



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

December 19, 2018

EA-18-008

Mr. Mark Bezilla
Site Vice President
FirstEnergy Nuclear Operating Co.
Davis-Besse Nuclear Power Station
5501 N. State Rte. 2, Mail Stop A-DB-3080
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION—NRC 95001 SUPPLEMENTAL INSPECTION REPORT 05000346/2018040 AND ASSESSMENT FOLLOWUP LETTER

Dear Mr. Bezilla:

On November 16, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection using Inspection Procedure 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs." On November 16, 2018, the NRC inspection team discussed the results of this inspection and the implementation of your corrective actions with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC performed this inspection to review your station's actions in response to a White Finding/Violation in the Mitigating System Cornerstone which was documented and finalized in NRC Inspection Report 05000346/2018010. (ML18068A523)

On August 23, 2018, you informed the NRC that your station was ready for the supplemental inspection. This supplemental inspection was conducted to provide assurance that the root causes and contributing causes of the events resulting in the White Finding/Violation were understood, that the extent of condition and extent of cause of any performance issues were identified, and that the corrective actions for any performance issues addressed the root causes and contributing causes and were sufficient to prevent recurrence.

The NRC determined your staff's evaluation identified the primary root cause of the White Finding to be preventative maintenance instructions for replacing the Auxiliary Feedwater Turbine Pump #1 inboard oil sight glass did not include dimensions or guidance for setting the required operational bands. The extent of condition was determined to potentially affect other critical equipment at the site including pumps, compressors, and generators that utilize an oil sight glass for proper oil level verification. The corrective actions to prevent recurrence were determined to be updates to the lubrication manual of each critical equipment and/or field calibration of oil levels to ensure that oil sight glass operational bands for each equipment were within the design or vendor requirements.

The NRC determined that completed or planned corrective actions addressed the performance issue that led to the White Finding/Violation. As a result, the NRC determined the performance at Davis Besse Nuclear Power Station to be in the Licensee Response Column of the Reactor Oversight Process Action Matrix as of the date of this letter. Therefore, the performance deficiency will be considered as an Action Matrix input until the end of the fourth quarter of 2018 in which the supplemental inspection exit meeting was conducted. I intend to conduct the regulatory performance meeting at a future date to discuss the performance deficiency and the licensee's proposed corrective actions with the licensee.

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 Title 10 of the *Code of Federal Regulations*, Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Dariusz Szwarc, Acting Branch Chief
Branch 2
Division of Reactor Projects

Docket No. 50-346
License No. NPF-3

Enclosure:
Inspection Report 05000436/2018040

cc: Distribution via LISTSERV®

Letter to Mark Bezilla from Dariusz Szwarc dated December 19, 2018.

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION—NRC 95001 SUPPLEMENTAL INSPECTION REPORT 05000346/2018040 AND ASSESSMENT FOLLOWUP LETTER

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Number: 50-346

License Number: NPF-3

Report Number: 05000346/2018040

Enterprise Identifier: I-2018-003-0023

Licensee: FirstEnergy Nuclear Operating Company (FENOC)

Facility: Davis-Besse Nuclear Power Station

Location: Oak Harbor, OH

Dates: November 13, 2018, through November 16, 2018

Inspector: A. Shaikh, Senior Reactor Inspector

Approved by: D. Szwarc, Acting Chief
Branch 2
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting a supplemental inspection at Davis-Besse Nuclear Power Station in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. The NRC and self-revealed findings, violations, and additional items are summarized in the table below. There were no licensee-identified non-cited violations documented in this report.

List of Findings and Violations

No findings or violations were identified.

Additional Tracking Items

None

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently, approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspector reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards."

OTHER ACTIVITIES—TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

In preparation for the inspection, the licensee performed a root cause analysis (RCA) to address the White Violation. This RCA was reviewed during the inspection to address the objectives of the IP. The inspector determined that the licensee's RCA was conducted to a level of detail commensurate with the significance of the problem and reached reasonable conclusions. The inspector also concluded that the licensee identified reasonable and appropriate corrective actions and that the corrective actions appeared to be prioritized commensurate with the safety significance of the issue.

The inspector reviewed the licensee's root causes, contributing causes, extent of condition, and extent of cause determinations developed in response to a White Violation of Title 10 *Code of Federal Regulations*, Part 50, Appendix B, Criteria V, "Instructions, Procedures, and Drawings," and an associated Technical Specification (TS) violation of TS 3.7.5, "Emergency Feedwater." The inspector assessed whether the licensee's corrective actions to address the root and contributing causes were sufficient to prevent recurrence. The highlights of the performance review and NRC's assessment are documented below.

(1) Problem Identification

- a) Licensee-identified issue during Auxiliary Feedwater Turbine Pump (AFPT) 1 quarterly test on September 13, 2017. High inboard bearing temperature (>220° Fahrenheit) caused AFPT 1 to be tripped by Operations.
- b) The AFPT 1 was inoperable and unavailable since the last satisfactory quarterly test on June 21, 2017. Missed opportunity to identify issue of improper bearing oil sight glass markings and hence insufficient bearing oil level was in 2001, 2003, and 2011.
- c) During the time (approximately 87 days) that the AFPT 1 was inoperable, the AFPT 2 was also inoperable during maintenance and testing on multiple occasions. This condition is prohibited by TS and could have resulted in prevention of safety function of a system needed to remove residual heat. The extended unavailability of AFPT 1 resulted in a Delta core damage frequency of 8.09E-07, which when coupled with qualitative evaluation of external events such as Fire and Seismic, resulted in a LOW safety significance and therefore, the WHITE Finding documented in Inspection Report 05000346/2018010. (ML18068A523)

(2) Root Cause, Extent-of-Condition, and Extent-of-Cause Evaluation

- a) Licensee utilized Failure Mode Analysis, TapRoot, Event Causal Factors Analysis, Equipment Failure Analysis and latent organizational weakness methodologies/tools in conducting the root cause evaluation.
- b) Level of detail was commensurate with the significance of the problem. Specifically, the failure mode analysis and supporting documents were sufficiently detailed to allow for an independent reviewer to assess the cause(s) and factors and basis for accepting or refuting potential causes.
- c) The root cause evaluation identified three prior opportunities to identify problems associated with sight glass markings. These missed prior opportunities included 2001 (lubrication manual improvement and establishment), 2003 (AFPT outboard sight glass replacement and inboard sight glass level marking repainting), and 2011 (condition report documenting outboard sight glass level set too high). The root cause evaluation also identified 17 incidents in industry involving general unawareness of the appropriate oil sight glass operating bands.
- d) Extent of condition looked at several systems in the plant that utilized sight glasses for verifying adequate bearing oil levels to ensure that sight glass level markings were in accordance with field-verified calibration or vendor-specified requirements. The extent of condition included safety-related or important-to-safety systems and comprised of a population of 22 systems that included a number of pumps, generators, and compressors. The extent of cause focused on reviewing other work instructions intended to translate design or original equipment manufacturer/Vendor requirements into work documents to ensure that the work documents accurately reflected the design or original equipment manufacturer/Vendor requirements. The extent of cause comprised of a population of 25 work packages associated with motor-operated valves, air-operated valves, electrical data, instrument and control, and radiation monitor data packages.
- e) The root cause evaluation appropriately considered all potential safety culture components (as described in NUREG-2165, "Safety Culture Common Language") for the root cause, extent of condition, and extent of cause.
- f) Not applicable because the licensee does not have a second white input in the same cornerstone of Mitigating Systems as does the WHITE Finding associated with the AFPT #1 Inboard Bearing Failure.

(3) Corrective Actions

- a) Licensee's corrective actions for the root cause included reviewing and updating the lubrication manual relative to design or vendor recommended values for oil level and calibrating sight glass oil levels to bearing oil ring submergence to arrive at appropriate sight glass markings. This calibration of the AFPT and other extent of condition pumps, compressors, and generators was performed via intrusive inspection. Other corrective actions included training and presentations offered to site engineering, management, and maintenance staff on the results of the root cause evaluation and expectations to prevent recurrence.

- b) Corrective actions for verifying oil levels are in accordance with design or vendor requirements to establish markings were appropriately prioritized for Systems, Structures, and Components. Corrective actions for updated lubrication manuals associated with all the extent of condition equipment were also prioritized appropriately in conjunction with above corrective actions. In addition, corrective actions addressing training needs for plant staff and management were conducted in parallel to the above corrective actions to ensure staff and management were cognizant of updated lubrication manuals and new correct oil sight glass level markings.
 - c) Schedule for implementing corrective actions has almost all actions implemented as of this inspection with the exception of spent fuel pumps, component cooling water pumps, and emergency diesel generator intake filters. Corrective actions associated with updating lubrication manuals for these components and oil sight glass level markings will be implemented after intrusive inspections can be conducted on these components in 2019.
 - d) Licensee assessment of effectiveness of corrective actions to prevent recurrence (CAPTR) included post maintenance testing following intrusive inspection and remarking of sight glass oil levels. In addition, satisfactory surveillance tests of pumps, compressors, and generators since implementation of corrected oil levels in the respective components provided quantified validation of CAPTR effectiveness. Other effectiveness reviews for corrective actions included: maintenance orders for sight glass marking verifications, outstanding sight glass marking tracking, and lubrication manuals update verification. Qualitative measures included a 90 percent or higher satisfactory response rate for knowledge surveys post CAPTR training.
 - e) The licensee’s corrective actions (both planned and implanted) adequately addressed the Notice of Violation of Title 10 *Code of Federal Regulations*, Part 50, Appendix B, Criteria V, “Instructions, Procedures, and Drawings,” and an associated TS violation of TS 3.7.5, “Emergency Feedwater.”
- (4) The licensee did not request credit for self-identification of an old design issue; therefore, the risk-significant issue was not evaluated against the IMC 0305 criteria for treatment of an old design issue.

INSPECTION RESULTS

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

Observation	IP 95001
<p>Assessment of licensee’s evaluation and corrective actions: The root cause assessment accurately described who identified the issue and under what conditions the issue was identified, how long the issue existed and the prior opportunities for identification. The root cause used a systematic methodology to identify the root and contributing causes and was conducted to a level of detail commensurate with the significance of the problem. The root cause evaluation included a consideration of prior occurrences of the problem and did a thorough review of prior operating experience that might have represented opportunities to identify earlier. The root cause evaluation addressed the extent of condition and the extent of cause of the problem. The root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture traits in NUREG–2165, “Safety Culture Common</p>	

Language,” referenced in IMC 0310, “Aspects Within Cross-Cutting Areas.” The appropriate corrective actions were specified for each of the root and contributing causes and have been effectively prioritized with consideration of significance and regulatory compliance. The corrective actions taken to address and preclude repetition of significant performance issues were prompt and effective. The Notice of Violation related to the supplemental inspection was adequately addressed.

The inspector determined that completed or planned corrective actions addressed the performance issue that led to the White Violation.

EXIT MEETINGS AND DEBRIEFS

The inspector confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On November 16, 2018, the inspector presented the Supplemental Procedure 95001 inspection results to Mr. M. Bezilla, Site Vice President, and other members of the licensee staff. The NRC, Region III, Division of Reactor Projects, Branch Chief, Mr. Dariusz Szwarc, will conduct the regulatory performance meeting at a future date to discuss the performance deficiency and the licensee’s proposed corrective actions with the licensee.
- During the exit meeting, the NRC discussed the performance at Davis-Besse Nuclear Power Station in accordance with IMC 0305, Section 10.01.a. The meeting was attended by the NRC Senior Resident Inspector at Davis-Besse and Site Vice President, and other senior licensee staff. The NRC and licensee discussed the issues related to the WHITE Violation that resulted in Davis-Besse moving to the Regulatory Response Column of the Action Matrix. This discussion included the causes, corrective actions, extent of condition and extent of cause, and other planned licensee actions for the issues identified as a result of the WHITE input. The criteria required for returning to the Licensee Response Column of the Action Matrix was discussed.

DOCUMENTS REVIEWED

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

- CR 17-09857-0003; Provide Tracking Mechanism That Will Address Slinger Ring Size Discrepancies for Component Cooling Water Pumps 1 and 2; 11/14/2018
- CR 2018-10195; NRC 95001: Oil Drop on HPI Pump #1 Motor Outboard Bearing Sight glass; 11/14/2018
- CR 2018-10187; NRC 95001: Extraneous Mark on AFPT #1 Inboard Bearing Sight glass; 11/14/2018
- Work Order 200730493; AFPT #1 Coupling Inspection; Revision 0
- CR 2017-09857; Review Responses to Extent of Cause Corrective Actions 27-31; 11/30/2018
- CR 2018-10251; NRC 95001; CR 2017-09857 Safety Culture Evaluation Weakness Action Not Tracked/Linked to CR RCE or 95001 Assessment; 11/15/2018
- Work Order 200730474; AFPT #1 Bearing Replacement; Revision 0
- Report 092017; BETA Laboratory Bearing Failure Analysis Report; 09/30/2017
- CR 2017-09857; #1 Auxiliary Feed Water Pump Turbine Inboard Bearing Damage Root Cause Evaluation Report; 07/18/2018