UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

June 05, 2025

EAF-RIV-2025-0090

Joseph Sullivan, Site Vice President
Entergy Operations Inc.
17265 River Road
Killona, LA 70057

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING, NOTICE OF VIOLATION, AND FOLLOW-UP ASSESSMENT LETTER; NRC INSPECTION REPORT 05000382/2025091

Dear Joseph Sullivan:

This letter provides you the final significance determination of the preliminary White finding discussed in our previous communication dated April 9, 2025, which included U.S. Nuclear Regulatory Commission (NRC) Inspection Report 05000382/2025090, Agencywide Documents Access and Management System (ADAMS) Accession No. ML25097A205. The finding involved the failure to properly develop and implement adequate maintenance instructions for the fuel linkage connection to the mechanical governor for emergency diesel generator (EDG) A.

At your request, a Regulatory Conference was held on May 21, 2025, to discuss your views on this issue. A summary of this meeting, which includes both the NRC and your presentation, was issued on May 29, 2025 (ML25142A367). During the conference, your staff described your assessment and evaluation as to how the event occurred, your assessment of the significance of the finding, and the corrective actions taken to resolve it. Overall, the information provided represented a basis for identifying the likely causal factors that contributed to the actual failure that occurred on October 9, 2024. However, uncertainty remains regarding the condition of the affected components and the corresponding potential impact of those conditions and components on the ability to support a design basis function for a 24-hour mission time should a design basis demand have occurred prior to October 7, 2024. The available information appears to support that a low initial cap screw preload condition was present prior to the test run on October 9, 2024, which corresponded to a successful runtime of 2.79 hours on that date prior to the cap screw backing out resulting in tripping of the EDG. It is not clear from the available information whether one or more incrementally higher initial cap screw preload condition(s) existing prior to October 7 could have corresponded to a successful runtime of greater than 2.79 hours but less than 24 hours prior to failure. Therefore, we conclude that a defensible and reasonable approach to bracket an exposure time is to account for 24 hours of actual demonstrated EDG runtime.

You and your staff provided additional insight into the failure of EDG A governor to fuel rack linkage. You agreed with the proposed performance deficiency and with the proposed violation. You also agreed with the overall timeline of the events leading to the failure of EDG A and when the washer was likely placed under the cap screw on the outboard side of the heim joint.

You and your staff presented a case for 3.53 days of exposure (inoperability of EDG A) based on laboratory testing that showed how the preload on the cap screw that holds the heim joint to the lever arm is lost due to a combination of fretting vibration and sweep movement of the lever arm, and then how vibration of the EDG results in the cap screw backing out. The laboratory representative discussed the test parameters and how engineering equivalency was used to demonstrate that the test setup was similar to EDG A. Video evidence from the testing showed a plausible scenario that illustrated how the cap screw could have lost preload and backed out of the connection, thus rendering EDG A unable to perform its safety function on October 9, 2024.

While the laboratory testing results presented were useful and provided important information, it was not conclusive to capture the full range of parameters of concern. The presentation provided a plausible conclusion; however, there are several factors that were not addressed that indicate this is one possible outcome and not necessarily the most likely one. First, the statement of engineering equivalency did not specifically address many different variables between the testing setup versus the actual EDG A configuration. The governor, lever arm, heim joint, and threaded arm connection to other control surfaces is difficult to model in an experimental mock-up. There are many variables that could impact the disassembly of the heim joint (i.e., loss of cap screw preload and backing out) such as direction of movement, frequency of movement, movement orientation, condition of bolt threads, condition of lever arm threads, and movement between the lever arm and the heim joint. Second, the data presented conveyed only two test runs of approximately a dozen that were performed in the lab. As stated in the meeting, these other test runs were stopped with the cap screw pre-load lost and the cap screw still remaining threaded into the lever arm despite vibrations for an hour to hours into the tests. That data conflicts with the conclusion that once the pre-load on the cap screw is lost it only takes minutes for the cap screw to completely back out of the joint due to vibration. This could mean that not all preload was lost, and the engine vibration alone results in the final loss of preload and in the cap screw coming out of the connection with the lever. Third, during discussion, no clear evidence was given for how the continued loss of preload on the bolt occurred once the corner of the lever arm was worn off from the interference with the heim joint chamfer.

Concerning the exposure time for EDG A, you and your staff presented that the offset of the governor linkage arm (1/4 inch offset) occurred during the January 2024 maintenance activity and resulted in increased interference which resulted in the loss of preload. Given the lack of clarity on whether the interference alone or the interference combined with engine vibration are what resulted in the cap screw backing out of the connection, the NRC Significance Determination Process usage rules support an exposure time of Time/2 from January through October 2024. However, since EDG A had 24 hours of run time elapsed during that window, it is reasonable to use an exposure time from the time after the first 24 hours of run time until the repairs were completed.

Through more recent discussions, we are aware of recent updates being proposed to the station’s fire PRA model as well as corresponding updates to the NRC SPAR PRA model, which could impact the risk evaluation for this issue. We have evaluated the proposed changes and determined that the cumulative impact of these considerations would not result in a decrease in total risk below the White significance threshold.

After considering the information developed during the inspection and the information presented at the regulatory conference, the NRC has concluded that the finding associated with the deficiency is appropriately characterized as White, a finding of low-to-moderate safety significance, and associated with the Mitigating Systems cornerstone. The NRC has also determined that a violation is associated with this finding.

You have 30 calendar days from the date of this letter to appeal the staff's determination of significance for the identified White finding. Such appeals will be considered to have merit only if they meet the criteria given in Inspection Manual Chapter 0609, Attachment 2 (ML24156A064). An appeal must be sent in writing to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 1600 East Lamar Blvd., Arlington, Texas 76011-4511.

The NRC has also determined that the failure to properly develop and implement adequate maintenance instructions for the fuel linkage connection to the mechanical governor for EDG A, is a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," as cited in the enclosed Notice of Violation (Notice), Enclosure 1. The circumstances surrounding the violation were described in detail in Inspection Report 05000382/2025090. In accordance with the NRC Enforcement Policy, the Notice is considered an escalated enforcement action because it is associated with a White finding.

The NRC has concluded that information regarding: (1) the reason for the violation; (2) the corrective actions that have been taken and the results achieved; and (3) the date when full compliance will be achieved is already adequately addressed on the docket in Inspection Report 05000382/2025090. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

As a result of our review of Waterford Steam Electric Station, Unit 3's performance, including this White finding, we have assessed the performance of Waterford Steam Electric Station, Unit 3, to be in the Regulatory Response column of the NRC's Action Matrix, effective the second quarter of 2025. Therefore, we plan to conduct a supplemental inspection using Inspection Procedure 95001, "Supplemental Inspection Response to Action Matrix Column 2 (Regulatory Response) Inputs," when your staff has notified us of your readiness for this inspection. This inspection procedure is conducted to provide assurance that the root cause and contributing causes of risk significant performance issues are understood, the extent of condition and the extent of cause are identified, and the corrective actions are sufficient to preclude repetition.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, the enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's ADAMS, accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the public without redaction.

If you have any questions concerning this matter, please contact John Dixon at (817) 200-1574.

Sincerely,

Signed by Monninger, John
on 06/05/25

John D. Monninger
Regional Administrator

Docket No. 05000382
License No. NPF-38

Enclosure:
Notice of Violation

cc w/ encl: Distribution via LISTSERV

WATERFORD STEAM ELECTRIC STATION, UNIT 3 – FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING, NOTICE OF VIOLATION, AND FOLLOW-UP ASSESSMENT LETTER; NRC INSPECTION REPORT 05000382/2025091 – DATED JUNE 05, 2025

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ADAMS ACCESSION NUMBER: **ML25149A059**

☒SUNSI Review:	ADAMS:	☐ Non-Publicly Available	☒ Non-Sensitive	Keyword:
By: ACR	☒ Yes ☐ No	☒ Publicly Available	☐ Sensitive	RGN4-001

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NOTICE OF VIOLATION

Entergy Operations Inc.
Waterford Steam Electric Station, Unit 3

Docket No. 05000382
License No. NFP-38
EAF-RIV-2025-0090

During an NRC inspection conducted from March 9, 2025, to April 3, 2025, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and that the instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. The licensee established work orders WO-00434438 (replacement of the rod ends), WO-00482368 (first replacement of the governor for the train A emergency diesel generator), WO-00579374 (second replacement of the governor for the train A emergency diesel generator), and WO-54199975 (reassembly of the rod end linkage after it was found disconnected), in part, to meet this requirement.

Contrary to the above, from June 2016 to February 4, 2025, the licensee failed to adequately develop and implement instructions, procedures, or drawings for an activity affecting quality of a type appropriate to the circumstances, and to include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically, the licensee’s work orders for the replacement of the rod ends, replacement of the governor, and reconnecting of the rod end joint for emergency diesel generator A failed to include adequate maintenance and post-maintenance inspection instructions. The instructions did not include appropriate quantitative or qualitative acceptance criteria for the installation of all required parts, to include tightness checks of adjacent connections and linkages and post-maintenance inspections to ensure that mechanical binding did not occur. This resulted in the failure of emergency diesel generator A to run.

This violation is associated with a White significance determination process finding.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved, is already addressed on the docket in Inspection Report 05000382/2025090. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a “Reply to a Notice of Violation, EAF-RIV-2025-0090” and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 1600 East Lamar Blvd., Arlington, Texas 76011-4511, and the NRC Resident Inspector at the Waterford Steam Electric Station, Unit 3, and email it to R4Enforcement@nrc.gov, within 30 days of the issuance of this Notice of Violation (Notice).

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html. Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Dated this 5th day of June 2025