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Manager, Emergency Preparedness

10 CFR 50.54(q) & 72.44(f)

W3F1-2021-0024

March 11, 2021

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

Subject: Emergency Preparedness Documents

Waterford Steam Electric Station, Unit 3 (Waterford 3)
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

Pursuant to 10 CFR 50.54(q)(5), 10 CFR 50.4(b)(5)(ii), 10 CFR 72.44(f) and 10 CFR 72.4, Entergy Operations Inc. (Entergy) hereby submits the following Waterford 3 Emergency Preparedness License Bases document:

Emergency Action Levels EP-001-001 (with 50.54 (q) attached)	Revision 34 (2/24/21)
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These changes to the Waterford 3 Emergency Plan and associated documents listed above, were evaluated by Entergy, and determined to not reduce the effectiveness of the plan.

This letter contains no new regulatory commitments.

If you have any questions or require additional information, please contact Paul Wood, Regulatory Assurance Manager, at 504-464-3786.

Respectfully,

A handwritten signature in black ink, appearing to read "John Overly". The signature is fluid and cursive, with the first name "John" and last name "Overly" clearly distinguishable.

John Overly

JLO/djv

Enclosure: DVD Waterford 3 - EP-001-001, Emergency Action Levels, Revision 34 and 10CFR50.54(q).

cc: With Enclosure:
NRC Region IV – Mr. Ryan Alexander
NRC Region IV Regional Administrator

Without Enclosure:
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRR Project Manager

10CFR50.54(Q)(3) Screening

Procedure/Document Number: EP-001-001	Revision: 34
Equipment/Facility/Other: Waterford 3	
Title: Recognition & Classification of Emergency Conditions	

Part I. Description of Activity Being Reviewed (This is generally changes to the emergency plan, EALs, EAL bases, etc. – refer to Section 3.0 Step 6):

1. Fixed formatting and changed revision number throughout.
2. In Attachment 7.1, under AA1 EAL #2, Table A2: Changed the values given for PRM-IRE-0627 and PRM-IRE-0647 from 5.38E-01 uCi/ml to 8.55E-02 uCi/ml, AND added PRM-IRE-6775, PRM-IRE-6776, PRM-IRE-6778, PRM-IRE1900, and PRM-IRE-0648, and their associated maximum operating range values. Relocated Table A2 from part b of the EAL to part a.
3. In Attachment 7.2, under AA1 EAL #2, Table A2: Changed the values given for PRM-IRE-0627 and PRM-IRE-0647 from 5.38E-01 uCi/ml to 8.55E-02 uCi/ml, AND added PRM-IRE-6775, PRM-IRE-6776, PRM-IRE-6778, PRM-IRE1900, and PRM-IRE-0648, and their associated maximum operating range values. Relocated Table A2 from part b of the EAL to part a.
4. In Attachment 7.2, under AU1 EAL #2: Added the statement, "Historical release permits indicate that the NOUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1."
5. Added "2.17 EC-88621, Radiation Monitoring Calculations for Monitor Spans to Support EALs and Plant Operations" to References Section.

NOTE: A before and after view of changes 2-4 above is provided on page 4 of this document.

Part II. Activity Previously Reviewed?

Is this activity fully bounded by an NRC approved 10CFR50.90 submittal or Alert and Notification System Design Report?

If YES, identify bounding source document number/approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below:

Justification: N/A

☐ YES
50.54(q)(3)
Evaluation is
NOT required.
Enter
justification
below and
complete Part
VI.

☒ NO
Continue to
next part

☐ Bounding document attached (optional)

Part III. Applicability of Other Regulatory Change Control Processes

Check if any other regulatory change processes control the proposed activity. (Refer to EN-LI-100)

APPLICABILITY CONCLUSION

- ☒ If there are no other controlling change processes, continue the 10CFR50.54(q)(3) Screening.
- ☐ One or more controlling change processes are selected, however, some portion of the activity involves the emergency plan or affects the implementation of the emergency plan; continue the 10CFR50.54(q)(3) Screening for that portion of the activity. Identify the applicable controlling change processes below.
- ☐ One or more controlling change processes are selected and fully bounds all aspects of the activity. 10CFR50.54(q)(3) Evaluation is NOT required. Identify controlling change processes below and complete Part VI.

CONTROLLING CHANGE PROCESSES

10CFR50.54(q)

10CFR50.54(Q)(3) Screening

Procedure/Document Number: EP-001-001	Revision: 34
Equipment/Facility/Other: Waterford 3	
Title: Recognition & Classification of Emergency Conditions	

Part IV. Editorial Change Is this activity an editorial or typographical change such as formatting, paragraph numbering, spelling, or punctuation that does not change intent? Justification: Changes 1 and 5 listed in Part 1 are purely editorial in nature in accordance with EN-AD-101. This change maintains the original intent and does not change the technical content or affect the purpose or scope of the process prescribed in the procedure. "NO" is selected because this activity contains other changes that are not editorial.	<input type="checkbox"/> YES 50.54(q)(3) Evaluation is NOT required. Enter justification and continue to next part or complete Part VI as applicable.	<input checked="" type="checkbox"/> NO Continue to next part
Part V. Emergency Planning Element/Function Screen (Associated 10CFR50.47(b) planning standard function identified in brackets) Does this activity affect any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II?		
1. Responsibility for emergency response is assigned. [1]	<input type="checkbox"/>	
2. The response organization has the staff to respond and to augment staff on a continuing basis (24/7 staffing) in accordance with the emergency plan. [1]	<input type="checkbox"/>	
3. The process ensures that on shift emergency response responsibilities are staffed and assigned. [2]	<input type="checkbox"/>	
4. The process for timely augmentation of onshift staff is established and maintained. [2]	<input type="checkbox"/>	
5. Arrangements for requesting and using off site assistance have been made. [3]	<input type="checkbox"/>	
6. State and local staff can be accommodated at the EOF in accordance with the emergency plan. [3]	<input type="checkbox"/>	
7. A standard scheme of emergency classification and action levels is in use. [4]	<input checked="" type="checkbox"/>	
8. Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notifications. [5]	<input type="checkbox"/>	
9. Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway. [5]	<input type="checkbox"/>	
10. The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter. [5]	<input type="checkbox"/>	
11. Systems are established for prompt communication among principal emergency response organizations. [6]	<input type="checkbox"/>	
12. Systems are established for prompt communication to emergency response personnel. [6]	<input type="checkbox"/>	
13. Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway emergency planning zone (EPZ). [7]	<input type="checkbox"/>	
14. Coordinated dissemination of public information during emergencies is established. [7]	<input type="checkbox"/>	
15. Adequate facilities are maintained to support emergency response. [8]	<input type="checkbox"/>	
16. Adequate equipment is maintained to support emergency response. [8]	<input type="checkbox"/>	
17. Methods, systems, and equipment for assessment of radioactive releases are in use. [9]	<input type="checkbox"/>	
18. A range of public PARs is available for implementation during emergencies. [10]	<input type="checkbox"/>	

10CFR50.54(Q)(3) Screening

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19. Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities. [10]	<input type="checkbox"/>
20. A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.[10]	<input type="checkbox"/>
21. The resources for controlling radiological exposures for emergency workers are established. [11]	<input type="checkbox"/>
22. Arrangements are made for medical services for contaminated, injured individuals. [12]	<input type="checkbox"/>
23. Plans for recovery and reentry are developed. [13]	<input type="checkbox"/>
24. A drill and exercise program (including radiological, medical, health physics and other program areas) is established. [14]	<input type="checkbox"/>
25. Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills are assessed via a formal critique process in order to identify weaknesses. [14]	<input type="checkbox"/>
26. Identified weaknesses are corrected. [14]	<input type="checkbox"/>
27. Training is provided to emergency responders. [15]	<input type="checkbox"/>
28. Responsibility for emergency plan development and review is established. [16]	<input type="checkbox"/>
29. Planners responsible for emergency plan development and maintenance are properly trained. [16]	<input type="checkbox"/>

APPLICABILITY CONCLUSION

- ☐ If no Part V criteria are checked, a 10CFR50.54(q)(3) Evaluation is NOT required; document the basis for conclusion below and complete Part VI.
- ☒ If any Part V criteria are checked, complete Part VI and perform a 10CFR50.54(q)(3) Evaluation.

BASIS FOR CONCLUSION

Changes 1 and 5 were determined to be editorial in nature per Part IV above, and further evaluation of these change are not needed.

10 CFR 50.47(b) emergency planning standard 4 in Part V of this form is affected by Changes 2-4. A 10CFR50.54(q)(3) Evaluation will be performed to determine if the effectiveness of the emergency plan is reduced and prior NRC approval is required.

Part VI. Signatures:

Preparer Name (Print) Don Vincent	Preparer Signature 	Date: 2/14/21
(Optional) Reviewer Name (Print) N/A	Reviewer Signature N/A	Date: N/A
Reviewer Name (Print) Gina Taylor Nuclear EP Project Manager	Reviewer Signature Gina L Taylor <small>Digitally signed by Gina L Taylor DN: cn=Gina L Taylor, c=US, o=Entergy, ou=Corporate Emergency Preparedness, email=gtaylor3@entergy.com Date: 2021.02.15 15:48:16 -0500</small>	Date: 2/15/21
Approver Name (Print) John Overly Emergency Planning Manager or designee	Approver Signature 	Date: 2/18/2021

10CFR50.54(Q)(3) Screening

Procedure/Document Number: EP-001-001	Revision: 34
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BEFORE AND AFTER VIEW OF CHANGES 2-4 DESCRIBED IN PART 1.

	Location	Original	Revision																										
2.	Attachment 7.1 AA1 EAL #2	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>5.38E-01 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>5.38E-01 uCi/ml</td></tr></table>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	5.38E-01 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	5.38E-01 uCi/ml	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>8.55E-02 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>8.55E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMP #1 LIQUID MONITOR PRM-IRE-6775</td><td>4.20E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMP #2 LIQUID MONITOR PRM-IRE-6776</td><td>4.20E-02 uCi/ml</td></tr><tr><td>TURBINE BUILDING SUMP DISCHARGE LIQUID MONITOR PRM-IRE-6778</td><td>4.20E-02 uCi/ml</td></tr><tr><td>CIRCULAR DISCHARGE MONITOR PRM-IRE-1900</td><td>4.20E-02 uCi/ml</td></tr><tr><td>GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648</td><td>2.99E+02 uCi/cc</td></tr></table> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	8.55E-02 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	8.55E-02 uCi/ml	DRY COOLING TOWER SUMP #1 LIQUID MONITOR PRM-IRE-6775	4.20E-02 uCi/ml	DRY COOLING TOWER SUMP #2 LIQUID MONITOR PRM-IRE-6776	4.20E-02 uCi/ml	TURBINE BUILDING SUMP DISCHARGE LIQUID MONITOR PRM-IRE-6778	4.20E-02 uCi/ml	CIRCULAR DISCHARGE MONITOR PRM-IRE-1900	4.20E-02 uCi/ml	GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648	2.99E+02 uCi/cc
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4.	Attachment 7.2 AU1 EAL #2	Added statement to Basic Document	Historical release permits indicate that the NOUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1.																										

10CFR50.54(Q)(3) Evaluation

Procedure/Document Number: EP-001-001	Revision: Revision 34
Equipment/Facility/Other: Waterford 3	
Title: Recognition & Classification of Emergency Conditions	

Part I. Description of Proposed Change:

1. Change 1 was screened out and will not be evaluated.
2. In Attachment 7.1, under AA1 EAL #2, Table A2: Changed the values given for PRM-IRE-0627 and PRM-IRE-0647 from 5.38E-01 uCi/ml to 8.55E-02 uCi/ml, AND added PRM-IRE-6775, PRM-IRE-6776, PRM-IRE-6778, PRM-IRE1900, and PRM-IRE-0648, and their associated maximum operating range values. Relocated Table A2 from part b of the EAL to part a.
3. In Attachment 7.2, under AA1 EAL #2, Table A2: Changed the values given for PRM-IRE-0627 and PRM-IRE-0647 from 5.38E-01 uCi/ml to 8.55E-02 uCi/ml, AND added PRM-IRE-6775, PRM-IRE-6776, PRM-IRE-6778, PRM-IRE1900, and PRM-IRE-0648, and their associated maximum operating range values. Relocated Table A2 from part b of the EAL to part a.
4. In Attachment 7.2, under AU1 EAL #2: Added the statement, "Historical release permits indicate that the NOUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1."
5. Change 5 was screened out and will not be evaluated.

NOTE: A before and after view of changes 2-4 is provided on page 6 of this document.

Part II. Description and Review of Licensing Basis Affected by the Proposed Change:

An electronic search of the Emergency Plan, EAL document (EP-001-001 Recognition & Classification of Emergency Conditions), the On-Shift Staffing Analysis, the Evacuation Time Estimate, and the Alert and Notification System Design Report was performed using keywords "emergency classification" 48 hits, none relevant; "emergency action level" 13 hits, none relevant; "effluent" 34 hits, none relevant, "radiation monitor" 19 hits, none relevant, "overrange", 0 hits and "off-scale" 1 hit, not relevant.

Additionally, a manual review of the entire Emergency Plan was performed. The search of potentially affected Emergency Plan sections specifically focused on Emergency Plan Section 4.1 Waterford 3 Classification, Emergency Plan Table 4-1 Summary of Initiating Conditions, Emergency Plan Section 7.4 Assessment Facilities and Equipment, and Emergency Plan Table 7-2 Process and Effluent Radiological Monitors/Samplers.

A historical review of EP-001-001 Recognition & Classification of Emergency Conditions was performed to the last NRC Approved revision which was Revision 29 with the migration to NEI 99-01 Rev 5 EALs. This approval was provided in a letter dated July 18, 2011, with the subject "WATERFORD STEAM ELECTRIC STATION, UNIT 3 – APPROVAL OF CONVERSION OF THE EMERGENCY ACTION LEVEL SCHEME TO SCHEME BASED ON NUCLEAR ENERGY INSTITUTE (NEI) 99-01, REVISION 5 (TAC NO. ME4726)" with ADAMS Accession No. ML111380558. Additional historical review was performed to Revision 28 in which the table containing the maximum operating limit of the effluent radiation monitors was added.

The Initiating Conditions listed in Table 4-1 of the Emergency Plan are not changed by this procedure revision. Because this activity is only changing EP-001-001 Recognition & Classification of Emergency Conditions, and not changing the Waterford 3 Emergency Plan, a historical review of the Emergency Plan was not performed.

The proposed changes do not change any Initiating Condition described in the Emergency Plan. The proposed changes do affect EAL entry criteria detailed in EP-001-001 Recognition & Classification of Emergency Conditions for selected Unusual Event and Alert EALs in cases where a monitor reading based on a multiple of the release permit monitor setpoint results in an off-scale high value.

The proposed changes do affect effluent radiation monitor operating range values contained in Emergency Plan Table 7-2 Process and Effluent Radiological Monitors/Samplers. Emergency Plan Table 7-2 references tables in sections 11 and 12 of the FSAR. A change to the Emergency Plan will need to be processed upon a revision to the FSAR to correct the maximum operating limit values of the effluent radiation monitors as detailed in the engineering report provided with CR-WF3-2020-6312. This change to the Emergency Plan will be tracked by WT-WTWF3-2018-00166 CA-00043.

10CFR50.54(Q)(3) Evaluation

Procedure/Document Number: EP-001-001	Revision: Revision 34
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Part III. Describe How the Proposed Change Complies with Relevant Emergency Preparedness Regulation(s) and Previous Commitment(s) Made to the NRC:

10 CFR 50.47(b)(4) – A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures

Site Compliance – A standard emergency classification and action level scheme based on NEI 99-01 Revision 5 remains in effect with this change. The change addresses the potential for a missed or untimely classification when a radiological release permit radiation monitor may be over ranged by the occurrence of an off-normal event associated with the release.

NRC Commitments – A Waterford 3 Licensing System search was performed using the Implementing Procedure query with an additional field to search for “EP-001-001”. A second search was performed using the Emergency Plan Query (EMPL) with additional fields added to specifically search commitment text. A search of commitments was performed with the following criteria “EP-001-001”, “emergency classification”, “emergency action level”, and “initiating condition”. The proposed changes do not affect any commitments made to the NRC.

Part IV. Description of Emergency Plan Planning Standards, Functions and Program Elements Affected by the Proposed Change:

10 CFR 50.47(b)(4) - Emergency Classification System

- A standard scheme of emergency classification and action levels is in use.

Sections IV.B and IV.C of Appendix E to 10 CFR 50 provide supporting requirements. Informing criteria appear in Section II.D of NUREG-0654 and the licensee's emergency plan.

10CFR50.54(Q)(3) Evaluation

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Part V. Description of Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

An engineering analysis of the maximum operating ranges for WF3 effluent radiation monitors and their relationship to EALs for radiological effluents – documented in CR-WF3-2020-06312 and validated by EC-88621 – has determined that under certain conditions 7 radiation monitors may be over ranged when the Unusual Event multiple (2) and/or Alert multiple (200) is applied to the alarm setpoint established for a discharge permit.

Changes 2 and 3:

CR-WF3 2019-01975 and CR-WF3-2020-06312 identified a condition where the maximum operating range of effluent radiation monitors used for evaluation of EAL AA1 could in some cases be lower than 200 times the established alarm setpoint for a radioactivity discharge permit. Under certain circumstances, the maximum operating range may also be lower than the Unusual Event limit for the discharge permit of 2 times the alarm setpoint. This issue is addressed in change 4. Using the maximum operating range values provided in the engineering report associated with CR-WF3-2020-06312, Table A2 was revised in EAL AA1 in Attachment 7.1 and the AA1 basis in attachment 7.2 to correct the values for the effluent radiation monitors already contained in the table, and to include additional effluent radiation monitors identified in the CR and their associated maximum operating values. The Emergency Director will use the most limiting condition of either the value listed in Table A2 or a valid reading of >200 times the alarm setpoint of the current discharge permit in making an Alert classification as specified in EAL AA1.2. In addition, the table was relocated from EAL 2.b to 2.a for ease of use and reference.

Continuous release permits are processed by the Chemistry Department for the Plant Stack, Main Condenser Exhaust, Fuel Handling Building Exhaust, Circulating Water (downstream of Steam Generator Blowdown cooling), Dry Cooling Tower Sumps, and the Turbine Building Industrial Waste Sump effluent pathways. The Chemistry technicians are able to access and change the alarm setpoint values for these associated effluent radiation monitors as directed by established procedural guidance. The Chemistry Department also establishes and sets alarm setpoints in accordance with established procedures and batch-discharge permits for the Boron Management, Liquid Waste Management, and Gaseous Waste Management effluent pathways. These effluent radiation monitor alarm setpoints are available to the Emergency Director for evaluation of entry criteria for emergency classifications.

These changes are much like changes made in EP-001-001 Revision 28 and evaluated under 10CFR50.54(q) where a similar condition was identified. These changes correct information added in Revision 28 for current conditions and add additional clarifying information.

Change 4:

This change provides for the event where the Unusual Event multiple of 2 times the monitor alarm setpoint for EAL 2 of AU1 may result in a value beyond the maximum operating range of the monitor. Information is provided in the basis to describe this condition that is aligned with information provided in the basis for AA1. The AU1 basis information directs the user to AA1. In a condition where a discharge is ongoing that exceeds the maximum range of the monitor and isolation of the release is not successful in 15 minutes, an Alert is the applicable classification.

(Continued Next Page)

10CFR50.54(Q)(3) Evaluation

Procedure/Document Number: EP-001-001	Revision: Revision 34
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Title: Recognition & Classification of Emergency Conditions	

EALs:

Changes 2-4 address the condition where the actual magnitude of a radiological release is unknown because an ongoing release has exceeded the setpoint established by a discharge permit, has not been isolated, has exceeded the maximum range of the monitor and the Unusual Event and/or Alert threshold for the release is also greater than the maximum range of the monitor. The actual magnitude of the release may be determined by grab sampling and analysis (AU1 EAL #3/AA1 EAL #3). A minimum of 34 minutes is required to analyze the sample without consideration for the time taken to take the sample, prepare it and begin the analysis, while indication of an off-normal condition is present because the applicable radiation monitor is at the top of its range. Because the top of the range monitor reading cannot discriminate between the Unusual Event multiple of 2 and the Alert multiple of 200 and presents an unknown condition, the Alert classification is applicable. Use of this top of monitor range EAL threshold in this circumstance ensures a timely classification of the event at the maximum classification level that could be exceeded where the actual conditions are unknown. Six of the seven affected radiation monitors are liquid monitors. There is no Site Area Emergency or General Emergency classification applicable to a liquid release. For the last monitor, gaseous waste management, a downstream monitor is provided on the plant stack that would provide indication of Site Area Emergency or General Emergency conditions under AS1 or AG1 EAL 1. Therefore, the Alert classification is appropriate for the condition. A Site Area Emergency or General Emergency classification is not warranted or appropriate. Note that the choice of either 200 times the high alarm setpoint for the release, or off-scale high (top of range), meets the intent of the radiological effluent initiating conditions/emergency action levels of providing classification thresholds for UNPLANNED and/or uncontrolled releases of radioactivity to the environment.

EMERGENCY PLAN:

These changes do not affect any process detailed in the Emergency Plan. This change does, however, establish lower maximum operating limit values than what is shown in Table 7-2 of the Emergency Plan. The effectiveness of the Emergency Plan is not reduced because these operating limits have been determined to be different for some of the monitors through an engineering evaluation. The Emergency Plan reflects the operating limits that are in the FSAR. These Emergency Plan operating limits are provided for information based on FSAR content. The Emergency Plan does not direct emergency response based on the specific values for the operating range limits of the monitors. The EALs in EP-001-001 are being revised to reflect information that is based on specific values for the operating range of selected effluent monitors and to correct information already present for two of the monitors. The Emergency Plan should be revised upon a revision to the FSAR to correct the upper range values of the affected effluent radiation monitors. WT-WTWF3-2018-00166 CA-00043 has been initiated to track the needed change to the Emergency Plan.

This change does not affect any information (other than FSAR-sourced information in Table 7-2) or process detailed in the Emergency Plan.

CONCLUSION:

The proposed changes ensure that the operating ranges of the effluent radiation monitors will not be exceeded without entering into an emergency classification when the threshold for EAL entry is greater than the top of that range. These changes correct an identified adverse condition and therefore the effectiveness of the Emergency Plan has not been degraded or lost, but restored since it provides the Emergency Director with additional clarifying information to ensure a classification is not overlooked or masked by an EAL threshold for a radiation monitor indication that is beyond the operating range of the monitor, presenting an unknown condition to the decision maker. In addition, the proposed changes do not result in a change to the underlying NEI 99-01 Revision 5 scheme for the site specific EALs.

The proposed changes to the EP-001-001 Recognition & Classification of Emergency Conditions continue to meet the planning standards outlined in 10CFR50.47(b)(4) Emergency Classification System. The effectiveness of the emergency plan is not reduced. These changes can be incorporated without prior NRC approval."

10CFR50.54(Q)(3) Evaluation

Procedure/Document Number: EP-001-001	Revision: Revision 34
Equipment/Facility/Other: Waterford 3	
Title: Recognition & Classification of Emergency Conditions	

Part VI. Evaluation Conclusion

Answer the following questions about the proposed change.

1. Does the proposed change comply with 10CFR50.47(b) and 10CFR50 Appendix E?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
2. Does the proposed change maintain the effectiveness of the emergency plan (i.e., no reduction in effectiveness)?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
3. Does the proposed change constitute an emergency action level scheme change?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

If questions 1 or 2 are answered NO, or question 3 answered YES, reject the proposed change, modify the proposed change and perform a new evaluation or obtain prior NRC approval under provisions of 10CFR50.90. If questions 1 and 2 are answered YES, and question 3 answered NO, implement applicable change process(es). Refer to Section 6.7 Step 8.

Part VII. Signatures

Preparer Name (Print) Don Vincent	Preparer Signature 	Date: 2/14/21
(Optional) Reviewer Name (Print) N/A	Reviewer Signature	Date:
Reviewer Name (Print) Gina Taylor Nuclear EP Project Manager	Reviewer Signature Gina L Taylor <small>Digitally signed by Gina L Taylor DN: cn=Gina L Taylor, c=US, o=Entergy, ou=Corporate Emergency Preparedness, email=gtaylor3@entergy.com Date: 2021.02.15 15:36:52 -06'00'</small>	Date: 2/15/21
Approver Name (Print) John Overly Emergency Planning Manager or designee	Approver Signature 	Date: 2/18/2021

10CFR50.54(Q)(3) Evaluation

Procedure/Document Number: EP-001-001	Revision: Revision 34
Equipment/Facility/Other: Waterford 3	
Title: Recognition & Classification of Emergency Conditions	

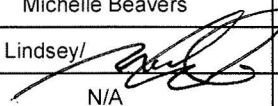
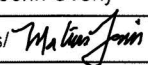
BEFORE AND AFTER VIEW OF CHANGES 2-4 DESCRIBED IN PART 1.

BEFORE

AFTER

	Location	Original	Revision																										
2.	Attachment 7.1 AA1 EAL #2	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>5.38E-01 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>5.38E-01 uCi/ml</td></tr></table>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	5.38E-01 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	5.38E-01 uCi/ml	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>8.55E-02 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>8.55E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMM #1 LIQUID MONITOR PRM-IRE-6775</td><td>4.20E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMM #2 LIQUID MONITOR PRM-IRE-6776</td><td>4.20E-02 uCi/ml</td></tr><tr><td>TURBINE BUILDING SUMM DISCHARGE LIQUID MONITOR PRM-IRE-6778</td><td>4.20E-02 uCi/ml</td></tr><tr><td>CIRCULAR WATER DISCHARGE MONITOR PRM-IRE-1900</td><td>4.20E-02 uCi/ml</td></tr><tr><td>GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648</td><td>2.99E+02 uCi/cc</td></tr></table> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	8.55E-02 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	8.55E-02 uCi/ml	DRY COOLING TOWER SUMM #1 LIQUID MONITOR PRM-IRE-6775	4.20E-02 uCi/ml	DRY COOLING TOWER SUMM #2 LIQUID MONITOR PRM-IRE-6776	4.20E-02 uCi/ml	TURBINE BUILDING SUMM DISCHARGE LIQUID MONITOR PRM-IRE-6778	4.20E-02 uCi/ml	CIRCULAR WATER DISCHARGE MONITOR PRM-IRE-1900	4.20E-02 uCi/ml	GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648	2.99E+02 uCi/cc
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3.	Attachment 7.2 AA1 EAL #2	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>5.38E-01 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>5.38E-01 uCi/ml</td></tr></table>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	5.38E-01 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	5.38E-01 uCi/ml	<p>2. a. For Table A2 monitors: <u>EITHER</u> a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes <u>OR</u> a VALID reading ≥ the Table A2 value for ≥ 15 minutes.</p> <table><tr><th colspan="2">Table A2</th></tr><tr><th>MONITOR</th><th>CONC.</th></tr><tr><td>BORON MANAGEMENT DISCHARGE PRM-IRE-0627</td><td>8.55E-02 uCi/ml</td></tr><tr><td>LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647</td><td>8.55E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMM #1 LIQUID MONITOR PRM-IRE-6775</td><td>4.20E-02 uCi/ml</td></tr><tr><td>DRY COOLING TOWER SUMM #2 LIQUID MONITOR PRM-IRE-6776</td><td>4.20E-02 uCi/ml</td></tr><tr><td>TURBINE BUILDING SUMM DISCHARGE LIQUID MONITOR PRM-IRE-6778</td><td>4.20E-02 uCi/ml</td></tr><tr><td>CIRCULAR WATER DISCHARGE MONITOR PRM-IRE-1900</td><td>4.20E-02 uCi/ml</td></tr><tr><td>GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648</td><td>2.99E+02 uCi/cc</td></tr></table> <p><u>OR</u></p> <p>b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.</p>	Table A2		MONITOR	CONC.	BORON MANAGEMENT DISCHARGE PRM-IRE-0627	8.55E-02 uCi/ml	LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	8.55E-02 uCi/ml	DRY COOLING TOWER SUMM #1 LIQUID MONITOR PRM-IRE-6775	4.20E-02 uCi/ml	DRY COOLING TOWER SUMM #2 LIQUID MONITOR PRM-IRE-6776	4.20E-02 uCi/ml	TURBINE BUILDING SUMM DISCHARGE LIQUID MONITOR PRM-IRE-6778	4.20E-02 uCi/ml	CIRCULAR WATER DISCHARGE MONITOR PRM-IRE-1900	4.20E-02 uCi/ml	GASEOUS WASTE MANAGEMENT MONITOR PRM-IRE-0648	2.99E+02 uCi/cc
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4.	Attachment 7.2 AU1 EAL #2	Added statement to Basic Document	Historical release permits indicate that the NQUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1.																										

7.1 REQUEST/APPROVAL PAGE

<h1 style="margin: 0;">SAFETY RELATED</h1> <h2 style="margin: 0;">PROCEDURE</h2>		Normal Review Class (check one): <input checked="" type="checkbox"/> OSRC <input type="checkbox"/> QUALIFIED REVIEW	
PROCEDURE NUMBER: EP-001-001		REVISION: 034	
TITLE: Recognition and Classification of Emergency Conditions			
PROCEDURE OWNER (Position Title): Emergency Planning Manager			
TERM (check one): <input checked="" type="checkbox"/> PERMANENT <input type="checkbox"/> TEMPORARY			
Effective Date / Milestone (if applicable): 2 / 24 / 2021			
Expiration Date / Milestone (if applicable): N/A			
PROCEDURE ACTION (CHECK ONE): <input checked="" type="checkbox"/> REVISION <input type="checkbox"/> DELETION <input type="checkbox"/> NEW PROCEDURE			
DESCRIPTION AND JUSTIFICATION: Changes made based on engineering analysis and findings from CR-WF3-2020-6312.			
	Location	Original	Revision
1.	Throughout	Fixed formatting and changed revision number.	
Continued on pg 2.			
<input checked="" type="checkbox"/> Request/Approval Page Continuation Sheet(s) attached.			
REVIEW PROCESS (CHECK ONE): <input checked="" type="checkbox"/> NORMAL <input type="checkbox"/> EDITORIAL CORRECTION (REVISIONS ONLY) <input type="checkbox"/> TECHNICAL VERIFICATION (REVISIONS ONLY)			
REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		Don Vincent	11/6/2020
EC SUPERVISOR Administrative Review <u>and</u> Approval		(sign) N/A	
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Engineering	Dan Haslauer	11/10/2020
	Operations	Dave Litloff	11/11/2020
	Chemistry	Michelle Beavers	11/9/2020
	OSRC Chair	Brian Lindsey/ 	2-22-2021
		N/A	
PROCESS APPLICABILITY DETERMINATION		OSRC 03-003	
Performed <input type="checkbox"/> PA Exclusion <input checked="" type="checkbox"/>			
TECHNICAL Review <input checked="" type="checkbox"/> Verification <input type="checkbox"/>		Aaron Ertel	11/12/2020
QUALIFIED REVIEWER Review <input type="checkbox"/>		N/A	
GROUP/DEPT. HEAD Review <input checked="" type="checkbox"/> Approval <input type="checkbox"/>		(sign) John Overly	11/12/2020
GM, PLANT OPERATIONS Review <input type="checkbox"/> Approval <input checked="" type="checkbox"/>		(sign) Matt Lewis/ 	2/23/2021
VICE PRESIDENT, OPERATIONS Approval <input type="checkbox"/>		(sign) N/A	

REQUEST/APPROVAL PAGE (CONT'D)

CONTINUATION SHEET

Page 2 of 2

PROCEDURE/INSTRUCTION NUMBER: EP-001-001

REVISION: 034

DESCRIPTION AND JUSTIFICATION (CONTINUED):

	Location	Original	Revision																						
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4.	Attachment 7.2 AU1 EAL #2	Added statement to Basic Document	<p>Historical release permits indicate that the NQUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1.</p>																						

5. Added "2.17 EC-88621, Radiation Monitoring Calculations for Monitor Spans to Support EALs and Plant Operations" to reference section.

	ADDITIONAL CROSS-DISCIPLINE REVIEWS	PRINT NAME OR SIGNATURE	DATE
CROSS-DISCIPLINE AND INTERNAL REVIEWS (LIST GROUPS, FUNCTIONS, POSITIONS, ETC.)		N/A	
		N/A	
		N/A	
		N/A	
		N/A	

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LIST OF EFFECTIVE PAGES

1-159

Revision 034

Reference Use

1.0 PURPOSE

- 1.1 This procedure describes the immediate actions to be taken to recognize and classify the four emergency classifications: Unusual Event, Alert, Site Area Emergency, and General Emergency.

2.0 REFERENCES

- 2.1 Waterford 3 SES Emergency Plan
- 2.2 Title 10, Code of Federal Regulations Part 50, Appendix E
- 2.3 NEI 99-01 Methodology for Development of Emergency Action Levels, Revision 5
- 2.4 Waterford 3 SES Final Safety Analysis Report
- 2.5 EP-001-010, Unusual Event
- 2.6 EP-001-020, Alert
- 2.7 EP-001-030, Site Area Emergency
- 2.8 EP-001-040, General Emergency
- 2.9 EP-002-015, Emergency Responder Activation
- 2.10 EP-002-052, Protective Action Guidelines
- 2.11 EP-002-150, Emergency Plan Implementing Records
- 2.12 EP-004-010, Toxic Chemical Contingency Procedure
- 2.13 NUREG-1022, Event Reporting Guidelines: 10CFR50.72 and 50.73
- 2.14 UNT-006-010, Event Notification and Reporting
- 2.15 HP-CALC-2001-001, PASS System Elimination (Dose Rates Calculation)
- 2.16 HP-CALC-2005-002, Emergency Action Levels (EALs) (Abnormal Rad Levels and Radiological Effluent) Based on Power Uprate Source Terms
- 2.17 EC-88621, Radiation Monitoring Calculations for Monitor Spans to Support EALs and Plant Operations

3.0 RESPONSIBILITIES

- 3.1 The Emergency Director (ED) is responsible for implementation of this procedure
- 3.2 The Emergency Director (ED) is responsible for declaration of the appropriate emergency classification whenever, in his judgment, the station status warrants such a declaration.
- 3.3 The Shift Manager shall assume the responsibility and authority of the Emergency Director (ED) until such time that he is properly relieved of this duty by the EOF Duty Emergency Director
- 3.4 If the Shift Manager cannot immediately assume the duty of Emergency Director, then the Control Room Supervisor (CRS) shall assume the duty of Emergency Director until properly relieved by the EOF Duty Emergency Director or Shift Manager.
- 3.5 When the EOF is activated and responsibilities are transferred, then the EOF Emergency Director is responsible for implementation of this procedure and declaration of the appropriate emergency classification whenever, in his judgment, the station status warrants such a declaration.
- 3.6 The assessment, classification, and declaration of an emergency condition is expected to be completed within 15 minutes after the availability of indications (i.e. plant instrumentation, plant alarms, computer displays, or incoming verbal reports) to plant operators that an EAL has been exceeded.
 - 3.6.1 The 15-minute criterion is not to be construed as a grace period to restore plant conditions to avoid declaring the event.
 - 3.6.2 The emergency declaration should be made promptly without waiting for the 15 minute period to elapse once the EAL is recognized as being exceeded.
 - 3.6.3 For EALs that specify duration of the off-normal condition, such as fire lasting 15 minutes, loss of power for 15 minutes, etc.:
 - The Emergency Director shall make the declaration at the first available opportunity when the time has elapsed (not after an additional 15 minutes)
 - The declaration should be made before the EAL is met (time duration has elapsed) when the Emergency Director has information that the off-normal condition will not be corrected within the specified time duration.

4.0 INITIATING CONDITIONS

- 4.1 An off-normal event has occurred, or is in progress.

NOTE

This instruction does not replace any plant operating procedure. Ensure that any immediate actions (for example, use of Emergency Procedures) are taken for the proper operation of the plant. During an emergency condition, continue to use the appropriate plant procedures in parallel with this instruction.

- 4.2 An action step in a plant procedure refers to this instruction for classification of the indicated plant conditions.

5.0 PROCEDURE

5.1 Definitions

- 5.1.1 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 offsite 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, and General Emergency.
- 5.1.2 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.
- 5.1.3 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.

5.2 Classification

- 5.2.1 Verify the off-normal event to ensure that the event is real.
- 5.2.2 Match the off-normal event with one of the following six emergency categories:
- | | |
|---|-------|
| 5.2.2.1 Abnormal Radiation Levels/Radiological Effluents | TAB A |
| 5.2.2.2 Cold Shutdown/Refueling System Malfunction | TAB C |
| 5.2.2.3 ISFSI Malfunction | TAB E |
| 5.2.2.4 Fission Product Barrier Degradation | TAB F |
| 5.2.2.5 Hazards and Other Conditions Affecting Plant Safety | TAB H |
| 5.2.2.6 System Malfunction | TAB S |
- 5.2.3 Refer to Attachment 7.1, Emergency Categories, under the category TAB selected in step 5.2.2 above, match the off-normal condition with the appropriate IC to determine the emergency classification.
- 5.2.4 If an event or condition existed which met or exceeded an IC but no emergency was declared and the basis for the emergency classification no longer exists at the time of the discovery (rapidly concluded event, missed classification or misclassified event), then do not classify the emergency or make offsite notifications.
- 5.2.4.1 Notify the NRC within one hour of the discovery of the undeclared or misclassified event in accordance with UNT-006-010.

NOTE

The effects of combinations of initiating conditions that individually constitute a lower classification may be considered as a possibly higher emergency classification.

5.2.5 Declare the highest emergency classification for which an IC has been met or exceeded.

5.2.6 Perform the emergency actions in accordance with the appropriate Emergency Plan Implementing Instruction, one of which is provided for each classification, as follows:

5.2.6.1 Unusual Event - EP-001-010

5.2.6.2 Alert - EP-001-020

5.2.6.3 Site Area Emergency - EP-001-030

5.2.6.4 General Emergency - EP-001-040

5.2.7 Assessment actions shall be continued, and if necessary, the emergency classification escalated (or downgraded) as more definitive information becomes available or if the plant conditions change.

6.0 FINAL CONDITIONS

6.1 The plant conditions which activated this instruction have been declassified to non-emergency status.

7.0 ATTACHMENTS

7.1 Emergency Categories

Index of Initiating Conditions

TAB A Abnormal Radiation Levels/Radiological Effluents

TAB C Cold Shutdown/Refueling System Malfunction

TAB E ISFSI Malfunction

TAB F Fission Product Barrier Degradation

TAB H Hazards and Other Conditions Affecting Plant Safety

TAB S System Malfunction

7.2 Waterford 3 EAL Basis Document

8.0 RECORDS

None

INDEX OF INITIATING CONDITIONS

TAB A ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

1. Releases of gaseous or liquid radioactivity to the environment
2. Unplanned rise in plant radiation/damage to irradiated fuel/loss of water level
3. Rise in radiation levels within the facility that impedes operation of systems required to maintain safe operation

TAB C COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

1. RCS Leakage
2. Unplanned loss of RCS/reactor vessel inventory
3. Unplanned loss of decay heat removal capability with irradiated fuel in the reactor vessel
4. Loss of AC power
5. Loss of required DC power
6. Inadvertent criticality
7. Loss of onsite or offsite communications

TAB E ISFSI MALFUNCTION

1. Damage to a loaded cask confinement boundary

TAB F FISSION PRODUCT BARRIER DEGRADATION

1. Loss of Containment, RCS, or Fuel Clad barrier(s)

TAB H HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

1. Security
2. Judgment
3. Control Room evacuation
4. Fire or explosion
5. Toxic, corrosive, asphyxiant or flammable gases
6. Natural or destructive phenomena

INDEX OF INITIATING CONDITIONS (Cont'd)

TAB S SYSTEM MALFUNCTION

1. Loss of offsite/onsite AC power
3. Failure of Reactor Protection System
4. Loss of Vital DC power
6. Loss of safety system annunciators/indicators
7. RCS Leakage
8. Loss of onsite or offsite communications
9. Fuel clad degradation
10. Inadvertent criticality
11. Inability to reach required operating mode within Tech Spec limits

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT																																																																																	
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Radiological Effluents	<div><div>AG1</div><div>Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology.</div><div>Emergency Action Level(s): (1 or 2 or 3)</div><div>NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.</div><div>1. 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Field survey results indicate closed window dose rates >1000 mR/hr expected to continue for ≥ 60 minutes; or analyses of field survey samples indicate CDE Thyroid > 5000 mR for one hour of inhalation, at or beyond the EAB.</div></div>	<div><div>AS1</div><div>Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release.</div><div>Emergency Action Level(s): (1 or 2 or 3)</div><div>NOTE: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.</div><div>1. 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MONITOR	CONC.																																																																																						
BORON MANAGEMENT DISCHARGE PRM-IRE-0627	8.55E-02 uCi/ml																																																																																						
LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	8.55E-02 uCi/ml																																																																																						
¹ DRY COOLING TOWER SUMP #1 LIQUID MONITOR PRM-IRE-6775	4.20E-02 uCi/ml																																																																																						
¹ DRY COOLING TOWER SUMP #2 LIQUID MONITOR PRM-IRE-6776	4.20E-02 uCi/ml																																																																																						
¹ TURBINE BUILDING SUMP DISCHARGE LIQUID MONITOR PRM-IRE-6778	4.20E-02 uCi/ml																																																																																						
CIRCWATER DISCHARGE MONITOR PRM-IRE-1900	4.20E-02 uCi/ml																																																																																						
GASEOUS WASTE MANAGEMENT MONITOR PRMR-IRE-0648	2.99E+02 uCi/cc																																																																																						
MONITOR	CONC.	EFFLUENT RATE																																																																																					
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.51E+05 uCi/sec																																																																																					
FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL , PRM-IRE-5107A or B, RE5107A-1 or RE5107B-1	1.61E-02 uCi/cc																																																																																						
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE-3032, RE3032-4		2.25E+05 uCi/sec																																																																																					
PLANT STACK PIG GAS CHANNEL PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1	3.45E-03 uCi/cc																																																																																						
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.51E+05 uCi/sec																																																																																					
¹ DRY COOLING TOWER SUMPS MONITOR, PRM-IRE-6775 or PRM-IRE-6776, RE6775-1 or RE6776-1	8.49E-04 uCi/ml																																																																																						
¹ TURBINE BUILDING INDUSTRIAL WASTE SUMP MONITOR, PRM-IRE-6778, RE6778-1	8.49E-04 uCi/ml																																																																																						
Table A1 TRM Limits																																																																																							
	ALERT	UE																																																																																					
Gaseous Release																																																																																							
Noble Gases: ≤ 500 mrem/yr whole body	1.00E+05	1000																																																																																					
Noble Gases: ≤ 3000 mrem/yr skin	6.00E+05	6000																																																																																					
I-131, I-133, H-3 and particulates with half-lives > 8 days: ≤ 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																																																																																					
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	
ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS							
Abnormal Radiation Levels		<div>AA2</div> <div>Damage to irradiated fuel or loss of water level that has resulted or will result in uncovering of irradiated fuel outside the reactor vessel.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s): (1 or 2)</div> <div>1. A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered.</div> <div>OR</div> <div>2. VALID alarm or reading ≥ HIGH alarm limits on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:</div> <div><ul style="list-style-type: none">CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1) ≥ HIGH alarmCONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1) ≥ HIGH alarmREFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1) ≥ HIGH alarmFHB 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) ≥ 1000 mR/hrFUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL , (PRM-IRE-5107A OR B, RE5107A-1 OR RE5107B-1) ≥ HIGH alarm</div>	<div>AU2</div> <div>UNPLANNED rise in plant radiation levels.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s): (1 or 2)</div> <div>1. a. UNPLANNED water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal as indicated by:<ul style="list-style-type: none">Personnel observation, spent fuel pool level below level plate, refueling crew report, indication on area security camera, RWSP level drop due to makeup demands.</div> <div>AND</div> <div>b. VALID Area Radiation Monitor reading rise on any of the following:</div> <div><ul style="list-style-type: none">CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)CONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1)REFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1)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)</div> <div>OR</div> <div>2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels</div> <div><div>NOTE: For area radiation monitors with ranges incapable of measuring 1000 times normal* levels, classification shall be based on VALID full scale indication unless surveys confirm that area radiation levels are below 1000 times normal* within 15 minutes of the Area Radiation Monitor indications going to full scale indication.</div><div>*Normal can be considered as the highest reading in the past 24 hours excluding the current peak value.</div></div>				
		<div>AA3</div> <div>Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s):</div> <div>1. Dose rate greater than 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:</div> <div><ul style="list-style-type: none">Main Control RoomCAS</div>					

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT		
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION								
Cold Shutdown/Refueling Loss of RCS/Reactor Vessel Inventory	CG1 Loss of RCS/reactor vessel inventory affecting fuel clad integrity with containment challenged. <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div></div>		CS1 Loss of RCS/reactor vessel inventory affecting core decay heat removal capability. <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div></div>		CA1 Loss of RCS/reactor vessel Inventory. <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div></div>		CU1 RCS leakage. <div><div></div><div></div><div></div><div></div><div>5</div><div></div></div>	
	Emergency Action Level(s): (1 or 2)		Emergency Action Level(s): (1 or 2 or 3)		Emergency Action Level(s): (1 or 2)		Emergency Action Level(s):	
	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time		Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time		Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.		Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.	
	1. a. Core Exit Thermocouples indicate superheat for ≥ 30 minutes.		1. With CONTAINMENT CLOSURE not established, RVLMS upper plenum level 0%.		1. Loss of RCS/reactor vessel inventory as indicated by reactor vessel level at 12 ft.		1. RCS leakage results in the inability to maintain or restore level within Pressurizer or RCS level target band for ≥ 15 minutes.	
	AND		OR		OR			
	b. Any of the following containment challenge indications: <ul style="list-style-type: none">CONTAINMENT CLOSURE not establishedExplosive mixture inside containmentUNPLANNED rise in containment pressure.		2. With CONTAINMENT CLOSURE established, Core Exit Thermocouples indicate superheat.		2. RCS/reactor vessel level cannot be monitored for ≥ 15 minutes with a loss of RCS/reactor vessel inventory as indicated by an unexplained level rise in containment sump or reactor drain tank.			
	OR		OR					
	2. a. RCS/reactor vessel level cannot be monitored with core uncover indicated by any of the following for ≥ 30 minutes: <ul style="list-style-type: none">Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 10R/hrErratic Source Range Monitor indicationUnexplained level rise in containment sump or reactor drain tank		3. RCS/reactor vessel level cannot be monitored ≥ 30 minutes with a loss of RCS/reactor vessel inventory as indicated by any of the following: <ul style="list-style-type: none">Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 10R/hrErratic Source Range Monitor indicationUnexplained level rise in containment sump or reactor drain tank.					
	AND							
	b. Any of the following containment challenge indications: <ul style="list-style-type: none">CONTAINMENT CLOSURE not establishedExplosive mixture inside containmentUNPLANNED rise in containment pressure.							

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					
Refueling Loss of RCS/Reactor Vessel Inventory					<div><div>CU2</div><div>UNPLANNED loss of RCS/reactor vessel inventory.</div><div><div></div><div></div><div></div><div></div><div></div><div>6</div></div></div> <div><div>Emergency Action Level(s): (1 or 2)</div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div><div>1. UNPLANNED RCS/reactor vessel level drop as indicated by either of the following:<div>a. RCS/reactor vessel water level drop below the reactor vessel flange for ≥ 15 minutes when the RCS/reactor vessel level band is established above the reactor vessel flange.</div><div>OR</div><div>b. RCS/reactor vessel water level drop below the RCS/reactor vessel level band for ≥ 15 minutes when the RCS/reactor vessel level band is established below the reactor vessel flange.</div></div><div>OR</div><div>2. RCS/reactor vessel level cannot be monitored with a loss of RCS/reactor vessel inventory as indicated by an unexplained level rise in the containment sump or reactor drain tank.</div></div>
	<div>Plant Modes (white boxes indicate applicable modes)</div> <div><div>1</div>Power Operations<div>2</div>Startup<div>3</div>Hot Standby<div>4</div>Hot Shutdown<div>5</div>Cold Shutdown<div>6</div>Refueling<div>D</div>Defueled</div>				

GENERAL EMERGENCY			SITE AREA EMERGENCY			ALERT			UNUSUAL EVENT																			
COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION																												
Loss of Decay Heat Removal	<table><tr><th colspan="3">Table C1 RCS Reheat Duration Thresholds</th></tr><tr><th>RCS</th><th>Containment Closure</th><th>Duration</th></tr><tr><td>Intact (but not RCS reduced inventory)</td><td>N/A</td><td>60 minutes*</td></tr><tr><td rowspan="2">Not intact or RCS reduced inventory</td><td>Established</td><td>20 minutes*</td></tr><tr><td>Not Established</td><td>0 minutes</td></tr><tr><td colspan="3">*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.</td></tr></table>					Table C1 RCS Reheat Duration Thresholds			RCS	Containment Closure	Duration	Intact (but not RCS reduced inventory)	N/A	60 minutes*	Not intact or RCS reduced inventory	Established	20 minutes*	Not Established	0 minutes	*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.			<div>CA3</div> <div>Inability to maintain plant in Cold Shutdown.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div></div>			<div>CU3</div> <div>UNPLANNED loss of decay heat removal capability with irradiated fuel in the reactor vessel.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div></div>		
						Table C1 RCS Reheat Duration Thresholds																						
						RCS	Containment Closure	Duration																				
						Intact (but not RCS reduced inventory)	N/A	60 minutes*																				
						Not intact or RCS reduced inventory	Established	20 minutes*																				
							Not Established	0 minutes																				
						*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.																						
						<div>Emergency Action Level(s): (1 or 2)</div> <div>1. An UNPLANNED event results in RCS temperature > Technical Specification cold shutdown temperature limit > the specified duration in Table C1.</div> <div>OR</div> <div>Note: EAL #2 does not apply in solid plant conditions.</div> <div>2. An UNPLANNED event results in RCS pressure increase > 10 psi due to a loss of RCS cooling.</div>			<div>Emergency Action Level(s): (1 or 2)</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit</div> <div>OR</div> <div>2. Loss of all RCS temperature and RCS/reactor vessel level indication for ≥ 15 minutes.</div>																			

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 (cont.)				
Loss of AC Power			<div>CA5</div> <div>Loss of all offsite and all onsite AC power to safety busses ≥ 15 minutes.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. Loss of all offsite and all onsite AC power to safety busses ≥ 15 minutes.</div>	<div>CU5</div> <div>AC power capability to safety busses reduced to a single power source ≥ 15 minutes such that any additional single failure would result in station blackout.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div><div></div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. a. AC power capability to safety busses reduced to a single power source ≥ 15 minutes</div> <div>AND</div> <div>b. Any additional single power source failure will result in station blackout.</div>
Loss of DC Power				<div>CU6</div> <div>Loss of required DC power ≥ 15 minutes.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div><div></div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.</div> <div>1. < 108 volts on required vital DC bus ≥ 15 minutes.</div>
Inadvertent Criticality				<div>CU7</div> <div>Inadvertent criticality.</div> <div><div></div><div></div><div></div><div></div><div>5</div><div>6</div><div></div></div> <div>Emergency Action Level(s):</div> <div>1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.</div>

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 (cont.)																			
Loss of Communications	<table><tr><th>Table C2 Onsite Communication Methods</th><th>Table C3 Offsite Communication Methods</th></tr><tr><td>Plant radio system</td><td>All telephone lines (commercial and microwave)</td></tr><tr><td>Plant paging system</td><td>VOIP phones</td></tr><tr><td>In-plant telephones</td><td>ENS</td></tr><tr><td>Sound powered phones</td><td></td></tr></table>						Table C2 Onsite Communication Methods	Table C3 Offsite Communication Methods	Plant radio system	All telephone lines (commercial and microwave)	Plant paging system	VOIP phones	In-plant telephones	ENS	Sound powered phones		CU8	Loss of all onsite or offsite communications capabilities.	<div><div></div><div></div><div></div><div></div><div></div><div>5</div><div>6</div><div>D</div></div>
							Table C2 Onsite Communication Methods	Table C3 Offsite Communication Methods											
							Plant radio system	All telephone lines (commercial and microwave)											
							Plant paging system	VOIP phones											
							In-plant telephones	ENS											
Sound powered phones																			
Emergency Action Level(s): (1 or 2)																			
1. Loss of all Table C2 onsite communication methods affecting the ability to perform routine operations																			
OR																			
2. Loss of all Table C3 offsite communication methods affecting the ability to perform offsite notifications.																			

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
ISFSI MALFUNCTION					
Cask Damage					<div><div>E-HU1</div><div>Damage to a loaded cask CONFINEMENT BOUNDARY.</div></div> <div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. Damage to a loaded cask CONFINEMENT BOUNDARY.</div></div>

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			
FISSION PRODUCT BARRIER DEGRADATION															
	FG1	Loss of ANY two barriers AND loss or potential loss of the third barrier.	<div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>	FS1	Loss or potential loss of ANY two barriers.	<div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>	FA1	ANY loss or ANY potential loss of EITHER fuel clad or RCS.	<div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>	FU1	ANY loss or ANY potential loss of containment.	<div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>			

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

SEE FOLLOWING PAGE FOR EALS FOR BARRIER LOSS AND POTENTIAL LOSS

Fuel Clad Barrier EALs		RCS Barrier EALs		Containment Barrier EALs	
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS
1. Safety Function Status (FCB1)		1. Safety Function Status (RCB1)		1. Safety Function Status (CNB1)	
Core Heat Removal Safety Function NOT met	RCS Heat Removal Safety Function NOT met	Not Applicable	a. RCS Pressure Control Safety Function NOT met	Not Applicable	Containment Temperature and Pressure Control Safety Function NOT met
2. Primary Coolant Activity Level (FCB2)		2. RCS Leak Rate (RCB2)		2. Containment Pressure (CNB2)	
RCS Dose Equivalent Iodine > 300 µCi/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	Not Applicable	RCS leak rate > available makeup capacity as indicated by RCS subcooling < 28° F	UNISOLABLE RCS leak > 44 gpm	a. Rapid unexplained drop in containment pressure following an initial rise in containment pressure OR b. Containment pressure or sump level response not consistent with LOCA conditions	a. Containment pressure > 50 PSIA and rising OR b. Explosive mixture exists inside containment OR c. 1. Containment pressure > 17.7 PSIA AND 2. LESS THAN one full train of Containment Spray operating (1750 gpm)
3. Core Exit Thermocouple Readings (FCB3)		3. SG Tube Rupture (RCB3)		3. Core Exit Thermocouple Readings (CNB3)	
≥ 1200 degrees F	≥ 700 degrees F	SGTR that results in an ECCS (SI) actuation	Not Applicable	Not Applicable	a. 1. Core exit thermocouples >1200 degrees F AND 2. restoration procedures not effective within 15 minutes OR b. 1. Core exit thermocouples > 700 degrees F AND 2. RVLMS upper plenum level equal to 0% or LOWER AND 3. Restoration procedures not effective within 15 minutes
4. Reactor Vessel Water Level (FCB4)		4. Containment Radiation Monitoring (RCB4)		4. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB4)	
Not applicable	RVLMS upper plenum level 0%	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr	Not Applicable	a. RUPTURED SG is also FAULTED outside of containment OR b. 1. Primary-to-Secondary leakrate > 10 gpm AND 2. UNISOLABLE steam release from affected SG to the environment	Not Applicable
5. Containment Radiation Monitoring (FCB5)		5. Other Indications (RCB5)		5. Containment Isolation Failure or Bypass (CNB5)	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr	Not Applicable	Not Applicable	RCS pressure dropping due to primary relief not reseating	a. UNISOLABLE breach of containment AND b. Direct downstream pathway to the environment exists after containment isolation signal.	Not Applicable
6. Emergency Director Judgment (FCB6)		6. Emergency Director Judgment (RCB6)		6. Containment Radiation Monitoring (CNB6)	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier		Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the RCS Barrier		Not Applicable	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 4000 R/hr.
				7. Emergency Director Judgment (CNB7) Any condition in the opinion of the Emergency 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	<div><div>HG1</div><div>HOSTILE ACTION resulting in loss of physical control of the facility.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>(1 or 2)</div><div>1. A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.</div><div>OR</div><div>2. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.</div></div>	<div><div>HS1</div><div>HOSTILE ACTION within the PROTECTED AREA.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Waterford 3 Security Shift Supervision.</div></div>	<div><div>HA1</div><div>HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>(1 or 2)</div><div>1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Waterford 3 Security Shift Supervision</div><div>OR</div><div>2. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.</div></div>	<div><div>HU1</div><div>Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>(1 or 2 or 3)</div><div>1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Waterford 3 Security Shift Supervision</div><div>OR</div><div>2. A credible site specific security threat notification</div><div>OR</div><div>3. A validated notification from NRC providing information of an aircraft threat.</div></div>			
	<div><div>HG2</div><div>Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.</div></div>	<div><div>HS2</div><div>Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.</div></div>	<div><div>HA2</div><div>Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.</div></div>	<div><div>HU2</div><div>Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.</div></div>			
Discretionary							

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					
Main Control Room Evacuation		<div><div>HS3</div><div>Control Room evacuation has been initiated and plant control cannot be established.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. a. Control Room evacuation has been initiated</div><div>AND</div><div>b. Control of the plant cannot be established in accordance with OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown within 15 minutes.</div></div>	<div><div>HA3</div><div>Control Room evacuation has been initiated.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown requires Control Room evacuation.</div></div>		
		<div><div>HA4</div><div>FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>1. FIRE or EXPLOSION resulting in VISIBLE DAMAGE to any of the following structures containing safety systems or components or Control Room indication of degraded performance of those safety systems:<div><div>•</div>Containment<div>•</div>Fuel Handling Building<div>•</div>Reactor Auxiliary Building<div>•</div>Cooling Tower Areas</div></div></div> <div><div>HU4</div><div>FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>(1 or 2)</div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the duration has exceeded, or will likely exceed, the applicable time.</div><div>1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any of the following areas:<div><div>•</div>Containment<div>•</div>Fuel Handling Building<div>•</div>Reactor Auxiliary Building<div>•</div>Cooling Tower Areas</div></div><div>OR</div><div>2. EXPLOSION within the PROTECTED AREA.</div></div>			

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				
Toxic Gas			<div>HA5<div>Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s):</div><div>Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.</div><div>1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor.</div></div>	<div>HU5<div>Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div></div> <div><div>Emergency Action Level(s): (1 or 2)</div><div>1. Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.</div><div>OR</div><div>2. Report by St. Charles Parish for evacuation or sheltering of site personnel based on an offsite event.</div></div>

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 or Destructive Phenomena		<table><tr><th colspan="4">TABLE H1: Structures/Areas for HU6 and HA6</th></tr><tr><td colspan="4"></td></tr><tr><td colspan="4">Containment</td></tr><tr><td colspan="4">Fuel Handling Building</td></tr><tr><td colspan="4">Reactor Auxiliary Building</td></tr><tr><td colspan="4">Cooling Tower Areas</td></tr></table>	TABLE H1: Structures/Areas for HU6 and HA6								Containment				Fuel Handling Building				Reactor Auxiliary Building				Cooling Tower Areas				<div>HA6</div> <div>Natural or destructive phenomena affecting VITAL AREAS.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s): (1 or 2 or 3 or 4 or 5)</div> <div>1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by RED LIGHT on the seismic monitor panel</div> <div>AND</div> <div>b. Earthquake confirmed by any of the following:</div> <div><div>• Earthquake felt in plant</div><div>• National Earthquake Center</div><div>• Control Room indication of degraded performance of systems required for the safe shutdown of the plant.</div></div> <div>OR</div> <div>2. Tornado striking or high winds > 100 mph resulting in VISIBLE DAMAGE to any of the Table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.</div> <div>OR</div> <div>3. Flooding in any of the Table H1 areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems.</div> <div>OR</div> <div>4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.</div> <div>OR</div> <div>5. Vehicle crash resulting in VISIBLE DAMAGE to any of the Table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.</div>	<div>HU6</div> <div>Natural or destructive phenomena affecting the PROTECTED AREA.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>D</div></div> <div>Emergency Action Level(s): (1 or 2 or 3 or 4 or 5 or 6)</div> <div>1. Seismic event identified by any 2 of the following:</div> <div><div>• Seismic event confirmed by station seismic instrumentation</div><div>• Earthquake felt in plant</div><div>• National Earthquake Center.</div></div> <div>OR</div> <div>2. Tornado striking within PROTECTED AREA boundary or high winds > 100 mph.</div> <div>OR</div> <div>3. Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in any Table H1 area.</div> <div>OR</div> <div>4. Turbine failure resulting in casing penetration or damage to turbine or generator seals.</div> <div>OR</div> <div>5. Hurricane force winds (\geq 74 mph) expected to arrive on site in \leq12 hours as projected by the National Weather Service for a hurricane event.</div> <div>OR</div> <div>6. River water level at the intake structure > +27 FT MSL.</div>
			TABLE H1: Structures/Areas for HU6 and HA6																									
			Containment																									
			Fuel Handling Building																									
			Reactor Auxiliary Building																									
			Cooling Tower Areas																									

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 AC Power	<div>SG1</div> <div>Prolonged loss of all offsite and all onsite AC power to safety busses.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>1. a. Loss of all offsite and all onsite AC power to safety busses</div> <div>AND</div> <div>b. Either of the following:</div> <div><div>• Restoration of at least one safety bus in < 4 hours is not likely</div></div> <div>OR</div> <div><div>• Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs ≥ 700 degrees F</div></div>	<div>SS1</div> <div>Loss of all offsite and all onsite AC power to safety busses ≥ 15 minutes.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div> <div>1. Loss of all offsite and all onsite AC power to safety busses ≥ 15 minutes.</div>	<div>SA1</div> <div>AC power capability to safety busses reduced to a single power source ≥ 15 minutes such that any additional single failure would result in station blackout.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div> <div>1. a. AC power capability to safety busses reduced to a single power source ≥ 15 minutes</div> <div>AND</div> <div>b. Any additional single power source failure will result in station blackout.</div>	<div>SU1</div> <div>Loss of all offsite AC power to safety busses ≥ 15 minutes.</div> <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div> <div>1. Loss of all offsite AC power to safety busses ≥ 15 minutes</div>			
	<div>SG3</div> <div>Automatic trip and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.</div> <div><div>1</div><div>2</div><div></div><div></div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>1. a. An automatic trip failed to shutdown the reactor</div> <div>AND</div> <div>b. All manual actions do not shutdown the reactor as indicated by reactor power ≥ 5%</div> <div>AND</div> <div>c. Either of the following exist or have occurred due to continued power generation:</div> <div><div>• CET temperatures at or approaching 1200° F</div></div> <div>OR</div> <div><div>• Inability to maintain at least one steam generator level > 36.3% wide range.</div></div>	<div>SS3</div> <div>Automatic trip fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.</div> <div><div>1</div><div>2</div><div></div><div></div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>1. a. An automatic trip failed to shutdown the reactor</div> <div>AND</div> <div>b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by reactor power ≥ 5%.</div>	<div>SA3</div> <div>Automatic trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.</div> <div><div>1</div><div>2</div><div></div><div></div><div></div><div></div></div> <div>Emergency Action Level(s):</div> <div>1. a. An automatic trip failed to shutdown the reactor as indicated by reactor power ≥ 5%</div> <div>AND</div> <div>b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by reactor power < 5%.</div>				
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		<div><div>SS4</div><div>Loss of all vital DC power ≥ 15 minutes.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div></div> <div><div>Emergency Action Level(s):</div><div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div></div><div><div>1.</div><div>< 108 volts on all vital DC busses ≥ 15 minutes.</div></div></div>					
Loss of Annunciators		<div><div>SS6</div><div>Inability to monitor a SIGNIFICANT TRANSIENT in progress.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div></div> <div><div>Emergency Action Level(s):</div><div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div></div><div><div>1.</div><div><div>a.</div><div><div>Loss of > approximately 75% of the following ≥ 15 minutes:</div><div><div>Cabinets C, D, H, K, M, N, SA, SB annunciators</div></div></div></div><div><div>OR</div><div><div>Control Room safety system indication</div></div></div><div><div>AND</div><div><div>A SIGNIFICANT TRANSIENT is in progress.</div></div></div><div><div>AND</div><div><div>Compensatory indications are unavailable.</div></div></div></div></div>	<div><div>SA6</div><div>UNPLANNED loss of safety system annunciation or indication in the Control Room with either (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div></div> <div><div>Emergency Action Level(s):</div><div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div></div><div><div>1.</div><div><div>a.</div><div><div>UNPLANNED loss of > approximately 75% of the following ≥ 15 minutes:</div><div><div>Cabinets C, D, H, K, M, N, SA, SB annunciators</div></div></div></div><div><div>OR</div><div><div>Control Room safety system indication</div></div></div><div><div>AND</div><div><div>Either of the following:</div><div><div>A SIGNIFICANT TRANSIENT is in progress.</div></div></div><div><div>OR</div><div><div>Compensatory indications are unavailable.</div></div></div></div></div></div>	<div><div>SU6</div><div>UNPLANNED loss of safety system annunciation or indication in the Control Room ≥ 15 minutes.</div><div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div></div> <div><div>Emergency Action Level(s):</div><div><div>Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.</div></div><div><div>1.</div><div><div>UNPLANNED loss of > approximately 75% of the following ≥ 15 minutes:</div><div><div>a. Cabinets C, D, H, K, M, N, SA, SB annunciators</div><div><div>OR</div><div>Control Room safety system indication.</div></div></div></div></div></div>			

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						<div>SU7 RCS leakage. <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>Emergency Action Level(s): (1 or 2)</div> <div>1. Unidentified or pressure boundary leakage > 10 gpm</div> <div>OR</div> <div>2. Identified leakage > 25 gpm.</div>					
Loss of Communications	<div><table><tr><th>Table M1 Onsite Communications Methods</th><th>Table M2 Offsite Communications Methods</th></tr><tr><td>Plant radio system Plant paging system In-plant telephones Sound powered phones</td><td>All telephone lines (commercial and microwave) VOIP phones ENS</td></tr></table></div>					Table M1 Onsite Communications Methods	Table M2 Offsite Communications Methods	Plant radio system Plant paging system In-plant telephones Sound powered phones	All telephone lines (commercial and microwave) VOIP phones ENS	<div>SU8 Loss of all onsite or offsite communications capabilities. <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>Emergency Action Level(s): (1 or 2)</div> <div>1. Loss of all Table M1 onsite communications methods affecting the ability to perform routine operations</div> <div>OR</div> <div>2. Loss of all Table M2 offsite communications methods affecting the ability to perform offsite notifications.</div>	
Table M1 Onsite Communications Methods	Table M2 Offsite Communications Methods										
Plant radio system Plant paging system In-plant telephones Sound powered phones	All telephone lines (commercial and microwave) VOIP phones ENS										
Fuel Clad Degredation						<div>SU9 Fuel clad degradation. <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>Emergency Action Level(s):</div> <div>1. Reactor coolant sample activity value indicating fuel clad degradation > Technical Specification allowable limits</div> <div><ul style="list-style-type: none">> 60 μCi/gm DEI</div> <div>OR</div> <div><ul style="list-style-type: none">>1.0 μCi/gm DEI for more than 48 hours during one continuous time interval</div> <div>OR</div> <div><ul style="list-style-type: none">>100/Ē μCi/gm.</div>					
Inadvertent Criticality						<div>SU10 Inadvertent criticality. <div><div></div><div></div><div>3</div><div>4</div><div></div><div></div></div>Emergency Action Level(s):</div> <div>1. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.</div>					
Tech. Spec. Shutdown						<div>SU11 Inability to reach required operating mode within Technical Specification limits. <div><div>1</div><div>2</div><div>3</div><div>4</div><div></div><div></div></div>Emergency Action Level(s):</div> <div>1. Plant is not brought to required operating mode within Technical Specifications LCO Action Statement time.</div>					

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

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 $\geq 350^\circ\text{ F}$, $K_{eff} < .99$

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

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

Mode 6 = Refueling – RCS $< 140^\circ\text{ F}$, $K_{eff} < .95$, 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 also contained in the Basis section for each IC in the Basis Document.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. A decision maker's use of this Basis Document for assistance is not intended to delay the classification.

DEFINITIONS

The following definitions are taken from NEI 99-01 and the Waterford 3 Emergency Plan 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: A group of persons violently protesting station operations or activities at the site.

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

CONTAINMENT CLOSURE: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. Reference OP-901-131, Shutdown Cooling Malfunction, Attachment 7.1.

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

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

DEFINITIONS

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

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

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

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

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where IMMINENT timeframes are specified, they shall apply.

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

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

DEFINITIONS

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.

OWNER CONTROLLED AREA (OCA): The external area contiguous to the PROTECTED AREA extending outward to Entergy Louisiana, Inc. property lines.

PROJECTILE: An object directed toward a Nuclear Power Plant that could cause concern for its continued operability, reliability, or personnel safety.

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

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

SIGNIFICANT TRANSIENT: An UNPLANNED event involving one or more of the following: (1) automatic turbine runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) Safety Injection Activation, or (5) thermal power oscillations >10%.

STRIKE ACTION: A work stoppage within the PROTECTED AREA by a body of workers to enforce compliance with demands made on Entergy or its affiliates. The STRIKE ACTION must threaten to interrupt NORMAL PLANT OPERATIONS.

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

UNPLANNED: a parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

DEFINITIONS

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

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

VITAL AREAS: Any area which contains VITAL EQUIPMENT.

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU1

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Any release of gaseous or liquid radioactivity to the environment > 2 times the radiological effluent ODCM limits for ≥ 60 minutes.

Operating Mode Applicability: All

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

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

1. VALID reading on any of the following radiation monitors > the reading shown for ≥ 60 minutes:

MONITOR	CONC.	EFFLUENT RATE
CONDENSER EXHAUST WRGMPRM-IRE-0002, RE0002-4		1.51E+05 uCi/sec
FUEL HANDLING BUILDING EXHAUST PIG, GAS CHANNEL , PRM-IRE-5107A or B, RE5107A-1 or RE5107B-1	1.61E-02 uCi/cc	
FUEL HANDLING BUILDINGEXHAUST WRGM, PRM- IRE-3032, RE3032-4		2.25E+05 uCi/sec
PLANT STACK PIG GAS CHANNEL PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1	3.45E-03 uCi/cc	
PLANT STACK WRGM PRM-IRE- 0110, RE0110-4		1.51E+05 uCi/sec
¹ DRY COOLING TOWER SUMPS MONITOR, PRM-IRE-6775 or PRM- IRE-6776, RE6775-1 or RE6776-1	8.49E-04 uCi/ml	
¹ TURBINE BUILDING INDUSTRIAL WASTE SUMP MONITOR, PRM-IRE- 6778, RE6778-1	8.49E-04 uCi/ml	

¹Monitor reading not applicable if sump discharge is aligned to circulating water discharge.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU1

OR

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

OR

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates > 2 times the applicable values of the ODCM based limits from the Technical Requirements Manual (TRM) (Table A1) for ≥ 60 minutes.

<u>Table A1</u> <u>TRM Limits</u>		
	ALERT	UE
Gaseous Release		
Noble Gases: ≤ 500 mrem/yr whole body	1.00E+05	1000
Noble Gases: ≤ 3000 mrem/yr skin	6.00E+05	6000
I-131, I-133, H-3 and particulates with half-lives > 8 days: ≤ 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:

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

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU1

Waterford 3 incorporates features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of degradation in these features and/or controls.

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

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

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

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 60 minutes (EAL time limit) after an initial VALID reading on any of the applicable radiation monitors.

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

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

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.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU1

EAL #2

CAUTION

The Emergency Director shall make the declaration no later than 60 minutes (EAL time limit) after an initial VALID reading on any effluent monitor > 2 times the alarm setpoint established by a current radioactivity discharge permit.

Effluent monitors:

Plant Stack PIG A and B	PRM-IR-0100.1s and .2s
Plant Stack WRGM	PRM-IR-0110
FHB Exhaust PIG A and B	PRM-IR-5107 A and B
FHB Emergency Exhaust WRGM	PRM-IR-3032
Condenser Air Evacuation WRGM	PRM-IR-0002
Dry Cooling Tower Sump #1	PRM-IR-6775
Dry Cooling Tower Sump #2	PRM-IR-6776
Turbine Building Industrial Waste Sump	PRM-IR-6778
Circulating Water Discharge	PRM-IR-1900
Liquid Waste Management Discharge	PRM-IR-0647
Boron Management Discharge	PRM-IR-0627
Gaseous Waste Management Discharge	PRM-IR-0648

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

Continuous release permits are processed and retained by Chemistry for the plant stack, main condenser exhaust, Fuel Handling Building exhaust, dry cooling tower sumps and the Turbine Building industrial waste sump. The setpoints for these continuous release permits are the RM-11 high alarm setpoint for the monitor. The Chemistry shift technician can access these release permits (and setpoint values) as needed.

Historical release permits indicate that the NOUE value of 2 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range. If the monitor is at or exceeds the top of its indicated range, then refer to AA1.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU1

EAL #3

CAUTION

The Emergency Director shall make the declaration no later than 60 minutes (EAL time limit) after a confirmed grab sample analyses for gaseous or liquid releases indicating concentrations or release rates > 2 times the applicable values of the ODCM based limits from the Technical Requirements Manual (TRM) (Table A1).

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU2

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

UNPLANNED rise in plant radiation levels.

Operating Mode Applicability: All

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

1. a. UNPLANNED water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal as 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. VALID Area Radiation Monitor reading rise on any of the following:
 - CONTAINMENT AREA RADIATION MONITORS (PURGE ISOLATION), (ARM-IRE-5024S, 5025S, 5026S OR 5027S, RE5024-1, RE5025-1, RE5026-1 OR RE5027-1)
 - CONTAINMENT +46 STAIRS MONITORS, (ARM-IRE-5014 OR 5015, RE5014-1 OR RE5015-1)
 - REFUELING BRIDGE AREA RADIATION MONITOR (ARM-IRE-5013, RE5013-1)
 - 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)

OR

2. UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels

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

*Normal can be considered as the highest reading in the past 24 hours excluding the current peak value.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU2

Basis:

This IC addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in UNPLANNED 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.

EAL #1

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

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

For refueling events where the water level drops below the 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.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AU2

EAL #2

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an initial VALID full scale indication for area radiation monitors incapable of measuring 1000 times normal levels.

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

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

Initiating Condition – ALERT

Any release of gaseous or liquid radioactivity to the environment > 200 times the radiological effluent ODCM limits for ≥ 15 minutes.

Operating Mode Applicability: All

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

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

1. VALID reading on any of the following radiation monitors > the reading shown for ≥ 15 minutes:

MONITOR		EFFLUENT RATE
CONDENSER EXHAUST WRGM PRM-IRE-0002, RE0002-4		1.51E+07 uCi/sec
FUEL HANDLING BUILDING EXHAUST WRGM, PRM-IRE- 3032, RE3032-4		2.25E+07 uCi/sec
PLANT STACK WRGM PRM-IRE-0110, RE0110-4		1.51E+07 uCi/sec

OR

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

2. a. For Table A2 monitors: **EITHER** a VALID reading > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes **OR** a VALID reading \geq the Table A2 value for ≥ 15 minutes.

Table A2	
MONITOR	CONC.
BORON MANAGEMENT DISCHARGE PRM-IRE-0627	8.55E-02 uCi/ml
LIQUID WASTE MANAGEMENT DISCHARGE PRM-IRE-0647	8.55E-02 uCi/ml
¹ DRY COOLING TOWER SUMP #1 LIQUID MONITOR PRM-IRE-6775	4.20E-02 uCi/ml
¹ DRY COOLING TOWER SUMP #2 LIQUID MONITOR PRM-IRE-6776	4.20E-02 uCi/ml
¹ TURBINE BUILDING SUMP DISCHARGE LIQUID MONITOR PRM-IRE-6778	4.20E-02 uCi/ml
CIRCWATER DISCHARGE MONITOR PRM-IRE-1900	4.20E-02 uCi/ml
GASEOUS WASTE MANAGEMENT MONITOR PRMR-IRE-0648	2.99E+02 uCi/cc

¹Monitor reading not applicable if sump discharge is aligned to circulating water discharge.

OR

- b. For effluent monitors not listed in Table A2: VALID reading on any effluent monitor > 200 times the alarm setpoint established by a current radioactivity discharge permit for ≥ 15 minutes.

OR

3. Confirmed grab sample analyses for gaseous or liquid releases indicates concentrations or release rates > 200 times the applicable values of the ODCM based limits from the Technical Requirements Manual (TRM) (Table A1) for ≥ 15 minutes.

Table A1 TRM Limits		
	ALERT	UE
Gaseous Release		
Noble Gases: ≤ 500 mrem/yr whole body	1.00E+05	1000
Noble Gases: ≤ 3000 mrem/yr skin	6.00E+05	6000
I-131, I-133, H-3 and particulates with half-lives > 8 days: ≤ 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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

Basis:

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

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

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

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

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

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an initial VALID radiation monitor reading > the applicable monitor readings associated with EAL #1.

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

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

EAL #2

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an initial VALID effluent radiation monitor reading > 200 times the alarm setpoint established by a current radioactivity discharge permit or a Table A2 effluent radiation monitor reading \geq its associated value.

Effluent monitors:

Plant Stack PIG A and B	PRM-IR-0100.1s and .2s
Plant Stack WRGM	PRM-IR-0110
FHB Exhaust PIG A and B	PRM-IR-5107 A and B
FHB Emergency Exhaust WRGM	PRM-IR-3032
Condenser Air Evacuation WRGM	PRM-IR-0002
Dry Cooling Tower Sump #1	PRM-IR-6775
Dry Cooling Tower Sump #2	PRM-IR-6776
Turbine Building Industrial Waste Sump	PRM-IR-6778
Circulating Water Discharge	PRM-IR-1900
Liquid Waste Management Discharge	PRM-IR-0647
Boron Management Discharge	PRM-IR-0627
Gaseous Waste Management Discharge	PRM-IR-0648

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

Continuous release permits are processed and retained by Chemistry for the plant stack, main condenser exhaust, Fuel Handling Building exhaust, dry cooling tower sumps and the Turbine Building industrial waste sump. The setpoints for these continuous release permits are the RM-11 high alarm setpoint for the monitor. The Chemistry shift technician can access these release permits (and setpoint values) as needed.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA1

Historical release permits indicate that the Alert value of 200 times the radiation monitor setpoint established by the current permit may exceed the operating range of the monitor in some instances. For release permit monitors that have an associated WRGM (plant stack and Fuel Handling Building exhaust), the WRGM mid or high range uCi/cc channel may be used to determine whether or not the EAL value is exceeded. Other potentially affected monitors are listed in Table A2 with a corresponding value for the top of their digital indicating range.

EAL #3

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a confirmed grab sample analysis for gaseous or liquid releases indicating concentrations or release rates > 200 times the applicable values of the ODCM based limits from the TRM (Table A1).

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA2

Initiating Condition – ALERT

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

Operating Mode Applicability: All

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

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

OR

2. VALID alarm or reading > HIGH alarm limits on any of the following radiation monitors due to damage to irradiated fuel or loss of water level:
 - 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

Basis:

This IC addresses 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 an actual or substantial potential degradation in the level of safety of the plant.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA2

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

EAL #1

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. Depending on available level indication, the declaration may be based on indications of water makeup rate or decrease in Refueling Water Storage Pool level. Video cameras (Security or outage-related) may allow remote observation of level.

EAL #2

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

Increased ventilation monitor readings may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Increased background at the ventilation 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, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

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

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AA3

Initiating Condition – ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. Dose rate greater than 15 mR/hr in any of the following areas requiring continuous occupancy to maintain plant safety functions:
 - Main Control Room
 - CAS

Basis:

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

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

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.

Areas requiring continuous occupancy include the Main Control Room and the Central Alarm Station (CAS).

Initiating Condition – SITE AREA EMERGENCY

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

Operating Mode Applicability: All

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

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

1. VALID reading on any of the following radiation monitors > the reading shown for ≥ 15 minutes:
 - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate > $2.69\text{E}+08$ $\mu\text{Ci/sec}$
 - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate > $1.75\text{E}+08$ $\mu\text{Ci/sec}$
 - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate > $2.55\text{E}+08$ $\mu\text{Ci/sec}$

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 ≥ 60 minutes; or analyses of field survey samples indicate CDE Thyroid > 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 site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an initial VALID reading > the reading shown for radiation monitors listed in EAL #1.

The monitor list in EAL #1 includes monitors on all potential release pathways (plant stack, primary-secondary leak, fuel handling accident).

EAL #2

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

EAL #3

CAUTION

The Emergency Director shall make the declaration no later than 60 minutes (EAL time limit) after initial field survey results indicate closed window dose rates > 100 mR/hr and dose rates have not decreased below 100 mR/hr at or beyond the EAB.

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

AG1

Initiating Condition – GENERAL EMERGENCY

Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity > 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:** The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, the classification should be based on EAL #2 instead of EAL #1. Do not delay declaration awaiting dose assessment results.*

1. VALID reading on any of the following radiation monitors > the reading shown for ≥ 15 minutes:
 - CONDENSER EXHAUST WRGM (PRM-IRE-0002, RE0002-4) indicates release rate > $2.69\text{E}+09$ $\mu\text{Ci/sec}$
 - FUEL HANDLING BUILDING EXHAUST WRGM (PRM-IRE-3032, RE3032-4) indicates release rate > $1.75\text{E}+09$ $\mu\text{Ci/sec}$
 - PLANT STACK WRGM (PRM-IRE-0110, RE0110-4) indicates release rate > $2.55\text{E}+09$ $\mu\text{Ci/sec}$

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 ≥ 60 minutes; or analyses of field survey samples indicate CDE Thyroid > 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 site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an initial VALID reading > the reading shown for radiation monitors listed in EAL #1.

The monitor list in EAL #1 includes monitors on all potential release pathways (plant stack, primary-secondary leak, fuel handling accident).

EAL #2

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

EAL #3

CAUTION

The Emergency Director shall make the declaration no later than 60 minutes (EAL time limit) after initial field survey results indicate closed window dose rates > 1000 mR/hr and dose rates have not decrease below 1000 mR/hr at or beyond the EAB.

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):

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

1. RCS leakage results in the inability to maintain or restore level within Pressurizer or RCS level target band for ≥ 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after RCS leakage results in the inability to maintain or restore level within Pressurizer or RCS level target band.

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

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

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

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of RCS/reactor vessel inventory.

Operating Mode Applicability: Refueling (Mode 6)

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

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

1. UNPLANNED RCS/reactor vessel level drop as indicated by either of the following:
 - a. RCS/reactor vessel water level drop below the reactor vessel flange for ≥ 15 minutes when the RCS/reactor vessel level band is established above the reactor vessel flange.
 - OR**
 - b. RCS/reactor vessel water level drop below the RCS/reactor vessel level band for ≥ 15 minutes when the RCS/reactor vessel level band is established below the reactor vessel flange.
 - OR**
2. RCS/reactor vessel level cannot be monitored with a loss of RCS/reactor vessel inventory as indicated by an unexplained level rise in the containment sump or reactor drain tank.

Basis:

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

Refueling evolutions that 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, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the reactor vessel flange), warrants declaration of a NOUE due to the reduced RCS inventory that is available to keep the core covered.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

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

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) following either:

- a. Initial RCS/reactor vessel water level drop below the reactor vessel flange when RCS/reactor vessel level band is established above the reactor vessel flange.
- b. Initial RCS/reactor vessel water level drop below the RCS/reactor vessel level band when the RCS/reactor vessel level band is established below the reactor vessel flange.

This EAL 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, which is addressed 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 CA1 would be appropriate.

EAL #2

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU2

potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

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

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)

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

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

OR

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

Basis:

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

During refueling the level in the reactor vessel will normally be maintained above the reactor vessel flange. Refueling evolutions that decrease water level below the reactor vessel flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/reactor vessel temperatures depending on the time since shutdown.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU3

CAUTION

Using EAL #2 the Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a loss of all RCS temperature and RCS/reactor vessel level indication.

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

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU5

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

AC power capability to safety busses reduced to a single power source \geq 15 minutes such that any additional single failure would result in station blackout.

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

Emergency Action Level(s):

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

1. a. AC power capability to safety busses reduced to a single power source \geq 15 minutes

AND

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

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after AC power capability to safety busses has been reduced to a single power source and any additional single power source failure will result in a station blackout.

The condition indicated by this IC is the degradation of the offsite and onsite AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA5.

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

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for safety busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU6

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Loss of required DC power \geq 15 minutes.

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

Emergency Action Level(s):

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

1. < 108 volts on required vital DC bus \geq 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after indication of less than 108 volts on required vital DC bus.

This IC refers to loss of vital DC power from the 3A-DC, 3B-DC or 3AB-DC busses dependant upon designated protected train operability status.

The purpose of this IC and its associated EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations.

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

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

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Inadvertent criticality.

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

Emergency Action Level(s):

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

Basis:

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

This condition can be identified using the startup rate meter. The term “sustained” is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

Escalation would be by Emergency Director judgment.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CU8

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Loss of all onsite or offsite communications capabilities.

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

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

1. Loss of all Table C2 onsite communication methods affecting the ability to perform routine operations.

OR

2. Loss of all Table C3 offsite communication methods affecting the ability to perform offsite notifications.

Table C2 Onsite Communication Methods	Table C3 Offsite Communication Methods
Plant radio system Plant paging system In-plant telephones Sound powered phones	All telephone lines (commercial and microwave) VOIP phones ENS

Basis:

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

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

Initiating Condition – ALERT

Loss of RCS/reactor vessel inventory.

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

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

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

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

OR

2. RCS/reactor vessel level cannot be monitored for ≥ 15 minutes with a loss of RCS/reactor vessel inventory as indicated by an unexplained level rise in containment sump or reactor drain tank.

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 emergency classification level of an Alert.

EAL #1

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA1

EAL #2

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after the RCS/reactor vessel level is unable to be monitored with a loss of RCS/reactor vessel inventory as indicated by an unexplained level rise in containment sump or reactor drain tank.

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that 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.

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

Initiating Condition – ALERT

Inability to maintain plant in Cold Shutdown.

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 > Technical Specification cold shutdown temperature limit > the specified duration in Table C1.

Table C1 RCS Reheat Duration Thresholds		
RCS	Containment Closure	Duration
Intact (but not RCS reduced inventory)	N/A	60 minutes*
Not intact or RCS reduced inventory	Established	20 minutes*
	Not Established	0 minutes
*If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable.		

OR

Note: EAL #2 does not apply in solid plant conditions.

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

Basis:

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than the time durations listed in Table C1 (EAL time limit) for an unplanned event resulting in RCS temperature > Technical Specification cold shutdown temperature limit.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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

The RCS Reheat Duration Threshold table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when CONTAINMENT CLOSURE is established but RCS integrity is not established or RCS inventory is reduced (e.g., mid-loop operation). As discussed above, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

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

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

EAL #2

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

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

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA3

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CA5

Initiating Condition – ALERT

Loss of all offsite and all onsite AC power to safety busses \geq 15 minutes.

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

Emergency Action Level(s):

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

1. Loss of all offsite and all onsite AC power to safety busses \geq 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a loss of all offsite and all onsite AC power to safety busses.

Loss of all AC power compromises all plant safety systems requiring electric power including Shutdown Cooling, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

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

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for safety busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Radiation Levels / Radiological Effluent (Tab A) ICs.

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

Initiating Condition – SITE AREA EMERGENCY

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

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

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

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

1. With CONTAINMENT CLOSURE not established, RVLMS upper plenum level 0%.

OR

2. With CONTAINMENT CLOSURE established, Core Exit Thermocouples indicate superheat.

OR

3. RCS/reactor vessel level cannot be monitored ≥ 30 minutes with a loss of RCS/reactor vessel inventory as indicated by any of the following:
 - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) $> 10\text{R/hr}$
 - Erratic Source Range Monitor indication
 - Unexplained level rise in containment sump or reactor drain tank.

Basis:

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

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CS1

Escalation to a General Emergency is via CG1 or AG1.

EAL #3

CAUTION

The Emergency Director shall make the declaration no later than 30 minutes (EAL time limit) of the RCS/reactor vessel level being unable to be monitored with a loss of RCS/reactor vessel inventory as indicated in EAL #3.

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that 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 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

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 site specific monitor indication and possible alarm.

Initiating Condition – GENERAL EMERGENCY

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

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

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

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

1. a. Core Exit Thermocouples indicate superheat for ≥ 30 minutes.

AND

- b. Any of the following containment challenge indications:
 - CONTAINMENT CLOSURE not established
 - Explosive mixture inside containment
 - UNPLANNED rise in containment pressure

OR

2. a. RCS/reactor vessel level cannot be monitored with core uncover indicated by any of the following for ≥ 30 minutes:
 - Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) $> 10\text{R/hr}$
 - Erratic Source Range Monitor indication
 - Unexplained level rise in containment sump or reactor drain tank

AND

- b. Any of the following containment challenge indications:
 - CONTAINMENT CLOSURE not established
 - Explosive mixture inside containment
 - UNPLANNED rise in containment pressure

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 30 minutes (EAL time limit) after Core Exit Thermocouples initially indicated superheat and EAL 1.b. is met.

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

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include: mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining.

Analysis indicates that core damage may occur within an hour following continued core uncovering therefore, 30 minutes was conservatively chosen.

If CONTAINMENT CLOSURE is re-established prior to exceeding the 30 minute core uncovering time limit then escalation to GE would not occur.

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

EAL #2

CAUTION

The Emergency Director shall make the declaration no later than 30 minutes (EAL time limit) from the loss of the ability to monitor RCS/reactor vessel level with core uncovering indicated by any parameter listed in EAL 2.a. and a containment challenge as identified by any EAL 2.b indication.

COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

CG1

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.

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the refueling mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that 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.

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

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 site specific monitor indication and possible alarm.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) MALFUNCTION

Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

Damage to a loaded cask CONFINEMENT BOUNDARY.

Operating Mode Applicability: All

Example Emergency Action Level(s):

1. Damage to a loaded cask CONFINEMENT BOUNDARY.

Basis:

An Unusual Event in this IC is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated. This includes classification based on a loaded fuel storage cask CONFINEMENT BOUNDARY loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

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

FISSION PRODUCT BARRIER DEGRADATION

FISSION PRODUCT BARRIER DEGRADATION

FU1 – Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

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)

FA1 – Initiating Condition – Alert

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)

FS1 – Initiating Condition – Site Area Emergency

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)

FG1 – Initiating Condition – General Emergency

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

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

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 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.
- The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.

FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>		<u>Containment Barrier EALs</u>			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS		

1. Safety Function Status (FCB1)		1.Safety Function Status (RCB1)		1.Safety Function Status (CNB1)	
Core Heat Removal Safety Function NOT met	RCS Heat Removal Safety Function NOT met	Not Applicable	a. RCS Pressure Control Safety Function NOT met OR b. RCS Heat Removal Safety Function NOT met	Not Applicable	Containment Temperature and Pressure Control Safety Function NOT met
2. Primary Coolant Activity Level (FCB2)		2. RCS Leak Rate (RCB2)		2. Containment Pressure (CNB2)	
RCS Dose Equivalent Iodine > 300 µCi/gm as indicated by: a. Dose Rate at one foot from Primary Sample Panel > 950 mR/hr OR	Not Applicable	RCS leak rate > available makeup capacity as indicated by RCS Subcooling < 28°F	UNISOLABLE RCS leak > 44 gpm	a. Rapid unexplained drop in containment pressure following an initial rise in containment pressure	a. Containment pressure > 50 PSIA and rising OR b. Explosive mixture exists inside containment OR

FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>		<u>Containment Barrier EALs</u>			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS		

b. -4 RAB RADIO-CHEMISTRY LAB area radiation monitor (ARM-IRE-5020) > 125 mR/hr OR c. Chemistry sample results				OR b. Containment pressure or sump level response not consistent with LOCA conditions	c. 1. Containment pressure > 17.7 PSIA AND 2. LESS THAN one full train of Containment Spray operating (1750 gpm)
3. Core Exit Thermocouple Readings (FCB3)		3. SG Tube Rupture (RCB3)		3. Core Exit Thermocouple Readings (CNB3)	
≥ 1200 degrees F	≥ 700 degrees F	SGTR that results in an ECCS(SI) actuation	Not Applicable	Not Applicable	a. 1. Core exit thermocouples > 1200 degrees F AND

FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>	<u>Containment Barrier EALs</u>
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

					2. Restoration procedures not effective within 15 minutes OR b. 1. Core exit thermocouples >700 degrees F AND 2. RVLMS upper plenum level equal to 0% or LOWER AND 3. Restoration procedures not effective within 15 minutes
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FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>		<u>Containment Barrier EALs</u>			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

4. Reactor Vessel Water Level (FCB4)		4. Containment Radiation Monitoring (RCB4)		4. SG Secondary Side Release with P-to-S Leakage (CNB4)	
Not Applicable	RVLMS upper plenum level 0%	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr	Not Applicable	a. RUPTURED SG is also FAULTED outside of containment OR b.1. Primary-to Secondary leakrate > 10 gpm AND 2. UNISOLABLE steam release from affected SG to the environment	Not Applicable

FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY		SITE AREA EMERGENCY		ALERT		UNUSUAL EVENT	
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.		Loss or Potential Loss of ANY two barriers.		ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.		ANY Loss or ANY Potential Loss of Containment.	
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>		<u>Containment Barrier EALs</u>			
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS		

5. Containment Radiation Monitoring (FCB5)		5. Other Indications (RCB5)		5. Containment Isolation Failure or Bypass (CNB5)	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr	Not Applicable	Not Applicable	RCS pressure dropping due to primary relief not reseating	a. UNISOLABLE breach of containment AND b. Direct downstream pathway to the environment exists after containment isolation signal	Not Applicable
6. Emergency Director Judgment (FCB6)		6. Emergency Director Judgment (RCB6)		6. Containment Radiation Monitoring (CNB6)	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier		Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the RCS Barrier		Not Applicable	Containment High Range Radiation Monitor (ARM-IRE-5400 AS or

FISSION PRODUCT BARRIER DEGRADATION

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

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

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of ANY two barriers AND Loss or Potential Loss of third barrier.	Loss or Potential Loss of ANY two barriers.	ANY Loss or ANY Potential Loss of EITHER Fuel Clad or RCS.	ANY Loss or ANY Potential Loss of Containment.
<u>Fuel Clad Barrier EALs</u>		<u>RCS Barrier EALs</u>	<u>Containment Barrier EALs</u>
LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS

		ARM-IRE-5400 BS) > 4000 R/hr
		7. Emergency Director Judgment (CNB7)
		Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Containment Barrier

FISSION PRODUCT BARRIER DEGRADATION

Fuel Clad Barrier Emergency Action Levels:

The Fuel Clad Barrier consists of the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.

Safety Function Status (FCB1)

Loss:

Core Heat Removal Safety Function **NOT** met

Potential Loss:

RCS Heat Removal Safety Function **NOT** met

Basis:

Loss

Core Heat Removal Safety Function not met indicates significant superheating and core uncover and is considered to indicate loss of the Fuel Clad Barrier.

Potential Loss

RCS Heat Removal Safety Function not met indicates the ultimate heat sink function is under extreme challenge.

FISSION PRODUCT BARRIER DEGRADATION

Primary Coolant Activity Level (FCB2)

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 site specific value corresponds to 300 $\mu\text{Ci/gm}$ I-131 equivalent. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

There is no Potential Loss EAL associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

Fuel Clad Barrier Emergency Action Levels:

Core Exit Thermocouple Readings (FCB3)

Loss: Core Exit Thermocouple readings ≥ 1200 degrees F

Potential Loss: Core Exit Thermocouple readings ≥ 700 degrees F

Basis:

Loss

The Loss EAL of $\geq 1200^{\circ}$ F is consistent with NEI 99-01 and corresponds to significant superheating of the coolant.

Potential Loss

The Potential Loss setpoint of CET temperatures $\geq 700^{\circ}$ F is used as an indication of a loss of subcooling.

FISSION PRODUCT BARRIER DEGRADATION

Fuel Clad Barrier Emergency Action Levels:

Reactor Vessel Water Level (FCB4)

Loss: Not Applicable

Potential Loss: RVLMS upper plenum level 0%.

Basis:

There is no Loss EAL associated with this item.

The RVLMS value of 0% upper plenum level represents the lowest point that level can be measured in the system at 12.6" above the fuel alignment plate, corresponding to the closest monitored level to the top of active fuel.

FISSION PRODUCT BARRIER DEGRADATION

Fuel Clad Barrier Emergency Action Levels:

Containment Radiation Monitoring (FCB5)

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

Potential Loss: Not Applicable

Basis:

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

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

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 RCS barrier that appropriately escalates the emergency classification to a Site Area Emergency.

There is no Potential Loss EAL associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

Fuel Clad Barrier Emergency Action Levels:

Emergency Director Judgment (FCB6)

Any condition in the opinion of the Emergency 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 Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

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.

Safety Function Status (RCB1)

Loss: Not Applicable

Potential Loss:

- a. RCS Pressure Control Safety Function **NOT** met

OR

- b. RCS Heat Removal Safety Function **NOT** met

Basis:

There is no Loss EAL associated with this item.

Potential Loss a.

RCS Pressure Control Safety Function not met indicates an extreme challenge to the safety function derived from appropriate instrument readings.

Potential Loss b.

RCS Heat Removal Safety Function not met indicates the ultimate heat sink function is under extreme challenge.

FISSION PRODUCT BARRIER DEGRADATION

RCS Leak Rate (RCB2)

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

Potential Loss: UNISOLABLE RCS leak > 44 gpm.

Basis:

Loss

This 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.

Potential Loss

This EAL is based on the apparent inability to maintain normal liquid inventory within the RCS by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

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FISSION PRODUCT BARRIER DEGRADATION

RCS Barrier Emergency Action Levels:

SG Tube Rupture (RCB3)

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

Potential Loss: Not Applicable

Basis:

This EAL addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss EALs. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation (either automatic or manual) of ECCS (SI). This is consistent to the RCS leak rate barrier Potential Loss EAL.

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 associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

RCS Barrier Emergency Action Levels:

Containment Radiation Monitoring (RCB4)

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

Potential Loss: Not Applicable

Basis:

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

The radiation monitor reading is a value which indicates the release of reactor coolant to the containment.

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, fuel damage would also be indicated.

There is no Potential Loss EAL associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

RCS Barrier Emergency Action Levels:

Other Indications (RCB5)

Loss: Not Applicable

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

Basis:

There is no Loss EAL associated with this item.

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:

Emergency Director Judgment (RCB6)

Any condition in the opinion of the Emergency 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 Director in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

The Containment Barrier includes the containment building and 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.

Safety Function Status (CNB1)

Loss: Not Applicable

Potential Loss:

Containment Temperature and Pressure Control Safety Function **NOT** met

Basis:

There is no Loss EAL associated with this item.

Containment Temperature and Pressure Control Safety Function not met indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment.

Conditions leading to a Containment Temperature and Pressure Control Safety Function not met condition result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this threshold is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

FISSION PRODUCT BARRIER DEGRADATION

Containment Pressure (CNB2)

Loss:

- a. Rapid unexplained drop in containment pressure following an initial rise in containment pressure

OR

- b. Containment pressure or sump level response not consistent with LOCA conditions

Potential Loss:

- a. Containment pressure > 50 PSIA and rising

OR

- b. Explosive mixture exists inside containment

OR

- c. 1. Containment pressure > 17.7 PSIA

AND

- 2. LESS THAN one full train of Containment Spray operating (1750 gpm)

Basis:

Loss

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should increase as a result of mass and

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

Potential Loss a.

The site specific pressure is based on the containment design pressure.

Potential Loss b.

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists (refer to Severe Accident Management Guidelines Calculation Aid #7, Containment Challenge due to Hydrogen Combustion).

Potential Loss c.

This EAL represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fans, etc., 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 (CNB3)

Loss: Not Applicable

Potential Loss:

- a. 1. Core exit thermocouples >1200 degrees F

AND

2. restoration procedures not effective within 15 minutes

OR

- b. 1. Core exit thermocouples > 700 degrees F

AND

2. RVLMS upper plenum level equal to 0% or LOWER

AND

3. Restoration procedures not effective within 15 minutes

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) of core exit thermocouples > 1200 degrees F and restoration procedures not effective **OR** core exit thermocouples > 700 degrees F and RVLMS upper plenum level = to 0% or lower and restoration procedures not effective.

There is no Loss EAL associated with this item.

The conditions in these EALs represent an IMMEDIATE 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 RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

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

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

SG Secondary Side Release With Primary to Secondary Leakage (CNB4)

Loss:

- a. RUPTURED SG is also FAULTED outside of containment

OR

- b. 1. Primary-to-Secondary leakrate >10 gpm

AND

- 2. UNISOLABLE steam release from affected SG 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.

Users should realize that the two loss thresholds could be considered redundant. This was recognized during the development process. The inclusion of an EAL that uses Emergency Procedure commonly used terms like "RUPTURED and FAULTED" adds to the ease of the classification process and has been included based on this human factor concern.

This EAL results in an Unusual Event for smaller breaks that; (1) do not exceed the normal charging capacity EAL in RCS leak rate barrier Potential Loss, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss. For larger breaks, RCS barrier criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or UNISOLABLE secondary line breaks, this condition would exist in conjunction with RCS barrier conditions and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

Loss a.

This EAL addresses the condition in which a RUPTURED steam generator is also FAULTED. This condition represents a bypass of the RCS and containment barriers and is a subset of the second EAL. In conjunction with RCS leak rate barrier loss EAL RCB2, this would always result in the declaration of a Site Area Emergency.

FISSION PRODUCT BARRIER DEGRADATION

Loss b.

This EAL addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE 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., SG tube rupture with concurrent loss of off-site 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, 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 an UNISOLABLE release path to the environment. These minor releases are assessed using Abnormal Radiation Levels / Radiological Effluent ICs (TAB A).

There is no Potential Loss EAL associated with this item.

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

Containment Isolation Failure or Bypass (CNB5)

Loss:

- i. UNISOLABLE breach of containment

AND

- b. Direct downstream pathway to the environment exists after containment isolation signal

Potential Loss: Not Applicable

Basis:

This EAL addresses incomplete containment isolation that allows a direct release to the environment.

The use of the modifier “direct” in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period. 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 (CNB6)

Loss: Not Applicable

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

Basis:

There is no Loss EAL associated with this item.

CAUTION

NRC Information Notice 97-045 Supplement 1 identifies the potential for erratic indications from the Containment High Range Radiation Monitors (CHRRMs) as a result of Thermally Induced Currents (TIC) which may cause the CHRRM to read falsely high on a rapid thermal increase, and fail low intermittently on a rapid temperature decrease. The TICs induced in the Waterford CHRRM signal cable are anticipated to be negligible within 5 minutes. Because of this phenomenon, any trends or alarms on the CHRRMs should be validated by comparison to the containment low range/area radiation monitors and Air Monitoring Systems trends before actions are taken.

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 off-site protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.

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 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).

FISSION PRODUCT BARRIER DEGRADATION

Containment Barrier Emergency Action Levels:

Emergency Director Judgment (CNB7)

Any condition in the opinion of the Emergency 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 Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

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

Operating Mode Applicability: All

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

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Waterford 3 Security Shift Supervision

OR

2. A credible site specific security threat notification

OR

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

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under HA1, HS1 and HG1.

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

EAL #1

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

This EAL is based on the Safeguards Contingency Plan. The Safeguards Contingency Plan is based on guidance provided in NEI 03-12.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU1

EAL #2

This EAL is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of Unusual Event.

The determination of “credible” is made through use of information found in the Safeguards Contingency Plan.

EAL #3

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert via HA1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU2

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Unusual Event emergency classification level.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU4

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

Operating Mode Applicability: All

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

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

1. FIRE not extinguished within 15 minutes of Control Room notification or verification of a Control Room FIRE alarm in any of the following areas:

- Containment
- Fuel Handling Building
- Reactor Auxiliary Building
- Cooling Tower Areas

OR

2. EXPLOSION within the PROTECTED AREA.

Basis:

This IC addresses the magnitude and extent of FIRES or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

EAL #1

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a fire not extinguished in any of the areas identified in the EAL.

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the Control Room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

EAL #2

This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the EXPLOSION is sufficient for declaration.

The Emergency Director also needs to consider any security aspects of the EXPLOSION, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA4.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU5

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

Operating Mode Applicability: All

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

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

OR

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

Basis:

This IC is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect NORMAL PLANT OPERATIONS.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

This IC is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA5.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Natural or destructive phenomena affecting the PROTECTED AREA.

Operating Mode Applicability: All

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

1. Seismic event identified by any 2 of the following:

- Seismic event confirmed by station seismic instrumentation
- Earthquake felt in plant
- National Earthquake Center.

OR

2. Tornado striking within PROTECTED AREA boundary or high winds > 100 mph.

OR

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

TABLE H1: Structures/Areas for HU6 and HA6
Containment
Fuel Handling Building
Reactor Auxiliary Building
Cooling Tower Areas

OR

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

OR

5. Hurricane force winds (≥ 74 mph) expected to arrive on site in ≤ 12 hours as projected by the National Weather Service for a hurricane event.

OR

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

Basis:

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

EAL #1

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

For plants with operable seismic instrumentation, an earthquake of sufficient intensity such that the seismic switches of the plant are activated is an indication of a classifiable earthquake.

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 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.

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

EAL #2

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

Escalation of this emergency classification level, if appropriate, would be based on VISIBLE DAMAGE, or by other in plant conditions, via HA6.

EAL #3

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

Escalation of this emergency classification level, if appropriate, would be via HA6, or by other plant conditions.

EAL #4

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HU6

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via HU4 and HU5.

This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

Escalation of this emergency classification level, if appropriate, would be to HA6 based on damage done by PROJECTILES generated by the failure or in conjunction with a steam generator tube rupture. These latter events would be classified by the radiological (A) ICs or Fission Product Barrier (F) ICs.

EAL #5

This EAL 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 #6

This EAL 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

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Waterford 3 Security Shift Supervision.

OR

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

Basis:

NOTE: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on- site evacuation, dispersal or sheltering).

EAL #1

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OWNER CONTROLLED AREA. Those events are adequately addressed by other EALs.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA1

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes Independent Spent Fuel Storage Installations that may be outside the PROTECTED AREA but still in the OWNER CONTROLLED AREA.

EAL #2

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Initiating Condition -- ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency classification level.

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. OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown requires Control Room evacuation.

Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facilities may be necessary.

Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA4

Initiating Condition -- ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

- Containment
- Fuel Handling Building
- Reactor Auxiliary Building
- Cooling Tower Areas

Basis:

VISIBLE DAMAGE is used to identify the magnitude of the FIRE or EXPLOSION and to discriminate against minor FIRES and EXPLOSIONS.

The reference to structures containing safety systems or components is included to discriminate against FIRES or EXPLOSIONS in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the FIRE or EXPLOSION was large enough to cause damage to these systems.

The use of VISIBLE DAMAGE should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the EXPLOSION.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels/Radiological Effluent (A) ICs.

Initiating Condition -- ALERT

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

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

Basis:

Gases in a VITAL AREA can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBAs may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

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

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA5

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury.

Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunction (S), Fission Product Barrier Degradation (F) or Abnormal Radiation Levels / Radioactive Effluent (A) ICs.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

Initiating Condition -- ALERT

Natural or destructive phenomena affecting VITAL AREAS.

Operating Mode Applicability: All

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

NOTE: The RED LIGHT indicates that the design limit for the Operating Basis Earthquake (OBE) (0.05g horizontal or 0.033g vertical) has been exceeded.

1. a. Seismic event > Operating Basis Earthquake (OBE) as indicated by RED LIGHT on the seismic monitor panel

AND

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

OR

2. Tornado striking or high winds > 100 mph resulting in VISIBLE DAMAGE to any of the Table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.

OR

3. Flooding in any of the Table H1 areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment or Control Room indication of degraded performance of those safety systems.

OR

4. Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of any of the Table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.

OR

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HA6

5. Vehicle crash resulting in **VISIBLE DAMAGE** to any of the table H1 structures containing safety systems or components or Control Room indication of degraded performance of those safety systems.

TABLE H1: Structures/Areas for HU6 and HA6

Containment
Fuel Handling Building
Reactor Auxiliary Building
Cooling Tower Areas

Basis:

These EALs escalate from HU6 in that the occurrence of the event has resulted in **VISIBLE DAMAGE** to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by Control Room indications of degraded system response or performance. The occurrence of **VISIBLE DAMAGE** and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in these EALs to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction (S) ICs.

EAL #1

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

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

EAL #2

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

EAL #3

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

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

EAL #4

This EAL addresses the threat to safety related equipment imposed by PROJECTILES generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an ALERT in that the potential exists for actual or substantial potential degradation of the level of safety of the plant.

EAL #5

This EAL addresses vehicle crashes within the PROTECTED AREA that result in VISIBLE DAMAGE to VITAL AREAS or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

Initiating Condition – SITE AREA EMERGENCY

HOSTILE ACTION within the PROTECTED AREA.

Operating Mode Applicability: All

Emergency Action Level(s):

1. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Waterford 3 Security Shift Supervision.

Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Initiating Condition – SITE AREA EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

Initiating Condition – SITE AREA EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

1. a. Control Room evacuation has been initiated

AND

- b. Control of the plant cannot be established in accordance with OP-901-502, Evacuation of Control Room & Subsequent Plant Shutdown within 15 minutes

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a Control Room evacuation has been initiated and control of the plant cannot be established in accordance with OP-901-502.

The intent of this IC is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions such as reactivity control (ability to shutdown the reactor and maintain it shutdown), RCS inventory (ability to cool the core), and secondary heat removal (ability to maintain a heat sink).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director judgment. The Emergency Director is expected to make a reasonable, informed judgment within 15 minutes that the plant staff has control of the plant from the remote shutdown panel.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

HS3

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier Degradation (F) or Abnormal Radiation Levels/Radiological Effluent (A) EALs.

Initiating Condition – GENERAL EMERGENCY

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

Operating Mode Applicability: All

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

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

OR

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

Basis:

EAL #1:

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAs (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment 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 secondary heat removal (ability to maintain a heat sink).

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 and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the above initiating condition is not met.

EAL #2:

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool. At Waterford 3, the term “freshly off-loaded reactor core” refers to fuel that has been discharged from the core and stored in the spent fuel pool for a period of LESS THAN one year.

Initiating Condition – GENERAL EMERGENCY

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

Operating Mode Applicability: All

Emergency Action Level(s):

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

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

SYSTEM MALFUNCTION

SYSTEM MALFUNCTION

SU1

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Loss of all offsite AC power to safety busses \geq 15 minutes.

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level(s):

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

1. Loss of all offsite AC power to safety busses \geq 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after loss of all offsite AC power to safety busses.

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to safety busses.

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

SYSTEM MALFUNCTION

SU6

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

UNPLANNED loss of safety system annunciation or indication in the Control Room \geq 15 minutes.

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level(s):

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

1. UNPLANNED loss of > approximately 75% of the following \geq 15 minutes:

a. Cabinets C, D, H, K, M, N, SA, SB annunciators

OR

b. Control Room safety system indication.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an unplanned loss of > approximately 75% of the annunciators listed in the EAL or Control Room safety system indication.

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

Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

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

SYSTEM MALFUNCTION

SU6

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

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

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a SIGNIFICANT TRANSIENT is in progress during the loss of annunciation or indication.

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 or pressure boundary leakage was selected as it is observable with normal Control Room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

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

The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. Steam generator tube leakage is identified leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation (F) ICs.

SYSTEM MALFUNCTION

SU8

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

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 methods affecting the ability to perform routine operations

OR

2. Loss of all Table M2 offsite communications methods affecting the ability to perform offsite notifications.

Table M1 Onsite Communications Methods	Table M2 Offsite Communications Methods
Plant radio system Plant paging system In-plant telephones Sound powered phones	All telephone lines (commercial and microwave) VOIP phones ENS

Basis:

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

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

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.

- >60 $\mu\text{Ci/gm}$ DEI

OR

- >1.0 $\mu\text{Ci/gm}$ DEI for more than 48 hours during one continuous time interval

OR

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

Basis:

CAUTION

If basing the declaration on DEI being > 1.0 $\mu\text{Ci/gm}$, the Emergency Director shall make the declaration promptly after 48 hours (EAL time limit) of a continuous DEI value of > 1.0 $\mu\text{Ci/gm}$.

This IC is included because it is a precursor of more serious conditions and, as a result, is considered to be a potential degradation in the level of safety of the plant.

The EAL addresses coolant samples exceeding coolant Technical Specifications for transient iodine spiking limits and coolant samples exceeding coolant Technical Specifications for nominal operating iodine limits for the time period specified in the Technical Specifications.

Escalation of this IC to the Alert level is via the Fission Product Barriers (F).

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. UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Basis:

This IC addresses inadvertent criticality events. This IC indicates a potential degradation of the level of safety of the plant, warranting 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 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 Table (F), as appropriate to the operating mode at the time of the event.

Initiating Condition -- NOTIFICATION OF UNUSUAL EVENT

Inability to reach required operating mode within Technical Specification 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 operating mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a four hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate 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 the site Technical Specifications and is not related to how long a condition may have existed.

SYSTEM MALFUNCTION

SA1

Initiating Condition -- ALERT

AC power capability to safety busses reduced to a single power source \geq 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):

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

1. a. AC power capability to safety busses reduced to a single power source \geq 15 minutes

AND

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

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after AC power capability to safety busses has been reduced to a single power source such that any additional single failure would result in a station blackout.

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

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

SYSTEM MALFUNCTION

SA1

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for safety busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed.

SYSTEM MALFUNCTION

SA3

Initiating Condition -- ALERT

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

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

Emergency Action Level(s):

1. a. An automatic trip failed to shutdown the reactor as indicated by reactor power $\geq 5\%$

AND

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

Basis:

Manual trip actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to 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. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shutdown the plant.

Opening the A32 and B32 Bus Feeders to facilitate insertion of all CEAs requires declaration of a Site Area Emergency under SS3.

If manual actions taken at the reactor control console fail to shutdown the reactor, the event would escalate to a Site Area Emergency.

SYSTEM MALFUNCTION

SA6

Initiating Condition -- ALERT

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

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level(s):

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

1. a. UNPLANNED loss of > approximately 75% of the following \geq 15 minutes:

- Cabinets C, D, H, K, M, N, SA, SB annunciators

OR

- Control Room safety system indication

AND

b. Either of the following:

- A SIGNIFICANT TRANSIENT is in progress.

OR

- Compensatory indications are unavailable.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after an unplanned loss of > approximately 75% of the annunciators listed in the EAL **OR** Control Room safety system indication and EAL 1.b. conditions are met.

SYSTEM MALFUNCTION

SA6

This IC is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a SIGNIFICANT TRANSIENT.

Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

"Compensatory indications" in this context includes computer based information such as SPDS, QSPDS, COLSS, etc. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

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

SYSTEM MALFUNCTION

SA6

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a SIGNIFICANT TRANSIENT in progress during the loss of annunciation or indication.

SYSTEM MALFUNCTION

SS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of all offsite and all onsite AC power to safety busses \geq 15 minutes.

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level(s):

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

1. Loss of all offsite and all onsite AC power to safety busses \geq 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a loss of all offsite and all onsite AC power to safety busses.

Loss of all AC power to safety busses 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 to emergency busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

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

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for safety busses in the event diesels are lost, they are credited in this EAL. The EAL condition does not apply unless the TED also failed.

Escalation to General Emergency is via Fission Product Barrier Degradation (F) or IC SG1, "Prolonged loss of all offsite and all onsite AC power to safety busses."

Initiating Condition -- SITE AREA EMERGENCY

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

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

Emergency Action Level(s):

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

AND

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

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to IMMINENT loss or potential loss of both fuel clad and RCS.

Manual trip actions taken at the reactor control console are any set of actions by the Reactor Operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual trip actions are not considered successful if action away from the reactor control console is 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. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

SYSTEM MALFUNCTION

SS4

Initiating Condition -- SITE AREA EMERGENCY

Loss of all vital DC power \geq 15 minutes.

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

Emergency Action Level(s):

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

1. < 108 volts on all vital DC busses \geq 15 minutes.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after indication of less than 108 volts on all vital DC busses.

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

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

Escalation to a General Emergency would occur by Abnormal Radiation Levels/Radiological Effluent (A), Fission Product Barrier Degradation (F).

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):

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

1. a. Loss of > approximately 75% of the following \geq 15 minutes:

- Cabinets C, D, H, K, M, N, SA, SB annunciators

OR

- Control Room safety system indication

AND

b. A SIGNIFICANT TRANSIENT is in progress.

AND

c. Compensatory indications are unavailable.

Basis:

CAUTION

The Emergency Director shall make the declaration no later than 15 minutes (EAL time limit) after a loss of > approximately 75% of the annunciators listed in the EAL and EAL 1.b. and 1.c. are met.

This IC is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a SIGNIFICANT TRANSIENT.

SYSTEM MALFUNCTION

SS6

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

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

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU11 "Inability to reach required operating mode within Technical Specification limits."

A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Site specific indications needed to monitor safety functions necessary for protection of the public must include Control Room indications, computer generated indications and dedicated annunciation capability.

Indicators associated with safety systems are those indicators for reactivity control, core cooling, maintaining reactor coolant system integrity or maintaining containment integrity.

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

SYSTEM MALFUNCTION

SS6

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

SYSTEM MALFUNCTION

SG1

Initiating Condition -- GENERAL EMERGENCY

Prolonged loss of all offsite and all onsite AC power to safety busses.

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 all offsite and all onsite AC power to safety busses

AND

- b. Either of the following:

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

OR

- Continuing degradation of core cooling based on Fission Product Barrier monitoring as indicated by CETs ≥ 700 degrees F

Basis:

CAUTION

If making the declaration based on the restoration of at least one safety bus, then the Emergency Director shall make the declaration no later than 4 hours (EAL time limit) after the loss of all offsite and onsite AC power to safety busses.

Loss of all AC power to safety busses 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 to safety busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

SYSTEM MALFUNCTION

SG1

The likelihood of restoring at least one safety 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.

When temporary emergency diesels (TEDs) are used to supplement onsite AC power for safety 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 Director a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that loss or potential loss of Fission Product Barriers is IMMINENT?
2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

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

SYSTEM MALFUNCTION

SG3

Initiating Condition -- GENERAL EMERGENCY

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

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

Emergency Action Level(s):

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

AND

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

AND

- c. Either of the following exist or have occurred due to continued power generation:
 - CET temperatures at or approaching 1200° F

OR

- Inability to maintain at least one steam generator level > 36.3% wide range.

Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

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