UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

August 7, 2017

Mr. Michael R. Chisum, Vice President
Entergy Operations, Inc.
17265 River Road
Killona, LA 70057-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC BASELINE INSPECTION REPORT 05000382/2017010

Dear Mr. Chisum:

On May 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Waterford Steam Electric Station, Unit 3. On May 31, 2017, the NRC inspectors discussed the preliminary results of this inspection with you and other members of your staff. On August 7, 2017, the NRC inspectors discussed the final results of this inspection with Mr. B. Lanka, Director of Engineering, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one violation of NRC requirements. This violation was determined to be Severity Level IV under the traditional enforcement process. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

From May 2016 to May 2017, the NRC issued three Severity Level IV traditional enforcement violations associated with impacting the ability of the NRC to perform its regulatory oversight function. As a result of the three Severity Level IV traditional enforcement violations, the NRC will not conduct Inspection Procedure 92723, “Follow Up Inspection for Three or More Severity Level IV Traditional Enforcement Violations in the Same Area in a 12-Month Period,” to assess your evaluation of these violations and review the adequacy of associated corrective actions.

If you contest the violations or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC resident inspector at the Waterford Steam Electric Station, Unit 3.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Thomas R. Farnholtz, Branch Chief
Engineering Branch 1
Division of Reactor Safety

Docket No. 50-382
License No. NPF-38

Enclosure:
Inspection Report 05000382/2017010
w/Attachment: Supplemental Information

cc: Electronic Distribution

WATERFORD STEAM ELECTRIC STATION, UNIT 3 – NRC BASELINE INSPECTION REPORT 05000382/2017010 – August 7, 2017

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ADAMS ACCESSION NUMBER: ML17219A723

☒ SUNSI Review: By: TFarnholtz	ADAMS: ☒ Yes ☐ No	☐ Non-Publicly Available ☒ Publicly Available	☒ Non-Sensitive ☐ Sensitive	Keyword: NRC-002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000382
License:	NPF-38
Report:	05000382/2017010
Licensee:	Entergy Operations, Inc.
Facility:	Waterford Steam Electric Station, Unit 3
Location:	17265 River Road Killona, LA 70057
Dates:	April 25 through May 31, 2017
Inspectors:	R. Latta, Senior Reactor Inspector, Lead G. George, Senior Reactor Inspector
Approved By:	Thomas R. Farnholtz Chief, Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY

IR 05000382/2017010; 04/25/2017 – 05/31/2017; Waterford Steam Electric Station, Unit 3; Inspection Procedure 71111.18, Plant Modifications

The inspection activities described in this report were performed between April 25, 2017, and May 31, 2017, by inspectors from the NRC's Region IV office. One violation of NRC requirements is documented in this report. This violation was determined to be Severity Level IV under the traditional enforcement process. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

Other Findings and Violations

- Severity Level IV. The inspectors identified a Severity Level IV, non-cited violation of 10 CFR 50.59, "Changes, Tests, and Experiments," Section (c)(1), which states, in part, that a licensee may make changes in the facility as described in the updated safety analysis report without obtaining a license amendment pursuant to 10 CFR 50.90 only if: (i) a change to the technical specifications incorporated in the license is not required, and (ii) the change, test, or experiment does not meet any of the criteria in paragraph (c)(2). Title 10 CFR 50.59, Section (c)(2)(viii), states, in part, that a licensee shall obtain a license amendment pursuant to Section 50.90 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would result in a departure from a method of evaluation described in the updated safety analysis report used in establishing the design bases or in the safety analyses. Specifically, since January 2017, the licensee revised updated final safety analysis report Section 4.3.3.3 to reflect RAPTOR-M3G as the current licensing basis fluence method without first obtaining a license amendment. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2017-04748.

  The inspectors determined that the failure to evaluate proposed changes to determine if prior NRC review was required in accordance with 10 CFR 50.59 was a performance deficiency. Using NRC Inspection Manual Chapter 0612, Appendix B, "Issue Screening," the inspectors determined that this performance deficiency had minor safety significance. In accordance with the NRC Enforcement Manual, violations of 10 CFR 50.59 are not processed through the Reactor Oversight Process significance determination process because this violation potentially impacted the ability of the NRC to perform its regulatory oversight function. Therefore, this violation was processed through traditional enforcement examples of Section 6.1 of the NRC Enforcement Policy. This violation was more than minor because there was a reasonable likelihood that the change would require NRC review and approval prior to implementation, similar to the more than minor example of a change in requirements in the NRC Enforcement Manual, Appendix E, "Minor Violations – Examples," dated September 9, 2013. Since the violation was associated with a performance deficiency of minor significance, the traditional enforcement violation was determined to be a Severity Level IV violation, consistent with the example in paragraph 6.1.d(2) of the NRC Enforcement Policy. (Section 1R18)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R18 Plant Modifications (71111.18)

a. Inspection Scope

From April 27 to May 31, 2017, the inspectors reviewed one permanent plant modification that affected risk-significant structures, systems, and components (SSCs). The inspectors reviewed a modification to the fluence methodology used to evaluate reactor vessel material fluence model for the Waterford Unit 3 Reactor Vessel Radiation Surveillance Program.

The inspectors reviewed the design and implementation of the modification. The inspectors verified that work activities involved in implementing the modification did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspectors verified that post-modification testing was adequate to establish the operability of the SSC as modified.

These activities constituted completion of one sample of permanent modifications, as defined in Inspection Procedure 71111.18.

b. Findings

Failure to Evaluate Departures from Approved Methodologies for Reactor Vessel Fluence

Introduction. The inspectors identified a Severity Level IV non-cited violation of 10 CFR 50.59, "Changes, Tests, and Experiments," for the licensee's failure to obtain a license amendment pursuant to 10 CFR 50.90 prior to implementing a change to the facility, as described in the updated final safety analysis report, if the change would result in a departure from the method of evaluation described in the updated final safety analysis report used in establishing the design bases or in the safety analysis. Specifically, since January 2017, the licensee failed to obtain a license amendment prior to implementing a change to their updated final safety analysis report, Section 4.3.3.3, which described reactor vessel fluence calculation methodology to evaluate reactor vessel material integrity.

Description. The licensee is permitted to make changes to the facility as described in the updated final safety analysis report without prior NRC approval, provided that these changes do not result in a departure from the method of evaluation described in the updated final safety analysis report. Title 10 CFR 50.59, "Changes, Tests, and Experiments," defines a *change* as a modification or addition to, or removal from, the facility or procedures that affects a design function, method of performing or controlling the function, or an evaluation that demonstrates that intended functions will be accomplished. Title 10 CFR 50.59 also defines a *departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety* as changing from method described in the FSAR to another method unless that

method has been approved by NRC for the intended application. Paragraph (c)(2)(viii) of 10 CFR 50.59 requires that a licensee shall obtain a license amendment prior to implementing a proposed change, test, or experiment if the change, test, or experiment would result in a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses.

Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments," states that the methods described in Nuclear Energy Institute NEI 96-07, "Guidelines for 10 CFR 50.59 Evaluations," Revision 1, are acceptable to the NRC staff for complying with the provisions of 10 CFR 50.59. Nuclear Energy Institute NEI 96-07, Section 4.3.8, states that licensees can use different methods without first obtaining a license amendment if those methods have been approved by the NRC for the intended application. NEI 96-07 further states that the licensee must determine whether the change constitutes a departure from a method of evaluation that would require prior NRC review. The inspectors determined that the licensee failed to evaluate a change to Section 4.3.3.3, "Reactor Vessel Fluence Calculation Model," of the station's updated final safety analysis report for a change that constitutes a departure from a method of evaluation that would require prior NRC review.

Specifically, on October 6, 2016, during the NRC review of the licensee's license renewal application, the NRC staff identified to the licensee that the analytical code used to evaluate reactor vessel fluence for the period of extended operation, RAPTOR-M3G, was not previously approved by the NRC. The staff determined that the computer code was a departure from the method of evaluation described in the updated final safety analysis report used in establishing the design bases or in the safety analysis. The previously approved methodology was the discrete ordinates transport code, or DORT, which was accepted for general use by the NRC in a Safety Evaluation Report for Westinghouse WCAP-14040, Revision 3.[1] The DORT code was incorporated into the Waterford Steam Electric Station, Unit 3 Operating License through License Amendment 196.

In January 2017, as part of a license renewal application review, the applicant performed a 10 CFR 50.59 evaluation and found that a license amendment request was not necessary to adopt RAPTOR-M3G as the current licensing basis fluence method. Consequently, during review of Engineering Change Package 68581, the staff found that updated final safety analysis report Section 4.3.3.3 was revised to reflect RAPTOR-M3G as the current licensing basis fluence method which is contrary to the fluence method used to develop the current 40-year pressure-temperature limits in technical specifications.

Through further investigation, the NRC staff identified that the licensee used the RAPTOR-M3G code in April 2015, prior to the obtaining NRC approval. At that time, the licensee commissioned Westinghouse to evaluate reactor vessel fluence to ensure that the limits of the heatup and cooldown curves of Technical Specification Figures 3.4-2 and 3.4-3 would not need updating prior to 32 effective-full-power-years (EFPY). The result of the evaluation, using RAPTOR-M3G, was documented in Westinghouse Report

[1] ADAMS Accession No. ML050120209, Safety Evaluation Report for Westinghouse WCAP-14040, Rev. 3, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves"

WCAP-17969-NP, Rev. 0.[2] This report was submitted to the NRC as required by 10 CFR Part 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements," on August 6, 2015.

As a result of these actions, the inspectors determined, on two separate occurrences, that the licensee failed to evaluate and obtain a license amendment, in accordance with 10 CFR 50.59 (c)(2)(viii), for a change to reactor vessel fluence methodology prior to implementing reactor vessel fluence evaluation methodology. This change in a departure from a method of evaluation described in the FSAR (as updated) used in establishing the design bases or in the safety analyses.

The inspectors informed the licensee of their determination and the licensee initiated Condition Report CR-WF3-2017-04748, to address this issue in the licensee's corrective action program.

Analysis. The inspectors determined that the failure to evaluate proposed changes to determine if prior NRC review was required in accordance with 10 CFR 50.59 was a performance deficiency. Using NRC Inspection Manual Chapter 0612, Appendix B, "Issue Screening," the inspectors determined that this performance deficiency had minor safety significance. In accordance with the NRC Enforcement Manual, violations of 10 CFR 50.59 are not processed through the Reactor Oversight Process significance determination process because this violation potentially impacted the ability of the NRC to perform its regulatory oversight function. Therefore, this violation was processed through traditional enforcement examples of Section 6.1 of the NRC Enforcement Policy. This violation was more than minor because there was a reasonable likelihood that the change would require NRC review and approval prior to implementation, similar to the more than minor example of a change in requirements in the NRC Enforcement Manual, Appendix E, "Minor Violations – Examples," dated September 9, 2013. Since the violation was associated with a performance deficiency of minor significance, the traditional enforcement violation was determined to be a Severity Level IV violation, consistent with the example in paragraph 6.1.d(2) of the NRC Enforcement Policy.

Enforcement. The inspectors identified a Severity Level IV, non-cited violation of 10 CFR 50.59, "Changes, Tests, and Experiments," Section (c)(1), which states, in part, that a licensee may make changes in the facility as described in the updated safety analysis report without obtaining a license amendment pursuant to 10 CFR 50.90 only if: (i) a change to the technical specifications incorporated in the license is not required, and (ii) the change, test, or experiment does not meet any of the criteria in paragraph (c)(2). Title 10 CFR 50.59, Section (c)(2)(viii), states, in part, that a licensee shall obtain a license amendment pursuant to Section 50.90 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would result in a departure from a method of evaluation described in the updated safety analysis report used in establishing the design bases or in the safety analyses. Contrary to the above, since January 2017, the licensee failed to obtain a license amendment pursuant to Section 50.90 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would result in a departure from a method of evaluation described in the updated safety analysis report. Specifically, the licensee revised

[2] ADAMS Accession No. ML15222A361, Westinghouse Report WCAP-17969-NP, Rev. 0 "Analysis of Capsule 83° from the Entergy Operations, Inc. Waterford Unit 3 Reactor Vessel Radiation Surveillance Program," April 2015

updated final safety analysis report Section 4.3.3.3 to reflect RAPTOR-M3G as the current licensing basis fluence method without first obtaining a license amendment. This finding was entered into the licensee's corrective action program as Condition Report CR-WF3-2017-04748. Because this violation was entered into the licensee's corrective action program and the violation was not repetitive or willful, this Severity Level IV violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2.a, of the Enforcement Policy: NCV 05000382/2017010-01, "Failure to Evaluate Departures from Approved Methodologies for Reactor Vessel Fluence."

4OA6 Meetings, Including Exit

Exit Meeting Summaries

On May 31, 2017, the inspectors presented the preliminary inspection results to Mr. M. Chisum, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On August 7, 2017, the inspectors presented the final inspection results to Mr. B. Lanka, Director of Engineering, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

L. Bergeron, Assistant Manager, Operations
D. Brenton, General Manager, Plant Operations
M. Chisum, Site Vice President
D. Frey, Manager, Site Projects
A. Harris, Senior Licensing Specialist, Regulatory Assurance
J. Jarrell, Manager, Regulatory Assurance
B. Lanka, Director, Engineering
D. Selig, Manager, Maintenance
M. Zamber, Senior Licensing Specialist, Regulatory Assurance

NRC Personnel

D. Morey, Branch Chief, Aging Management of Reactor Systems Branch
A. Patel, Nuclear Engineer, Nuclear Performance and Code Review Branch
F. Ramirez, Senior Resident Inspector
C. Speer, Resident Inspector

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000382/2017010-01	NCV	Failure to Evaluate Departures from Approved Methodologies for Reactor Vessel Fluence (Section 1R18)

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Section 1R18: Plant Modifications

Design Change Packages

Number	Title	Revision
EC No. 68581	Reactor Vessel Surveillance Program Material Testing	0

Correspondence

Number	Title	Revision Date
LTR-REA 16-117	Response to NRC Request for Information Regarding RAPTOR- M3G on Waterford Unit 3 License Renewal Application	1
W3FI-2015-0056	Submittal of Reactor Vessel Material Surveillance Program Capsule Test Results – Waterford Steam Electric Station	August 6, 2015
ML16027A155	Reactor Systems Branch Safety Evaluation Input Catawba Nuclear Station, Units 1 And 2, Measurement Uncertainty Recapture Power Uprate	January 28, 2016
ML16081A333	Catawba Nuclear Station, Units 1 And 2 – Issuance Of Amendments Regarding Measurement Uncertainty Recapture Power Uprate (CAC Nos. MF 4526 and MF4527)	April 29, 2016

Condition Reports (CRs)

CR-WF3-2016-06359	CR-WF3-2017-02520	CR-WF3-2017-04748