



Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-3093
Tel 504-739-6660
Fax 504-739-6698
mchisum@entergy.com

Michael R. Chisum
Vice President - Operations
Waterford 3

W3F1-2015-0081

October 13, 2015

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

SUBJECT: Request for Additional Information (RAI) Clarification Regarding Adoption of National Fire Protection Association Standard NFPA 805 License Amendment Request (LAR) Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

- REFERENCES:
1. Entergy letter W3F1-2011-0074 "License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)", Waterford Steam Electric Station, Unit 3 dated November 17, 2011 [ML113220230]
 2. Entergy letter W3F1-2012-0005 "Supplemental Information in Support of the NRC Acceptance Review of Waterford 3 License Amendment Request to Adopt NFPA 805, Waterford Steam Electric Station, Unit 3" dated January 26, 2012 [ML12027A049]
 3. Entergy letter W3F1-2013-0048 "Supplement to NFPA 805 License Amendment Request (LAR) Waterford Steam Electric Station, Unit 3" dated December 18, 2013 [ML13365A325]
 4. NRC letter to Entergy dated July 13, 2015 "Request for Additional Information RE: License Amendment Request to Transition to National Fire Protection Association Standard 805 "(TAC NO. ME7602) [ML15182A346]
 5. NRC letter to Entergy dated July 21, 2015, "Request for Additional Information RE: License Amendment Request to Transition to National Fire Protection Association Standard 805" (TAC NO. ME7602) [ML15197A229]
 6. Entergy letter W3F1-2015-0057, "Responses to Request for Additional Information Regarding Adoption of National Fire Protection Association Standard NFPA 805 License Amendment Request (LAR) Waterford Steam Electric Station, Unit 3" dated August 31, 2015.

7. Entergy letter W3F1-2015-0078, "Revised Implementation Item Regarding Adoption of National Fire Protection Association Standard NFPA 805 License Amendment Request (LAR) Waterford Steam Electric Station, Unit 3" dated September 24, 2015.

Dear Sir or Madam:

By letter dated November 17, 2011, as supplemented by letters dated January 26, 2012, and December 18, 2013 (References 1 through 3 respectively), Entergy Operations, Inc. (Entergy), submitted a license amendment request (LAR) to transition its fire protection license basis at the Waterford Steam Electric Station, Unit 3, from paragraph 50.48(b) of Title 10 of the *Code of Federal Regulations* (10 CFR) to 10 CFR 50.48(c), "National Fire Protection Association Standard 805" (NFPA 805).

The LAR Supplement provided in Reference 3 represents changes to specified LAR Attachments and supporting calculations primarily as a result of performing extensive reanalysis utilizing only NRC-accepted methods. Two Requests for Additional Information letters were received on July 13, 2015 (Fire Modeling RAIs) and July 21, 2015 (Probabilistic Risk Analysis RAIs) via References 4 and 5. The responses to these RAIs were provided in Reference 6, with a revised implementation item included in Reference 7.

During a clarification call between the NRC and Entergy on October 1, 2015, Entergy agreed to expand the description of implementation item S2-22, as well as include additional detail in the response to FM RAI S01.h(ii).01 concerning main control room cabinet construction and modeling presented in Reference 6. The attachments contains the revised implementation item S2-22 and revised response to FM RAI S01.h(ii).01 which supersedes the previous response contained in Reference 6.

Additionally, a recent field walkdown confirmed that Hatch Cover 13 (HC-13) meets the requirements of a 3 hour fire barrier and transitioning NRC approval of Deviation 43 in Attachment K (Enclosure 2 of Reference 3) is not necessary. Attachment 3 contains the LAR impacts due to the revised disposition of Deviation 43.

There are no new regulatory commitments contained in this submittal. If you require additional information, please contact the Regulatory Assurance Manager, John Jarrell at 504-739-6685.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 13, 2015.

Sincerely,



MRC/AJH

Attachments: 1. Revised Implementation Item S2-22
2. Revised FM RAI S01.h(ii).01
3. LAR impacts of Deviation 43 revision

cc: Marc L. Dapas Regional Administrator U. S. Nuclear Regulatory Commission Region IV 1600 E. Lamar Blvd. Arlington, TX 76011-4511	RidsRgn4MailCenter@nrc.gov
NRC Senior Resident Inspector Waterford Steam Electric Station Unit 3 P.O. Box 822 Killona, LA 70066-0751	Frances.Ramirez@nrc.gov Chris.Speer@nrc.gov
U. S. Nuclear Regulatory Commission Attn: Mr. Michael Orenak Mail Stop 8-G9A Washington, DC 20555-0001	Michael.Orenak@nrc.gov
Louisiana Department of Environmental Quality Office of Environmental Compliance Surveillance Division P.O. Box 4312 Baton Rouge, LA 70821-4312	Ji.Wiley@LA.gov

ATTACHMENT 1

W3F1-2015-0081

Revised Implementation Item S2-22

Revised Implementation Item S2-22

Verify the validity of the reported change-in-risk subsequent to completion of all PRA-credited modifications, procedures updates, and implementation items matches the as-built, as-operated plant and that risk metrics do not exceed RG 1.174 risk acceptance guidelines. If the risk acceptance guidelines of RG 1.174 are not met, additional actions will be taken to restore the change-in-risk to meet the RG 1.174 risk acceptance guidelines. The model of record will be maintained and used to ensure future plant modifications are assessed via the change evaluation process and that change-in-risk continues to meet the RG 1.174 risk acceptance guidelines.

Additionally, the reported change-in-risk will include the following considerations:

1. Methods and guidance contained in NUREG/CR-7150 Volume 2 in addressing circuit failure probability (W3F1-2015-0015 PRA RAI S15 & W3F1-2015-0024 PRA RAI S17).
2. Assessment of SOKC contributions in order to represent the mean value CDF and LERF as described in Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant – Specific Changes to the Licensing Basis, Revision 2, dated May 2011 (W3F1-2015-0057PRA RAI S18.b.01)
3. Updated fire-modeling for secondary ignition impacts with Hot Gas Layer (HGL) development and Multi-Compartment Analysis (MCA) as described in response to FM RAI S01.b.01 (W3F1-2015-0057)
4. Updated fire-modeling for impacts due to re-assessment of the elevation of transient combustibles as presented in response to FM RAI S01.f.01 (W3F1-2015-0057)

ATTACHMENT 2

W3F1-2015-0081

Revised FM RAI S01.h(ii).01

Revised FM RAI S01.h(ii).01

NFPA 805, Section 2.4.3.3, states, in part, that the PRA approach, methods, and data shall be acceptable to the AHJ. LAR Section 4.5.1.2, "Fire Model Utilization in the Application," states, in part, that fire modeling was performed as part of the fire PRA development. In the supplement dated May 14, 2015, the licensee responded to FM RAI S01.h(ii) and explained that the electrical cabinet fires in the equipment area are grouped in one main control room (MCR) abandonment scenario, and that this scenario bounds electrical cabinet fires that propagate to adjacent cabinets. The licensee further stated that there are three electrical cabinets in the operator area of the MCR not included in this grouping; the individual scenarios involving these cabinets all lead to abandonment; and the results would be the same, regardless of fire propagation between cabinets.

The NRC staff determined that the revised Consolidated Model of Fire Growth and Smoke Transport analysis of MCR abandonment due to a loss of habitability does not include scenarios with cabinet fires that propagate to one or two adjacent cabinets. Provide a summary of an analysis to determine the time to MCR abandonment for propagating panel fires and the corresponding probability for abandonment, or provide technical justification for not considering propagating cabinet fire scenarios.

Waterford Response

The timing of MCR abandonment for loss of habitability is based on CFAST cases documented in PRA-W3-05-026 Revision 1, "Evaluation of the Unit 3 Control Room Abandonment Times at the Waterford Nuclear Station". The CFAST evaluation examined several different cases involving fire location and other factors such as HVAC and MCR boundary (doors open/closed).

For the MRC abandonment timing analysis, cabinet fires were represented by a single cabinet. This case was used as the basis for the abandonment timing for habitability. The MCR abandonment analysis examined the potential for a fire impacting more than one cabinet (PRA-W3-05-023, "Waterford Steam Electric Station 3 Main Control room Abandonment for Fire Initiating Events") and requiring MCR abandonment. The existing single panel evaluation for timing bounds both single and multiple panel fires based on the fire propagation guidance provided in Appendix S of NUREG/CR-6850 and considering the abandonment time currently utilized for loss of habitability and loss of control cases.

The cabinets in the MCR are solid metal wall enclosures abutted together. The design is for cables from the Cable Spreading Room to enter the cabinets from the floor which results in very few lateral penetrations. All control panels other than the Main Control Board (MCB) have one of two configurations. The first involves those with double walls and an observable air gap. For the cabinets where an air gap was not visually observed, either the exposed or exposing cabinet has substantial open ventilation at the top of the cabinet. Based on guidance from Appendix S of NUREG/CR-6850, it is appropriate to assume no fire spread for both of these cabinet configurations and the calculated abandonment time applies.

The cabinets composing the MCB that would result in abandonment due to loss of habitability are solid metal wall adjacent enclosures with some visible air gap separation. These cabinets have vents at the top of the rear face (approximately 0.5 sq ft) and at least two 1 inch diameter holes in the top of each cabinet. Though this configuration has aspects of both criteria in Appendix S for assuming no spread to adjacent cabinets, it does not unequivocally meet the guidance. Therefore the following additional justification is presented.

For the MCB cabinets, the initial fire would occur for 10 minutes prior to ignition of the second cabinet based on guidance given in Appendix S of NUREG/CR-6850 for the limiting configuration of single wall separation and cables in direct contact with the wall. This is conservative given the Waterford 3 MCB configuration of double wall interfaces (with indication of some visible air gaps) and very few instances of cables in contact with the walls. Using an assumed secondary ignition at 10 minutes after the initial cabinet fire begins, the fire in the exposed cabinet would have to grow to produce any sizeable increase in smoke or heat which would impact abandonment timing. The 10 minute secondary ignition time taken from Appendix S is conservative since it applies to single partition cabinets and the Waterford 3 configuration is double wall separation. Based on information contained in Appendix G of NUREG/CR-6850 for cabinet fires, the recommended time to reach the peak heat release rate (HRR) is 12 minutes. Even if significant smoke and/or heat is not evident in the exposed cabinet until 6 minutes after ignition (half the time to reach the peak HRR), the overall scenario time would be 16 minutes. The CFAST assessment in PRA-W3-05-026 leads to an average MCR abandonment time of 15 minutes after fire initiation. The effects from the exposed cabinet would not have a significant impact on habitability until after the current time that abandonment of the control room is postulated to occur. Therefore, the use of the single cabinet analysis appropriately represents the timing when conditions would lead to MCR abandonment. This is consistent with the current CFAST evaluation, and a separate assessment for abandonment times due to multiple cabinet fires based on propagation is not required.

ATTACHMENT 3

W3F1-2015-0081

LAR Impacts of Deviation 43 revision

Entergy - Attachment K - Existing Licensing Action Transition Licensing Actions

Licensing Action	Deviation-43 10CFR50 Appendix R Section III.G.2, lack of a 3-hr fire rating for floor hatch separating Fire Area RAB 25 and RAB 32.							
Required Post-Transition	No							
Licensing Basis	<p>Deviation request per WF3 Letter W3P84-0709, dated March 26, 1984, to the NRC provides the following justification for lack of a 3-hr fire rating for floor hatch separating Fire Area RAB25 and RAB 32.This deviation was approved by the NRC in NUREG 0787, Supplement No.8 "Safety Evaluation Report related to the operation of Waterford Steam Electric Station, Unit No. 3", Docket No. 50-382, Section 9.5.1.3(2), dated 12/1984.</p> <p><u>Justification</u></p> <p>a) A 3-hour fire protective coating applied to the RAB 32 (ceiling) side of the equipment hatch.</p> <p>b) Protection of floor side of hatch would be physically cumbersome to traffic flow during maintenance outages.</p> <p>c) Low probability of a flammable liquid spill in the vicinity of the due to strict administrative controls.</p> <p>d) There are no credible sources of ignition in this hatch vicinity.</p> <p>e) The design of the hatch is such that only limited seepage of a liquid past the hatch-to-floor fitting can occur, thus acting as a flame arrestor.</p> <p>f) Smoke detection coverage above and below the hatch provides adequate compensation for any fire hazard associated with seepage past the hatch fitting.In event a fire does occur prompt detection and suppression by the fire brigade is expected before any damage is caused to safety shutdown equipment (located away from the immediate hatch vicinity).</p> <p>g) Presence of portable fire extinguishers and standpipe hose stations ensure the ability to extinguish an exposure fire in this area in a timely manner.</p> <p>h) Administrative controls and low traffic volume limit the introduction of significant amounts of combustible materials.</p> <p>i) Ventilation exhaust system has sufficient capacity to allow adequate accessibility for damage control.</p> <p>j) Low combustible loading in the fire area.</p> <p>This deviation is no longer required because it has been subsequently verified that the floor hatch separating Fire Areas RAB 25 and RAB 32 has a 3-hr fire rating. Therefore this previously identified deviation will not be transitioned.</p>							
Fire Areas	<table><tr><th>ID</th><th>Description</th></tr><tr><td>RAB 25</td><td>Equipment Access Area</td></tr><tr><td>RAB 32</td><td>Pipe Penetrations: Auxiliary Component Cooling WaterPumps</td></tr></table>	ID	Description	RAB 25	Equipment Access Area	RAB 32	Pipe Penetrations: Auxiliary Component Cooling WaterPumps	
ID	Description							
RAB 25	Equipment Access Area							
RAB 32	Pipe Penetrations: Auxiliary Component Cooling WaterPumps							
References	<p><u>Document ID</u></p> <p>ECF91-028 Rev. 002 [All] - Combustible loading calculation for fire area RAB25</p> <p><u>Document ID</u></p> <p>ECF91-032 Rev. 002 [All] - Combustible loading calculation for fire area RAB32</p>							

Entergy - Attachment K - Existing Licensing Action Transition Licensing Actions

Licensing Action

Deviation-43 10CFR50 Appendix R Section III.G.2, lack of a 3-hr fire rating for floor hatch separating Fire Area RAB 25 and RAB 32.

Document ID

NUREG 0787, Supplement No.8 Rev. 12/1984 [Section 9.5.1.3(2)] - Safety Evaluation Report related to the operation of Waterford Steam Electric Station, Unit No. 3. Docket No. 50-382

Document ID

W3P84-0709 Rev. 03/26/1984 [Enclosure 1, RAB 25, Sect's A.1.b & D.2, 3 & 4] - Request for Relief from Certain Technical Requirements of Appendix R to 10CFR50

Chapter 3 References

Reference

3.11.2 Fire Barriers.

Changes to LAR Attachment C-1:

Fire Area ID: RAB 25 – Equipment Access Area

Remove Deviation 43 from Licensing Action Section

Fire Area ID: RAB 32 – Pipe Penetrations: Auxiliary Component Cooling Water Pumps

Remove Deviation 43 from Licensing Action Section

LAR Attachment C-1 Fire Area Transition

Fire Area ID: Compliance Basis:		Required Fire Protection Systems and Features	
RAB 32 - Pipe Penetrations: Auxiliary Component Cooling Water Pumps NFPA 805 4.2.4.2 Performance Based			
Required FP System(s)/Feature(s)	Description	Required By	Comments
Detection	RAB 32 Detection	EEEE/LA	None
Detection	RAB 32 Detection	Risk Criteria	None
Passive	1-hour fire resistant barrier on duct	EEEE/LA	None
Passive	3-hour protective coating on the hatch	EEEE/LA	None (Removed per letter W3F1-2015-0081)
Passive	Combustible Control	EEEE/LA	None
Passive	Design of the thermal cutoff on the valve		
		EEEE/LA	None