b>	
Not Applicable	RVLMS upper plenum level 0%.
<b>4. Containment Radiation Monitoring (FCB4)</b>	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr.	Not Applicable
<b>5. Emergency Coordinator/EOF Director Judgment (FCB5)</b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Fuel Clad Barrier.	

## **FUEL CLAD BARRIER WATERFORD 3: EALS**

### **Deviations:**

Waterford 3 deviates from NEI 99-01 guidance in that the potential loss RCS level EAL does not represent the Top of Active Fuel (TOAF) level, but a level above it. As part of its Inadequate Core Cooling Instrumentation, Waterford 3 uses a Reactor Vessel Level Monitoring System (RVLMS) that is displayed to the operators and can measure water level from near the top of the active fuel. The lowest point where monitoring is provided in this system is 12.6" above the fuel alignment plate. This monitoring point is equal to 0% upper plenum RVLMS level. This is consistent with the EOPs as follows: The Waterford 3 EOPs, in OP-902-008, Functional Recovery, use an acceptance criteria for RCS and core heat removal of RVLMS upper plenum level  $\geq 20\%$ . If the level is below 20%, then contingency actions must be taken and the criteria is considered not met. The next discrete measurement point below 20 % upper plenum level is 0% level. This deviation does not decrease the effectiveness of the Waterford 3 classification scheme because the EAL selected is an appropriately conservative value that continues to represent a significant threat to the ability to adequately cool the fuel cladding, is consistent with EOP guidance, is readily observable to the operators and represents the lowest level that can be measured using installed instrumentation in the reactor vessel.

The Critical Safety Function Status EALs are not used in the Fuel Clad Barrier EAL set at Waterford 3. Waterford 3 does not use Critical Safety Function Status Trees (CSFSTs). Waterford 3 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. This deviation does not decrease the effectiveness of the Waterford 3 EALs because the NEI intent is retained through other multiple EALs provided for this barrier and because the EAL set selected matches the plant Emergency Operating Procedures basis.

### **Differences:**

Entergy established a Waterford 3 EAL development team consisting of representatives from Engineering, Radiation Protection, Operations, Emergency Planning, the State of Louisiana and Security to develop the NEI 99-01-based EAL scheme. This group reviewed Waterford 3 specific calculations, UFSAR, Technical Specifications and plant procedures in developing the EALs. Additional EALs that represent a loss or potential loss of the fuel clad barrier were not identified that were determined to be included in the EAL scheme for this IC. This does not decrease the effectiveness of the EAL scheme selected 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."

## **FUEL CLAD BARRIER WATERFORD 3: EALS**

### **Differences (Cont'd):**

Waterford 3 provides additional information in the basis for the Emergency Director Judgment EAL. This is not a deviation because the same the information is found in NEI 99-01, but in a different location and therefore complies with NEI 99-01 guidance.

# RCS BARRIER

## NEI 99-01: EXAMPLE EALS

<u>RCS Barrier Example EALs</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<b><u>1. Critical Safety Function Status</u></b>	
Not Applicable	RCS Integrity – Red OR Heat Sink - Red
OR	
<b><u>2. RCS Leak Rate</u></b>	
GREATER THAN available makeup capacity as indicated by a loss of RCS subcooling	Unisolable leak exceeding the capacity of one charging pump in the normal charging mode
OR	
<b><u>3. SG Tube Rupture</u></b>	
SGTR that results in an ECCS (SI) actuation	Not Applicable
OR	
<b><u>4. Containment Radiation Monitoring</u></b>	
Containment rad monitor reading GREATER THAN (site-specific) R/hr	Not Applicable
OR	
<b><u>5. Other (Site-Specific) Indications</u></b>	
(Site-specific) as applicable	(Site-specific) as applicable
OR	
<b><u>6. Emergency Director Judgment</u></b>	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the RCS barrier	

# RCS BARRIER

## WATERFORD 3: EALS

RCS Barrier EALs	
LOSS	POTENTIAL LOSS
<b>1. RCS Leak Rate (RCB1)</b>	
GREATER THAN available makeup capacity as indicated by RCS subcooling < 28° F.	Unisolable RCS leak > 44 gpm.
<b>2. SG Tube Rupture (RCB2)</b>	
SGTR that results in an ECCS (SI) actuation	Not Applicable
<b>3. Containment Radiation Monitoring (RCB3)</b>	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr.	Not Applicable
<b>4. Other Indications (RCB4)</b>	
Not Applicable	RCS pressure dropping due to primary relief not reseating
<b>5. Emergency Coordinator/EOF Director Judgment (RCB5)</b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the RCS barrier	

### Deviations:

The Critical Safety Function Status EALs are not used in the RCS Barrier EAL set at Waterford 3. Waterford 3 does not use Critical Safety Function Status Trees (CSFSTs). Waterford 3 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. This deviation does not decrease the effectiveness of the Waterford 3 EALs because the NEI intent is retained through other multiple EALs provided for this barrier and because the EAL set selected matches the plant Emergency Operating Procedures basis.

## **RCS BARRIER**

### **WATERFORD 3: EALS**

#### **Differences:**

The Waterford 3 design uses 3 positive displacement charging pumps for normal RCS makeup. The plant design specifics of the positive displacement pump is that the flow from a charging pump is not variable, but provides 44 gpm discrete flow and flow increases or decreases based on the number of pumps in service. Therefore, Waterford 3 uses 44 gpm for the EAL vice the NEI 99-01 "Unisolable leak exceeding the capacity of one charging pump in the normal charging mode." The Waterford 3 EAL does not constitute a deviation because an equivalent statement is used.

Waterford 3 uses RCS subcooling less than 28 degrees F to indicate a loss of subcooling. This is the value used by the Operators in their procedures for safety function loss used to indicate a loss of subcooling and therefore meets the NEI intent.

Waterford 3 has chosen to add an EAL for pressurizer relief valves. The setpoint for the pressurizer code safety valves is 2500 psia +/- 3%. Their purpose is to provide RCS overpressure protection. The safety valves pass sufficient pressurizer steam to limit the RCS pressure to 2750 psia (110 % of design) following a complete loss of turbine generator load without simultaneous reactor trip. In the event of a primary relief valve lifting and not reseating, the loss of mass inventory of the RCS is large enough to uncover the core in a short period of time.

Waterford 3 provides additional information in the basis for the Emergency Director Judgment EAL. This is not a deviation because the same the information is found in NEI 99-01, but in a different location and therefore complies with NEI 99-01 guidance.

# CONTAINMENT BARRIER

## NEI 99-01: EXAMPLE EALS

<u>Containment Barrier Example EALs</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<b><u>1. Critical Safety Function Status</u></b>	
Not Applicable	Containment - Red
OR	
<b><u>2. Containment Pressure</u></b>	
Rapid unexplained decrease following initial increase  OR Containment pressure or sump level response not consistent with LOCA conditions	(Site-specific) PSIG and increasing  OR Explosive mixture exists  OR Pressure greater than containment depressurization actuation setpoint with less than one full train of depressurization equipment operating
OR	
<b><u>3. Core Exit Thermocouple Reading</u></b>	
Not Applicable	Core exit thermocouples in excess of 1200 degrees and restoration procedures not effective within 15 minutes; or, core exit thermocouples in excess of 700 degrees with reactor vessel level below top of active fuel and restoration procedures not effective within 15 minutes
OR	
<b><u>4. SG Secondary Side Release With P-to -S Leakage</u></b>	
RUPTURED S/G is also FAULTED outside of containment  OR Primary-to-Secondary leakrate greater than 10 gpm with nonisolable steam release from affected S/G to the environment	Not Applicable
OR	
<b><u>5. CNMT Isolation Valves Status After CNMT Isolation</u></b>	
Valve(s) not closed AND downstream pathway to the environment exists	Not Applicable
OR	

# CONTAINMENT BARRIER

## NEI 99-01: EXAMPLE EALS

<u>Containment Barrier Example EALs</u>	
<u>LOSS</u>	<u>POTENTIAL LOSS</u>
<b><u>6. Significant Radioactive Inventory In Containment</u></b>	
Not Applicable	Containment rad monitor reading GREATER THAN (site-specific) R/hr
OR	
<b><u>7. Other (site-specific) Indications</u></b>	
(Site-specific) as applicable	(Site-specific) as applicable
OR	
<b><u>8. Emergency Director Judgment</u></b>	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Containment barrier	

# CONTAINMENT BARRIER

## WATERFORD 3: EALS

Containment Barrier EALs	
LOSS	POTENTIAL LOSS
<b><u>1. Containment Pressure (CNB1)</u></b>	
a. Rapid unexplained drop following initial rise <b>OR</b> b. Containment parameters not consistent with LOCA conditions	a. Containment pressure 50 PSIA and rising <b>OR</b> b. Explosive mixture exists <b>OR</b> c. Containment pressure > 17.7 PSIA with LESS THAN one full train of Containment Spray operating (1750 gpm)
<b><u>2. Core Exit Thermocouple Readings (CNB2)</u></b>	
Not Applicable	Core exit thermocouples >1200 degrees F and restoration procedures not effective within 15 minutes <b>OR</b> Core exit thermocouples > 700 degrees F with RVLMS upper plenum level equal to 0% or LOWER and restoration procedures not effective within 15 minutes
<b><u>3. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB3)</u></b>	
Ruptured S/G is also faulted outside of containment <b>OR</b> Primary-to-Secondary leakrate >10 gpm with nonisolable steam release from affected S/G to the environment	Not Applicable
<b><u>4. Containment Isolation Valve Status After Containment Isolation (CNB4)</u></b>	
Unisolable breach of containment with a direct release path to the environment following containment isolation actuation.	Not Applicable
<b><u>5. Significant Radioactive Inventory in Containment (CNB5)</u></b>	
Not Applicable	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 4000 R/hr.
<b><u>6. Emergency Coordinator/EOF Director Judgment (CNB6)</u></b>	
Any condition in the opinion of the Emergency Coordinator/EOF Director that indicates Loss or Potential Loss of the Containment barrier	

## **CONTAINMENT BARRIER**

### **WATERFORD 3: EALS**

#### **Deviations:**

The Critical Safety Function Status EALs are not used in the Containment Barrier EAL set at Waterford 3. Waterford 3 does not use Critical Safety Function Status Trees (CSFSTs). Waterford 3 uses Safety Function Status Checks developed by the Combustion Engineering Owner's Group (CEOG) which are based on logic similar to that used for CSFSTs developed for Westinghouse PWRs. This deviation does not decrease the effectiveness of the Waterford 3 EALs because the NEI intent is retained through other multiple EALs provided for this barrier and because the EAL set selected matches the plant Emergency Operating Procedures basis.

#### **Differences:**

Waterford 3 uses a flow rate for one fully operable Containment Spray Pump to assist in determining if a train of depressurization equipment (Containment Spray) is operating, but degraded. This flow rate is taken from the Loss of Coolant Accident Recovery EOP for safety function status. Use of this value in the EAL simply provides a tool to assist the decision maker in defining the term "less than one full train..." that is provided in NEI 99-01 where NEI uses the term "...performing in a degraded manner..." in the basis for the EAL.

Waterford 3 uses broader terminology for CNB4 other than limiting the condition to isolation valves. This meets the NEI 99-01 intent because the NEI condition is bounded by the EAL chosen for Waterford 3 and the basis information is unchanged.

Entergy established a Waterford 3 EAL development team consisting of representatives from Engineering, Radiation Protection, Operations, Emergency Planning, the State of Louisiana and Security to develop the NEI 99-01-based EAL scheme. This group reviewed Waterford 3 specific calculations, UFSAR, Technical Specifications and plant procedures in developing the EALs. Additional EALs that represent a loss or potential loss of the containment barrier were not identified that were determined to be included in the EAL scheme for this IC. This is not a deviation and does not decrease the effectiveness of the EAL scheme selected 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."

## **CONTAINMENT BARRIER**

### **WATERFORD 3: EALS**

#### **Differences (Cont'd):**

Waterford 3 provides additional information in the basis for the Emergency Director Judgment EAL. This is not a deviation because the same the information is found in NEI 99-01, but in a different location and therefore complies with NEI 99-01 guidance.

Waterford 3 uses Containment pressure in units of PSIA instead of PSIG as indicated in NEI 99-01 because the accident monitoring instrumentation used as an indicator is in PSIA.

## **NEI 99-01: HU4**

Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant.

**Operating Mode Applicability:** All

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

1. Security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision
2. A credible site specific security threat notification.

## **WATERFORD 3: HU1**

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

**Operating Mode Applicability:** All

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

1. Security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision

**OR**

2. A credible site specific security threat notification.

**Deviations:**

None

**Differences:**

NEI 99-01 **HU4** is renumbered to Waterford 3 **HU1** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HU5**

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of a NOUE.

**Operating Mode Applicability:** All

**Example Emergency Action Level:**

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

## **WATERFORD 3: HU2**

Other conditions existing which in the judgment of the Emergency Coordinator warrant declaration of an Unusual Event.

**Operating Mode Applicability:** All

**Emergency Action Level(s):**

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

**Deviations:**

None

**Differences:**

NEI 99-01 HU5 is renumbered to Waterford 3 HU2 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HU2**

**FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection.**

**Operating Mode Applicability: All**

**Example Emergency Action Level:**

1. FIRE in buildings or areas contiguous to any of the following (site-specific) areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:

(Site-specific) list

## **WATERFORD 3: HU4**

FIRE within PROTECTED AREA boundary not extinguished within 15 minutes of detection.

**Operating Mode Applicability:** All

**Emergency Action Level(s):**

1. FIRE in or contiguous to Condensate Polisher Building, Containment, Fuel Handling Building, Reactor Auxiliary Building, Cooling Tower Areas or Turbine Building not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm.

**Deviations:**

None

**Differences:**

NEI 99-01 HU2 is renumbered to Waterford 3 HU4 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HU3**

Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant.

**Operating Mode Applicability:** All

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

1. Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS.
2. Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

## **WATERFORD 3: HU5**

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

**Operating Mode Applicability:** All

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

1. Report or detection of toxic or flammable gases that has or could enter the Exclusion Area Boundary in amounts that can affect NORMAL PLANT OPERATIONS.

### **OR**

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

### **Deviations:**

None

### **Differences:**

NEI 99-01 HU3 is renumbered to Waterford 3 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.), Waterford 3 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 Waterford 3 EALs.

In Louisiana, Parish government under home rule statutes provides protective actions for industry in any emergency event. Therefore, Waterford 3 refers only to St. Charles Parish in EAL #2 and not to State government. The term "parish" is synonymous with both "local" and "county" for St. Charles Parish, Louisiana.

## **NEI 99-01: HU1**

Natural and Destructive Phenomena Affecting the PROTECTED AREA.

**Operating Mode Applicability:** All

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

1. (Site-Specific) method indicates felt earthquake.
2. Report by plant personnel of tornado or high winds greater than (site-specific) mph striking within PROTECTED AREA boundary.
3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.
4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.
6. Uncontrolled flooding in (site-specific) areas of the plant that has the potential to affect safety related equipment needed for the current operating mode.
7. (Site-Specific) occurrences affecting the PROTECTED AREA.

## **WATERFORD 3: HU6**

Natural and destructive phenomena affecting the PROTECTED AREA

**Operating Mode Applicability:** All

**Emergency Action Level(s):** (1 or 2 or 3 or 4 or 5 or 6 or 7 or 8)

1. Earthquake felt in plant and detected on station seismic instrumentation.

**OR**

2. Report by plant personnel of tornado or high winds > 100 mph striking within PROTECTED AREA boundary.

**OR**

3. Vehicle crash into plant structures or systems within PROTECTED AREA boundary.

**OR**

4. Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.

**OR**

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

**OR**

6. Uncontrolled flooding in Reactor Auxiliary Building or Cooling Tower Areas that has the potential to affect safety related equipment needed for the current operating mode.

**OR**

7. Site predicted to experience a hurricane with hurricane force winds ( $\geq 74$  mph) on site in  $\leq 12$  hours as projected by the National Weather Service.

**OR**

8. River water level at the intake structure > +27 FT MSL.

## **WATERFORD 3: HU6 (Cont'd)**

**Deviations:**

None

**Differences:**

NEI 99-01 HU1 is renumbered to Waterford 3 HU6 for formatting purposes based on site preference for order of ICs alone.

## **NEI 99-01: HA4**

Confirmed Security Event in a Plant PROTECTED AREA.

**Operating Mode Applicability:** All

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

1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.
2. Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

## **WATERFORD 3: HA1**

Confirmed security event in a plant PROTECTED AREA

**Operating Mode Applicability:** All

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

1. INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.

**OR**

2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision

**Deviations:**

None

**Differences:**

NEI 99-01 HA4 is renumbered to Waterford 3 HA1 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HA6**

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert.

**Operating Mode Applicability:** All

### **Example Emergency Action Level:**

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

## **WATERFORD 3: HA2**

Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of an Alert.

**Operating Mode Applicability:** All

### **Example Emergency Action Level(s):**

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

### **Deviations:**

None

### **Differences:**

NEI 99-01 HA6 is renumbered to Waterford 3 HA2 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HA5**

Control Room Evacuation Has Been Initiated.

**Operating Mode Applicability:** All

**Example Emergency Action Level:**

1. Entry into (site-specific) procedure for control room evacuation.

## **WATERFORD 3: HA3**

Control Room evacuation has been initiated

**Operating Mode Applicability:**

**All**

**Emergency Action Level(s):**

Entry into OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown

**Deviations:**

None

**Differences:**

NEI 99-01 HA5 is renumbered to Waterford 3 HA3 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **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 in any of the following (site-specific) areas:

(Site-specific) list

**AND**

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

## **WATERFORD 3: 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 in the Reactor Auxiliary Building, Containment or Cooling Tower Areas.

### **AND**

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

**Deviations:**

None

**Differences:**

NEI 99-01 HA2 is renumbered to Waterford 3 HA4 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HA3**

Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown.

**Operating Mode Applicability:** All

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

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

## **WATERFORD 3: HA5**

Release of toxic or flammable gases within or contiguous to VITAL AREA which jeopardizes operation of systems required to maintain safe operations or establish or maintain safe shutdown.

**Operating Mode Applicability:** All

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

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

**OR**

2. Report or detection of gases in concentration > LOWER FLAMMABILITY LIMIT within or contiguous to VITAL AREA.

**Deviations:**

None

**Differences:**

NEI 99-01 HA3 is renumbered to Waterford 3 HA5 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HA1**

Natural and Destructive Phenomena Affecting the Plant VITAL AREA.

**Operating Mode Applicability:** All

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

1. (Site-Specific) method indicates Seismic Event greater than Operating Basis Earthquake (OBE).
2. Tornado or high winds greater than (site-specific) mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment or Control Room indication of degraded performance of those systems.
  - Reactor Building
  - Intake Building
  - Ultimate Heat Sink
  - Refueling Water Storage Tank
  - Diesel Generator Building
  - Turbine Building
  - Condensate Storage Tank
  - Control Room
  - Other (Site-Specific) Structures.
3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or control indication of degraded performance of those systems:
  - Reactor Building
  - Intake Building
  - Ultimate Heat Sink
  - Refueling Water Storage Tank
  - Diesel Generator Building
  - Turbine Building
  - Condensate Storage Tank
  - Control Room
  - Other (Site-Specific) Structures.
4. Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas: (site-specific) list.
5. Uncontrolled flooding in (site-specific) areas of the plant that results in degraded safety system performance as indicated in the control room or

## **NEI 99-01: HA1**

### **Example Emergency Action Levels Cont'd):**

that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

6. (Site-Specific) occurrences within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

## **WATERFORD 3: HA6**

Natural and destructive phenomena affecting the VITAL AREA.

**Operating Mode Applicability:** All

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

1. RED LIGHT on the seismic monitor panel indicates a VALID Seismic Event > Operating Basis Earthquake (OBE).

**OR**

2. Tornado or high winds > 100 mph within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to any of the following plant structures/equipment or Control Room indication of degraded performance of those systems.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

**OR**

3. Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or Control Room indication of degraded performance of those systems.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

**OR**

4. Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas.
  - Containment
  - Reactor Auxiliary Building
  - Cooling Tower Areas

**OR**

5. Uncontrolled flooding in the Reactor Auxiliary Building or Cooling Tower Areas that results in degraded safety system performance as indicated in the Control Room or that creates industrial safety hazards (e.g., electric shock) that preclude access necessary to operate or monitor safety equipment.

## **WATERFORD 3: HA6 (Cont'd)**

### **Deviations:**

None

### **Differences:**

NEI 99-01 HA1 is renumbered to Waterford 3 HA6 for formatting purposes based on site preference for order of ICs alone.

The following areas or buildings listed in the NEI EALs are not listed in the Waterford 3 EALs (#2 and #3) because of Waterford 3's design. The NEI intent is retained (e.g. although Waterford 3 does not list the Refueling Water Storage Tank, the Reactor Auxiliary Building IS listed - this is where the Refueling Water Storage Tank at Waterford 3 is housed) and the NEI EAL itself is not omitted or modified significantly.

**Intake Building** – Not applicable to Waterford 3 – no Intake Building. The Waterford 3 intake is not in the Protected Area and not a safety system

**Refueling Water Storage Tank** – Located in Reactor Auxiliary Building

**Diesel Generator Building** - Located in Reactor Auxiliary Building

**Condensate Storage Tank** – Design basis credited source (Condensate Storage Pool) located in Reactor Auxiliary Building

**Control Room** - Located in Reactor Auxiliary Building

Example EAL #6 is not used because the site specific phenomena referenced that are applicable to Waterford 3 (hurricanes and flooding) are addressed by EALs #2 and #5. The Waterford 3 EAL Basis Document for EAL #5 specifically includes a statement that the EAL applies to external flooding that may be of such significance that the Reactor Auxiliary Building is affected. The omission of this EAL is not a deviation because the NEI 99-01 EAL #6 is addressed (and not omitted), within the context of other EALs.

## **NEI 99-01: HS1**

Confirmed Security Event in a Plant VITAL AREA.

**Operating Mode Applicability:**

**All**

**Example Emergency Action Levels:**

**(1 or 2)**

1. INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.
2. Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

## **WATERFORD 3: HS1**

Confirmed security event in a plant VITAL AREA

**Operating Mode Applicability:**

**All**

**Emergency Action Level(s):**

**(1 or 2)**

1. INTRUSION into the VITAL AREA by a HOSTILE FORCE.

**OR**

2. Other security events as determined from the Waterford 3 Safeguards Contingency Plan and reported by the Waterford 3 Security Shift Supervision

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: HS3**

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of Site Area Emergency.

**Operating Mode Applicability:**

**All**

**Example Emergency Action Level:**

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

## **WATERFORD 3: HS2**

Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of Site Area Emergency.

**Operating Mode Applicability:**

**All**

**Emergency Action Level(s):**

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

**Deviations:**

None

**Differences:**

NEI 99-01 HS3 is renumbered to Waterford 3 HS2 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **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. Control room evacuation has been initiated.

**AND**

Control of the plant cannot be established per (site-specific) procedure within (site-specific) minutes.

## **WATERFORD 3: HS3**

Control Room evacuation has been initiated and plant control can not be established

**Operating Mode Applicability:** All

**Emergency Action Level(s):**

1. Control Room evacuation has been initiated

**AND**

- a. Time critical steps required to be performed by OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown outside the Control Room within 10 minutes not completed  $\leq$  10 minutes

**OR**

- b. Control of the plant cannot be established in accordance with OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown within 15 minutes.

**Deviations:**

None

**Differences:**

NEI 99-01 HS2 is renumbered to Waterford 3 HS3 for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: HG1**

Security Event Resulting in Loss Of Physical Control of the Facility.

**Operating Mode Applicability:** **All**

**Example Emergency Action Level:**

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

## **WATERFORD 3: HG1**

Security event resulting in loss of physical control of the facility

**Operating Mode Applicability:**

**All**

**Emergency Action Level(s):**

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

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: HG2**

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency.

**Operating Mode Applicability:**

**All**

**Example Emergency Action Level:**

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

## **WATERFORD 3: HG2**

Other conditions existing which in the judgment of the Emergency Coordinator/EOF Director warrant declaration of General Emergency.

**Operating Mode Applicability:** All

**Emergency Action Level(s):**

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

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: SU1**

Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

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

**AND**

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

## **WATERFORD 3: SU1**

Loss of all offsite power to essential busses > 15 minutes.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Loss of power to all unit auxiliary and startup transformers > 15 minutes.

**AND**

At least 'A' and 'B' emergency diesel generators supplying power to emergency busses.

**Deviations:**

None

**Differences:**

None

## **NEI 99-01: SU3**

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in The Control Room for Greater Than 15 Minutes

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

1. UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

## **WATERFORD 3: SU6**

UNPLANNED loss of most or all safety safety system annunciation or indication in the Control Room > 15 minutes.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.

**Deviations:**

None

**Differences:**

NEI 99-01 **SU3** is renumbered to Waterford 3 **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.), Waterford 3 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 Waterford 3 EALs. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **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.

## **WATERFORD 3: SU7**

RCS Leakage.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

**(1 or 2)**

1. Unidentified or pressure boundary leakage > 10 gpm.

**OR**

2. Identified leakage > 25 gpm.

**Deviations:**

None

**Differences:**

NEI 99-01 **SU5** is renumbered to Waterford 3 **SU7** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-07: SU6**

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Levels:**

**(1 or 2)**

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



## **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.

## **WATERFORD 3: SU9**

Fuel clad degradation.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Reactor coolant sample activity value indicating fuel clad degradation > Technical Specification allowable limits.
  - >1.0  $\mu\text{Ci/gm}$  DEI

**OR**

- >100/ $\bar{E}$   $\mu\text{Ci/gm}$

**Deviations:**

Waterford 3 does not provide a radiation monitor reading equivalent to NEI EAL #1. Waterford 3 does not use the letdown radiation monitor as a failed fuel monitor due to its inability to qualitatively assess the amount of failed fuel. The letdown radiation monitor was disabled in 1995. Dose Equivalent Iodine limits are used to indicate high RCS activity for this IC. The Waterford 3 EAL scheme is not decreased because RCS sampling is regularly performed and if RCS activity is approaching Technical Specification limits, the sampling frequency is increased, providing timely and accurate indication of the condition for the Unusual Event level.

**Differences:**

NEI 99-01 **SU4** is renumbered to Waterford 3 **SU9** for formatting purposes based on site preference for order of ICs alone.

## **NEI 99-01: SU8**

Inadvertent Criticality.

### **OPERATING MODE APPLICABILITY**

**Hot Standby  
Hot Shutdown**

### **Example Emergency Action Level:**

**(1 or 2)**

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

## **WATERFORD 3: SU10**

Inadvertent criticality.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

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

**Deviations:**

Waterford 3 deviates from NEI 99-01 guidance by not using one of the example EALs. Waterford 3 does not have a period meter, therefore the EAL for extended positive period is not used. The startup rate meter is used as the only EAL for this IC. This deviation does not decrease the effectiveness of the Waterford 3 EAL scheme because the NEI intent is retained through the use of the NEI 99-01 IC and EAL for startup rate as written and the deviation is in accordance with plant design.

**Differences:**

NEI 99-01 **SU8** is renumbered to Waterford 3 **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 (site-specific) Technical Specifications LCO Action Statement Time.

## **WATERFORD 3: SU11**

Inability to reach required shutdown within Technical Specification time limits.

**Operating Mode Applicability:**

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

**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 Waterford 3 **SU11** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: SA5**

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

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

1. AC power capability to site-specific essential busses reduced to a single power source for greater than 15 minutes

**AND**

Any additional single failure will result in station blackout.

## **WATERFORD 3: SA1**

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

**Operating Mode Applicability:**

	<b>Power Operations (Mode 1)</b>
	<b>Startup (Mode 2)</b>
	<b>Hot Standby (Mode 3)</b>
	<b>Hot Shutdown (Mode 4)</b>

### **Emergency Action Level(s):**

1. AC power capability to essential busses reduced to a single power source > 15 minutes

### **AND**

Any additional single failure will result in station blackout.

### **Deviations:**

None

### **Differences:**

NEI 99-01 SA5 is renumbered to Waterford 3 SA1 for formatting purposes based on site preference for order of ICs alone.

Waterford 3 differs from the NEI 99-01 basis for this IC in providing credit for temporary emergency diesel generators. Waterford 3 Technical Specification 3.8.1.1 ACTIONS b.(2).(a) and (b) credit temporary emergency diesel generators for Waterford 3 operation in modes 1 through 4. The NEI 99-01 basis for IC SS1 and SG1 refers to the reason for selection of this IC as "Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink." The NEI SS1 basis also goes on to state that "Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses." The NEI bases for the loss of power ICs present the basis for declaring the emergency condition as the loss of AC power to essential equipment and not the fact that certain specific equipment providing the source of the AC power was lost. Entergy uses temporary diesels for some planned maintenance activities in a capacity where the temporary diesel generator, at a minimum, is capable of supplying auxiliary power to required safe shutdown loads on the emergency diesel generator train removed from service for the maintenance outage.

## **WATERFORD 3: SA1 (Cont'd)**

### **Differences (Cont'd):**

This practice is acknowledged in the Waterford 3 Technical Specifications (and associated SER for Amendment 166) through the reference cited above. Entergy applies this concept to the SA1, SS1 and SG1 ICs. The difference is not a deviation because the intent of the NEI 99-01 EALs to declare an emergency condition based on credited AC power availability to plant safety systems is retained given that temporary emergency diesels are credited as a safe shutdown AC power source through their reference in Technical Specifications.

## **NEI 99-01: SA2**

Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby**

**Example Emergency Action Level(s):**

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

## **WATERFORD 3: SA3**

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

**Operating Mode Applicability:**

**Power Operations (Mode 1)  
Startup (Mode 2)  
Hot Standby (Mode 3)**

**Emergency Action Level(s):**

1. Indication(s) exist that indicate that the Reactor Protection System setpoint was exceeded and automatic trip did not occur and a successful manual trip occurred.

**Deviations:**

None

**Differences:**

NEI 99-01 **SA2** is renumbered to Waterford 3 **SA3** for formatting purposes based on site preference for order of ICs alone.

Waterford 3 has replaced the NEI 99-01 term "scram" with the term "trip" as "scram" is not a term used at Waterford 3. The terms are used interchangeably in the industry and have the same meaning when applied to Waterford 3 operations.

## **NEI 99-01: SA4**

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a SIGNIFICANT TRANSIENT in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

1. UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

**AND**

Either of the following: (a or b)

- a. A SIGNIFICANT TRANSIENT is in progress.

**OR**

- b. Compensatory non-alarming indications are unavailable.

## **WATERFORD 3: SA6**

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

**Operating Mode Applicability:**

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

**Emergency Action Levels(s):**

1. UNPLANNED loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators or indicators associated with safety systems > 15 minutes.

### **AND**

Either of the following (a or b):

- a. SIGNIFICANT TRANSIENT is in progress.

### **OR**

- b. Compensatory non-alarming indications are unavailable.

**Deviations:**

None

**Differences:**

NEI 99-01 SA4 is renumbered to Waterford 3 SA6 for formatting purposes based on site preference for order of ICs alone. Reference to the Plant Monitoring Computer is added to EAL 2 for clarification. The NEI 99-01 intent is retained because the NEI basis refers to computer indications and applications as defining "compensatory non-alarming indications."

## **NEI 99-01: SS1**

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

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

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

**AND**

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

**AND**

Failure to restore power to at least one emergency bus within (site-specific) minutes from the time of loss of both offsite and onsite AC power.

## **WATERFORD 3: SS1**

Loss of all offsite power and loss of all onsite AC power to essential busses.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

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

**AND**

Failure of the 'A' and 'B' emergency diesel generators to supply power to emergency busses

**AND**

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

**Deviations:**

None

**Differences:**

Waterford 3 differs from the NEI 99-01 basis for this IC in providing credit for temporary emergency diesel generators. Waterford 3 Technical Specification 3.8.1.1 ACTIONS b.(2).(a) and (b) credit temporary emergency diesel generators for Waterford 3 operation in modes 1 through 4. The NEI 99-01 basis for IC SS1 and SG1 refers to the reason for selection of this IC as "Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink." The NEI SS1 basis also goes on to state that "Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses." The NEI bases for the loss of power ICs present the basis for declaring the emergency condition as the loss of AC power to essential equipment and not the fact that certain specific equipment providing the source of the AC power was lost. Entergy uses temporary diesels for some planned maintenance activities in a capacity where the temporary diesel generator, at a minimum, is capable of supplying auxiliary power to required safe shutdown loads on the emergency

## **WATERFORD 3: SS1 (Cont'd)**

### **Differences (Cont'd):**

diesel generator train removed from service for the maintenance outage. This practice is acknowledged in the Waterford 3 Technical Specifications (and associated SER for Amendment 166) through the reference cited above. Entergy applies this concept to the SA1, SS1 and SG1 ICs. The difference is not a deviation because the intent of the NEI 99-01 EALs to declare an emergency condition based on credited AC power availability to plant safety systems is retained given that temporary emergency diesels are credited as a safe shutdown AC power source through their reference in Technical Specifications.

## **NEI 99-01: SS2**

Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful.

**Operating Mode Applicability:**

**Power Operation  
Startup**

**Example Emergency Action Level(s):**

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

## **WATERFORD 3: SS3**

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

**Operating Mode Applicability:**

**Power Operations (Mode 1)  
Startup (Mode 2)**

**Emergency Action Level(s):**

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

**Deviations:**

None

**Differences:**

Waterford 3 has replaced the NEI 99-01 term "scram" with the term "trip" as "scram" is not a term used at Waterford 3. The terms are used interchangeably in the industry and have the same meaning when applied to Waterford 3 operations.

## **NEI 99-01: SS3**

Loss of All Vital DC Power.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

1. Loss of All Vital DC Power based on (site-specific) bus voltage indications for greater than 15 minutes.

## **WATERFORD 3: SS4**

Loss of all vital DC power.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

Loss of all Vital DC power based on bus voltage indications < 108 volts for > 15 minutes.

**Deviations:**

None

**Differences:**

NEI 99-01 **SS3** is renumbered to Waterford 3 **SS4** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **NEI 99-01: SS4**

Complete Loss of Heat Removal Capability.

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

1. Loss of core cooling and heat sink (PWR).
1. Heat Capacity Temperature Limit Curve exceeded (BWR).

## **WATERFORD 3: SS5**

Complete loss of heat removal capability.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. Loss of core cooling and heat sink.

**Deviations:**

None

**Differences:**

NEI 99-01 **SS4** is renumbered to Waterford 3 **SS5** for formatting purposes based on site preference for order of ICs alone. There are no other noteworthy differences between the NEI and Waterford 3 IC and EALs.

## **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:**

1. a. Loss of most or all (site-specific) annunciators associated with safety systems.

**AND**

- b. Compensatory non-alarming indications are unavailable.

**AND**

- c. Indications needed to monitor (site-specific) safety functions are unavailable.

**AND**

- d. SIGNIFICANT TRANSIENT in progress.

## **WATERFORD 3: SS6**

Inability to monitor a SIGNIFICANT TRANSIENT in progress.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

1. a. Loss of most or all annunciator cabinets C, D, H, K, M, N, SA, SB annunciators associated with safety systems.

**AND**

- b. Compensatory non-alarming indications are unavailable

**AND**

- c. Indications needed to monitor safety functions (reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity) are unavailable

**AND**

- d. SIGNIFICANT TRANSIENT in progress

**Deviations:**

None

**Differences:**

Reference to the Plant Monitoring Computer is added to the EAL for clarification. The NEI 99-01 intent is retained because the NEI basis refers to computer indications and applications as defining "compensatory non-alarming indications."

## **NEI 99-01: SG1**

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

**Operating Mode Applicability:**

**Power Operation  
Startup  
Hot Standby  
Hot Shutdown**

**Example Emergency Action Level:**

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

**AND**

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

**AND**

Either of the following: (a or b)

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

**OR**

- b. (Site-Specific) Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

## **WATERFORD 3: SG1**

Prolonged loss of all offsite power and prolonged loss of all onsite AC power to essential busses.

**Operating Mode Applicability:**

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

**Emergency Action Level(s):**

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

**AND**

Failure of both 'A' and 'B' emergency diesel generators to supply power to emergency busses.

**AND**

Either of the following: (a or b)

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

**OR**

- b. FA1 entry conditions met.

**Deviations:**

None

**Differences:**

Waterford 3 differs from the NEI 99-01 basis for this IC in providing credit for temporary emergency diesel generators. Waterford 3 Technical Specification 3.8.1.1 ACTIONS b.(2).(a) and (b) credit temporary emergency diesel generators for Waterford 3 operation in modes 1 through 4. The NEI 99-01 basis for IC SS1 and SG1 refers to the reason for selection of this IC as "Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink." The NEI SS1 basis also goes on to state that "Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses."

## **WATERFORD 3: SG1 (Cont'd)**

### **Differences (Cont'd):**

The NEI bases for the loss of power ICs present the basis for declaring the emergency condition as the loss of AC power to essential equipment and not the fact that certain specific equipment providing the source of the AC power was lost.

Entergy uses temporary diesels for some planned maintenance activities in a capacity where the temporary diesel generator, at a minimum, is capable of supplying auxiliary power to required safe shutdown loads on the emergency diesel generator train removed from service for the maintenance outage. This practice is acknowledged in the Waterford 3 Technical Specifications (and associated SER for Amendment 166) through the reference cited above. Entergy applies this concept to the SA1, SS1 and SG1 ICs. The difference is not a deviation because the intent of the NEI 99-01 EALs to declare an emergency condition based on credited AC power availability to plant safety systems is retained given that temporary emergency diesels are credited as a safe shutdown AC power source through their reference in Technical Specifications.

Waterford 3 provides indication in EAL #2 that is taken from the Category F Fission Product Barrier EALs. This EAL continues to meet the intent of the NEI IC and EAL and is not a deviation because the NEI basis directs the decision maker to the Fission Product Barrier EAL indications to be applied in a judgment situation. Waterford 3's change is designed to make this referral process easier by providing reference to the FA1 indication.

## **NEI 99-01: SG2**

Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

**Operating Mode Applicability:**

**Power Operation  
Startup**

**Example Emergency Action Level:**

1. Indications exist that automatic and manual scram were not successful.

**AND**

Either of the following: (a or b)

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

**OR**

- b. Indication(s) exists that heat removal is extremely challenged.

## **WATERFORD 3: SG3**

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

**Operating Mode Applicability:**

**Power Operations (Mode 1)  
Startup (Mode 2)**

**Emergency Action Level(s):**

1. Indications exist that automatic and manual trips were not successful.

**AND**

Either of the following: (a or b)

- a. Indication(s) exist that core cooling is extremely challenged as indicated by CET temperatures  $>1200^{\circ}$  F

**OR**

- b. Indication(s) exists that heat removal is extremely challenged as indicated by inability to maintain at least one steam generator  $> 50\%$  wide range.

**Deviations:**

None

**Differences:**

**SG2** is renumbered to Waterford 3 IC **SG3** for formatting purposes based on site preference for order of ICs alone.

Waterford 3 has replaced the NEI 99-01 term "scram" with the term "trip" as "scram" is not a term used at Waterford 3. These terms are used interchangeably in the industry and have the same meaning when applied to Waterford 3 operations.

Waterford 3 provides indicators for the term "extremely challenged" in the EALs. These indicators are taken directly from the NEI basis for IC **SG2**.

**Attachment 6**

**W3F1-2004-0120**

**Cross reference matrix from NEI EAL number to Entergy EAL number**

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL NUMBER**

<b>NEW W3 IC</b>	<b>NEI 99-01 IC</b>	<b>OLD W3 IC</b>	<b>Diff. Doc. Pages</b>	<b>Type Difference</b>	<b>Basis Page No.</b>
AU1	AU1	UNCHNGD	3-5	DEVIATION	11
AU2	AU2	UNCHNGD	6-7	NONE*	15
AA1	AA1	UNCHNGD	8-10	DEVIATION	17
AA2	AA2	UNCHNGD	11-13	DEVIATION	21
AA3	AA3	UNCHNGD	14-16	DEVIATION	23
AS1	AS1	UNCHNGD	17-19	DEVIATION	25
AG1	AG1	UNCHNGD	20-22	DEVIATION	28
CU1	CU1	CU1	23-24	NONE*	32
CU2	CU2	CU1	25-26	NONE*	33
CU3	CU4	CU3	27-28	DIFFERENCE	35
CU4	CU5	CU4	29-30	DEVIATION	36
CU5	CU3	CU2	31-32	DIFFERENCE	37

\*NONE or IC NUMBER ONLY changes may contain minor format or grammatical changes such as use of symbols.  
 Input of site specific values was not considered a difference where it was felt the values did not differ from the NEI intent.

CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL NUMBER

<u>NEW W3 IC</u>	<u>NEI 99-01 IC</u>	<u>OLD W3 IC</u>	<u>Diff. Doc. Pages</u>	<u>Type Difference</u>	<u>Basis Page No.</u>
CU6	CU7	CU6	33-34	DIFFERENCE	38
CU7	CU8	CU7	35-36	DEVIATION	39
CU8	CU6	CU5	37-38	DIFFERENCE	40
CA1	CA1	UNCHNGD	39-40	DIFFERENCE	41
CA2	CA2	CA1	36-37	CONTENT	41
CA3	CA4	CA3	43-44	DIFFERENCE	45
CA5	CA3	CA2	45-46	DIFFERENCE	47
CS1	CS1	UNCHNGD	47-49	DEVIATION	49
CS2	CS2	CS1	50-51	DEVIATION	50
CG1	CG1	CG1	52-54	DEVIATION	52
FU1 (IC)	FU1	UNCHNGD	55	NONE*	56
FA1 (IC)	FA1	UNCHNGD	56	NONE*	56
FS1 (IC)	FS1	UNCHNGD	57	NONE*	56
FG1 (IC)	FG1	UNCHNGD	58	NONE*	56

\*NONE or IC NUMBER ONLY changes may contain minor format or grammatical changes such as use of symbols.  
 Input of site specific values was not considered a difference where it was felt the values did not differ from the NEI intent.

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL NUMBER**

<b>NEW W3 IC</b>	<b>NEI 99-01 IC</b>	<b>OLD W3 IC</b>	<b>Diff. Doc. Pages</b>	<b>Type Difference</b>	<b>Basis Page No.</b>
FUEL CLAD EALS	FUEL CLAD EALS	UNCHNGD	59-62	DEVIATION	62
RCS EALS	RCS EALS	UNCHNGD	63-65	DEVIATION	63
CNTNMENT EALS	CNTNMENT EALS	UNCHNGD	66-70	DEVIATION	65
HU1	HU4	UNCHNGD	71-72	DIFFERENCE	77
HU2	HU5	UNCHNGD	73-74	DIFFERENCE	79
HU4 (NO W3 HU3)	HU2	UNCHNGD	75-76	DIFFERENCE	80
HU5	HU3	UNCHNGD	77-78	DIFFERENCE	81
HU6	HU1	UNCHNGD	79-81	DIFFERENCE	82
HA1	HA4	UNCHNGD	82-83	DIFFERENCE	85
HA2	HA6	UNCHNGD	84-85	DIFFERENCE	86
HA3	HA5	UNCHNGD	86-87	DIFFERENCE	87
HA4	HA2	UNCHNGD	88-89	DIFFERENCE	88
HA5	HA3	UNCHNGD	90-91	DIFFERENCE	83
HA6	HA1	UNCHNGD	92-95	DIFFERENCE	92

\*NONE or IC NUMBER ONLY changes may contain minor format or grammatical changes such as use of symbols.  
 Input of site specific values was not considered a difference where it was felt the values did not differ from the NEI intent.

CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL NUMBER

<u>NEW W3 IC</u>	<u>NEI 99-01 IC</u>	<u>OLD W3 IC</u>	<u>Diff. Doc. Pages</u>	<u>Type Difference</u>	<u>Basis Page No.</u>
HS1	HS1	UNCHNGD	96-97	NONE*	95
HS2	HS3	UNCHNGD	98-99	DIFFERENCE	96
HS3	HS2	UNCHNGD	100-101	DIFFERENCE	97
HG1	HG1	UNCHNGD	102-103	NONE*	98
HG2	HG2	UNCHNGD	104-105	NONE*	99
SU1	SU1	UNCHNGD	106-107	NONE*	101
SU6 (NO W3 SU2/3/4/5)	SU3	SU3	108-109	DIFFERENCE	102
SU7	SU5	UNCHNGD	110-102	DIFFERENCE	104
SU8	SU6	UNCHNGD	112-113	DIFFERENCE	105
SU9	SU4	UNCHNGD	114-115	DEVIATION	106
SU10	SU8	UNCHNGD	116-117	DEVIATION	107
SU11	SU2	SU6	118-119	DIFFERENCE	108
SA1	SA5	UNCHNGD	120-122	DIFFERENCE	109
SA3 (NO W3 SA2)	SA2	SA2	123-124	DIFFERENCE	110

\*NONE or IC NUMBER ONLY changes may contain minor format or grammatical changes such as use of symbols.  
 Input of site specific values was not considered a difference where it was felt the values did not differ from the NEI intent.

**CROSS REFERENCE MATRIX FROM NEI EAL NUMBER TO ENTERGY EAL NUMBER**

<b>NEW W3 IC</b>	<b>NEI 99-01 IC</b>	<b>OLD W3 IC</b>	<b>Diff. Doc. Pages</b>	<b>Type Difference</b>	<b>Basis Page No.</b>
SA6 (NO W3 SA4/5)	SA4	SA3	125-126	DIFFERENCE	111
SS1	SS1	UNCHNGD	127-129	DIFFERENCE	113
SS3 (NO W3 SS2)	SS2	SS2	130-131	DIFFERENCE	115
SS4	SS3	UNCHNGD	132-133	DIFFERENCE	116
SS5	SS4	UNCHNGD	134-135	DIFFERENCE	117
SS6	SS6	SS3	136-137	DIFFERENCE	118
SG1	SG1	UNCHNGD	138-140	DIFFERENCE	120
SG3 (NO W3 SG2)	SG2	SG2	141-142	DIFFERENCE	122

\*NONE or IC NUMBER ONLY changes may contain minor format or grammatical changes such as use of symbols.  
 Input of site specific values was not considered a difference where it was felt the values did not differ from the NEI intent.

**Attachment 7**

**W3F1-2004-0120**

**Copies of documentation received from state agencies  
indicating discussions of and agreement with the proposed EAL changes**



**State of Louisiana**  
**Department of Environmental Quality**



**KATHLEEN BABINEAUX BLANCO**  
GOVERNOR

**L. HALL BOHLINGER**  
SECRETARY

January 27, 2004

Mr. Ken Peters, Director  
Nuclear Safety Assurance  
Entergy Operations, Inc.  
Waterford 3 Steam Electric Station  
17265 River Road  
Killona, LA 70057

Re: Review and Approval of Waterford 3 Steam Electric Station Emergency Action Level Revision

Dear Mr. Peters:

On January 22, 2004, the Emergency Preparedness Department of Waterford 3 Steam Electric Station, along with the State and risk Parishes, conducted an overview session on the proposed new scheme of its Emergency Action Level (EAL). Following the session, Mr. Jack Lewis and Mr. Ron Perry requested that the Louisiana Department of Environmental Quality (DEQ) review and provide concurrence and/or comments on the revision of the EAL scheme of W-3 SES, specifically the NEI 99-01, Rev. 4 methodology to be implemented as a replacement of the existing NUREG-0654 methodology (ref. W-3 Document Review Comment Form: Attachment 7.5, page 1 of 1 of W2.109, Rev. 5).

It is established that the U. S. Nuclear Regulatory Commission (NRC) has endorsed the NEI 99-01, Rev. 4 methodology as a viable alternative to the NUREG-0654 methodology to develop nuclear power plant emergency action levels (ref. NRC Regulatory Issue Summary 2003-18, dated October 8, 2003). DEQ understands that the NEI 99-01, Rev. 4 methodology is oriented more around the safety of the plant, and provides clearer and more precise guidance for the plant operators in recognizing and identifying emergency action levels leading to appropriate emergency classification levels, thus enhancing the operators' rapid emergency response ability. DEQ further understands that the adoption of the NEI 99-01, Rev. 4 methodology by Waterford 3 Steam Electric Station does not adversely impact the emergency classification process, emergency response dose calculation, accident assessment and off-site protective action recommendations (PAR) and measures, and the off-site environment.

Mr. Ken Peters  
January 27, 2004  
Page 2

Based on the above, the state of Louisiana, Department of Environmental Quality is hereby providing concurrence to Waterford 3 Steam Electric Station in adopting the NEI 99-01, Rev. 4 methodology as a replacement of the existing NUREG-0654 methodology. While we provide concurrence, we understand that the new EAL scheme must be acceptable to the NRC prior to implementation.

If we gather further comments on the new methodology, we will communicate those to you immediately. Should you have any questions regarding our position on the subject, please contact Prosanta Chowdhury of my staff at (225) 219-3618 or via e-mail at [Prosanta.Chowdhury@la.gov](mailto:Prosanta.Chowdhury@la.gov).

Sincerely,



L. Hall Bohlinger, Sc.D.  
Secretary

NCR:PC

File: W-3 SES 3.a

# DOCUMENT REVIEW COMMENT FORM

Page 1 of 1

Procedure Number: Emergency Plan EALs      Revision: XX      Change: XX      Deviation: XX

Review Type:     Cross Disc.     Qualified

Title: NEI BASED EALS TO BE SUBMITTED TO NRC FOR APPROVAL

Technical     Committed     Group/Dept. Head

Return To: R. J. Perry      Ext.: 504-739-6708      Return By: \_\_\_\_\_

Internal / Other:

Comment No.	Sec. No.	Comment	Res. No.	Resolution
1.	NEI Based EALS	The EAL changes have been discussed with my agency and agreed on.		

1. Reviewed By: *Alan Pate*      1/22/04  
 (Name / Date)  
 (Agency/Organization)    St. Charles OEP

2. Comments Resolved By: \_\_\_\_\_  
 (Preparer / Date)  
 (Reviewer / Date)

# DOCUMENT REVIEW COMMENT FORM

Procedure Number: Emergency Plan EALs      Revision: XX      Change: XX      Deviation: XX

Review Type:     Cross Disc.     Qualified

Title: NEI BASED EALS TO BE SUBMITTED TO NRC FOR APPROVAL

Technical     Committed     Group/Dept. Head

Return To: R. J. Perry      Ext.: 504-739-6708      Return By: \_\_\_\_\_

Internal / Other:

Comment No.	Sec. No.	Comment	Res. No.	Resolution
1.	NEI Based EALS	The EAL changes have been discussed with my agency and agreed on.		

1. Reviewed By: Paul J. Incale / JANUARY 22, 2004  
 (Name / Date)  
 (Agency/Organization) ST. JOHN PARISH OEP

2. Comments Resolved By: \_\_\_\_\_  
 (Preparer / Date)  
 (Reviewer / Date)

# DOCUMENT REVIEW COMMENT FORM

Procedure Number: Emergency Plan EALs    Revision: XX    Change: XX    Deviation: XX

Review Type:     Cross Disc.     Qualified

Title: NEI BASED EALS TO BE SUBMITTED TO NRC FOR APPROVAL

Technical     Committed     Group/Dept. Head

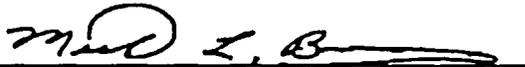
Return To: R. J. Perry

Ext.: 504-739-6708

Return By: \_\_\_\_\_

Internal / Other:

Comment No.	Sec. No.	Comment	Res. No.	Resolution
1.	NEI Based EALS	The EAL changes have been discussed with my agency and agreed on.		

1. Reviewed By:     1-29-04

(Name / Date)  
(Agency/Organization)

LA Office of Homeland Security & Emergency Preparedness

2. Comments Resolved By: \_\_\_\_\_

(Preparer / Date)  
(Reviewer / Date)

01/28/2004 12:04 FAX

01/28/2004 12:04 FAX

**Attachment 8**

**W3F1-2004-0120**

**Schematic illustrating unit auxiliary and start-up transformers**

