UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

December 9, 2021

EA-21-155

Mr. Terry Brown
Site Vice President
Energy Harbor Nuclear Corp.
Davis-Besse Nuclear Power Station
5501 N. State Rte. 2, Mail Stop A–DB–3080
Oak Harbor, OH 43449–9760

SUBJECT: DAVIS-BESSE - NRC INSPECTION REPORT (05000346/2021090); PRELIMINARY WHITE FINDING

Dear Mr. Brown:

This letter transmits the NRC's preliminary detailed risk evaluation of the safety significance of an inspection finding described in NRC inspection report 05000246/2021050. The finding has preliminarily been determined to be of low to moderate increased safety significance (i.e., White) that may require additional NRC inspections. As described in the previous inspection report, the finding involved the failure to select a suitable replacement part for the emergency diesel generator (EDG) speed switch. The speed switch design was not compatible with the station's 125/250 Volts direct current (Vdc) battery system. The switch design contained a subcomponent that was rated for 170 Vdc but was exposed to a voltage potential of 201 Vdc. The long-term exposure to this voltage potential caused the switch subcomponent to fail and, combined with another unrelated ground on the 125/250 Vdc system, resulted in failure of the switch. The failure of the switch resulted in the failure of the EDG to start during testing on September 4, 2020. This finding was assessed based on the best available information, using the applicable Significance Determination Process (SDP). The final resolution of this finding will be conveyed in separate correspondence.

The basis for the staff's significance determination is provided in the enclosure. This finding does not represent a current safety concern because the speed switches on both EDGs have been replaced and interim measures have been put in place until a new design is procured. However, the finding is also an apparent violation of NRC requirements and is being considered for escalated enforcement action in accordance with the Enforcement Policy, which can be found on the NRC's Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html.

In accordance with NRC Inspection Manual Chapter 0609, we intend to complete our evaluation using the best available information and issue our final determination of safety significance within 90 days of November 19, 2021, the date of the issuance of the special inspection report that initially documented the finding. The SDP encourages an open dialogue between the NRC staff and the licensee; however, the dialogue should not impact the timeliness of the staff's final determination.

Before we make a final decision on this matter, we are providing you with an opportunity to (1) attend a Regulatory Conference where you can present to the NRC your perspective on the facts and assumptions the NRC used to arrive at the finding and assess its significance, (2) submit your position on the finding to the NRC in writing, or (3) accept the finding as documented in the enclosure. If you request a Regulatory Conference, it should be held within 40 days of the receipt of this letter, and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. The focus of the Regulatory Conference is to discuss the significance of the finding and not necessarily the root cause(s) or corrective action(s) associated with the finding. If a Regulatory Conference is held, it will be open for public observation. If you decide to submit only a written response, such submittal should be sent to the NRC within 40 days of your receipt of this letter. If you decline to request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination, in that by not doing either, you fail to meet the appeal requirements stated in the Prerequisite and Limitation sections of Attachment 2 of NRC Inspection Manual Chapter 0609.

If you choose to send a response, it should be clearly marked as a "Response to An Apparent Violation; (EA-21-155)" and should include for the apparent violation: (1) the reason for the apparent violation or, if contested, the basis for disputing the apparent violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response should be submitted under oath or affirmation and may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. Additionally, your response should be sent to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Center, Washington, DC 20555-0001 with a copy to Laura Kozak, acting Branch Chief, U.S. Nuclear Regulatory Commission, Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532, within 40 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a Regulatory Conference.

Please contact Laura Kozak at 630-829-9604 and in writing within 10 days from the issue date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. The final resolution of this matter will be conveyed in separate correspondence.

Because the NRC has not made a final determination in this matter, no Notice of Violation is being issued for these inspection findings at this time. In addition, please be advised that the characterization of the apparent violation described in the enclosed inspection report may change as a result of further NRC review.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room and in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

Michelle Hayes Signed by Hayes, Michelle on 12/09/21

Michelle Hayes, Acting Deputy Director
Division of Reactor Safety

Docket No. 05000346
License No. NPF-3

Enclosure:
As stated

cc: Distribution via LISTSERV®

Letter to Terry Brown from Michelle Hayes dated December 9, 2021.

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Summary of the Detailed Risk Evaluation for the Davis-Besse Speed Switch Finding and Basis for Preliminary Significance Determination

Exposure Time – From late August 28 or early August 29, 2020, until September 7, 2020, Emergency Diesel Generator-2 (EDG) was unavailable; a "time window" of 9 days. This was when the engine was reasonably known to be in a failed condition. A factor of 9 days/365 days/year, or 0.0246 was applied to the annualized results.

Failure Mechanism – The failure of EDG-2, during a hypothetical demand, would be in the first few seconds of an attempted start of the engine. Consequently, the basic event in the Davis-Besse Standardized Plant Analysis Risk (SPAR) model basic event "Diesel Generator 1-2 Fails to Start" was set to "True." All other basic events were left at their nominal failure probabilities, except for the Mitigating Strategies equipment, which is discussed below.

Common Cause Implications – The two safety-related EDGs at Davis-Besse are similar in all respects, and the performance deficiency affected both engines. The potential for common cause failure was used in the NRC's evaluation. However, it is important to note that the Davis-Besse Station Blackout EDG was sufficiently different in design, vintage, and other material properties such that it was not part of the Common Cause Component Group with the two safety-related engines in the SPAR model.

Mitigating Strategies – The Mitigating Strategies equipment and response procedures (commonly and collectively known as FLEX) were credited in this analysis. Given that the performance deficiency affected the safety-related EDGs, and the accident sequences of concern were station blackout sequences that become *extended* losses of AC power scenarios, FLEX was included in the internal and external events analysis. However, the analyst adjusted the failure probabilities in the SPAR model for the FLEX basic events using a 3x multiplier to more accurately reflect the higher unreliability of portable equipment. The analyst also compared the FLEX unavailability/unreliability values used in the licensee Probabilistic risk assessment (PRA) model with the NRC SPAR model (using the 3x multiplier). No significant differences were identified.

Repair/Recovery of Failed Components – The diagnosis and replacement of the failed speed switch following the surveillance testing failure was three days in duration. The analyst concluded that the recovery of the failed speed switch during a postulated event, i.e., during a loss of offsite power that progresses to a station blackout for the non-conforming case was not credible.

Internal Events Risk – The dominant internal event accident sequence is a weather-related loss of offsite power sequence and contributes 46% of the total internal events risk. However, the overall results were dominated by fire and internal events only represented 12% of the total.

External Events Risk –

- Fire – Fire was the dominant contributor to the overall change in core damage frequency (CDF) result and was included quantitatively using the licensee's all hazard model. The dominant fire sequence are large damaging fires, or high energy arc faults, which cause a loss of offsite power (LOOP) with a subsequent loss of decay heat removal via the once-through steam generators with subsequent failure of makeup/high pressure injection (HPI) cooling. These scenarios contribute 54% of the fire risk. FLEX

equipment/strategies were credited in both the base and non-conforming cases. The analyst sampled the top 20 dominant cutsets and verified that bounding and/or unrealistic assumptions were not being used, however, further reviews or discussions with Energy Harbor staff may be needed to either confirm or refute this assumption.

- Tornados/High Winds and External Flooding – External flooding or tornados leading to a LOOP, though credible, was determined to be several orders of magnitude less frequent than the LOOP values used in the internal events model. No further analysis was performed.

- Seismic – Seismic-induced events were quantified using the licensee's all hazard model, though they were not a significant contributor to the overall result.

Uncertainty – With all risk evaluations, there are both aleatory (randomness) and epistemic (lack of knowledge) uncertainties. The aleatory uncertainty was assessed using the Davis-Besse SPAR model. The 5% and 95% values for the consolidated results (both internal and external events) were 9E-7/year to 4E-6/year. The remaining epistemic uncertainties with the results were centered on the fire results generated from the licensee's model. Specifically, it was unknown at the time of completion of the risk analysis whether substantial conservatism were present in the fire model, though some efforts had been taken to address this question as described above.

Item of Merit – The risk contribution for the two most commonly used items of merit, delta-CDF and delta large early release frequency (LERF), were quantified in the analysis. Delta-CDF remained the item of merit.

Consolidated Results –

	Base Case	Non-Conforming Case	Delta Risk (change in CDF)
Internal Events (NRC Results)	1.3E-7	3.6E-7	2.2E-7
Seismic (Licensee Results)	3.1E-7	3.4E-7	3.2E-8
Fire (Licensee Results)	1.3E-6	2.9E-6	1.6E-6
Total =	**1.7E-6**	**3.6E-6**	**1.9E-6**

The quantitative and qualitative inputs described above support the treatment of this finding as low to moderate safety significance (i.e., White).