



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 12, 2021

Mr. John A. Krakuszeski
Site Vice President
Brunswick Steam Electric Plant
Duke Energy Progress, LLC
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT – CLOSEOUT OF BULLETIN
2012-01, “DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM”

Dear Mr. Krakuszeski:

The U.S. Nuclear Regulatory Commission (NRC) staff has verified that Duke Energy Progress, LLC (the licensee) had provided the necessary information requested in the subject bulletin for Brunswick Steam Electric Plant (Brunswick). The purpose of this letter is to inform you that NRC staff has completed its review of this information and has closed out this bulletin for Brunswick.

Background

The NRC issued Bulletin (BL) 2012-01: Design Vulnerability in Electric Power System, dated July 27, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12074A115) to all holders of operating licenses and combined licenses for nuclear power reactors, except those who have permanently ceased operation and have certified that fuel has been removed from the reactor vessel. The bulletin requested information about each facility’s electric power system design that would allow the NRC staff to verify the system’s capability to address open phase conditions. Specifically, the NRC requested licensees to provide the following information:

- A description of how the protection scheme for engineered safety features buses (Class 1E for current operating plants or non-Class 1E for passive plants) is designed to detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on offsite power circuits or another power source; and
- A description of the operating configuration of engineered safety features buses (Class 1E for current operating plants or non-Class 1E for passive plants) at power (i.e., normal operating condition).

Brunswick Responses and Industry Resolution

By letter dated October 24, 2012 (ADAMS Accession No. ML12310A060), the licensee provided its response to BL 2012-01 for Brunswick. By letter dated January 31, 2014 (ADAMS Accession No. ML14043A169), the licensee provided supplemental information for this facility in response to an NRC staff request for additional information issued on December 20, 2013 (ADAMS Accession No. ML13351A314).

By letters dated October 9, 2013, and March 16, 2015 (ADAMS Accession Nos. ML13333A147 and ML15075A454, respectively), the Nuclear Energy Institute (NEI) submitted a voluntary industry initiative to address open phase conditions at nuclear power plants. The NEI letter dated March 16, 2015, stated, in part: “The initiative is a formal commitment by the companies that operate nuclear power plants to follow a specific policy or plan of action. The initiative calls for a proactive plan and schedule for addressing potential design vulnerabilities to the open phase condition.”

To evaluate the adequacy of the open phase isolation systems designs, the NRC staff issued Temporary Instruction (TI) 2515/194, “Inspection of the Licensees’ Implementation of Industry Initiative Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems (NRC Bulletin 2012-01),” dated October 31, 2017 (ADAMS Accession No. ML17137A416), which provided temporary inspection instructions for its staff to verify that licensees appropriately implemented the NEI voluntary industry initiative dated March 16, 2015. The NRC staff piloted the use of TI 2515/194 by inspecting four nuclear power plants with four distinct open phase isolation system designs. A summary of the NRC staff’s preliminary observations and issues needing additional clarity were discussed with industry representatives in two public meetings conducted on September 19, 2018, and October 17, 2018. The meeting summaries can be found in ADAMS under Package Accession Nos. ML18268A342 and ML18309A226, respectively.

By letter dated June 6, 2019 (ADAMS Accession No. ML19163A176), NEI submitted Revision 3 of the voluntary industry initiative to include an option for plants to perform a risk evaluation under certain boundary conditions to support manual response to an open phase condition. NEI also submitted NEI 19-02, “Guidance for Assessing Open Phase Condition Implementation Using Risk Insights” on June 20, 2019 (ADAMS Accession No. ML19172A086). On August 18, 2020, the NRC staff issued Revision 2 of TI 2515/194 (ADAMS Accession No. ML20230A328), which provided temporary inspection instructions for the purpose of verifying that licensees appropriately implemented Revision 3 of the NEI voluntary industry initiative. The revision accounted for changes reflected in Revision 3 of the NEI voluntary initiative.

NRC Staff Evaluation of Brunswick Response

In October 2019, the NRC staff performed inspections at Brunswick using TI 2515/194 dated October 31, 2017. In March 2021, the NRC staff performed inspections at Brunswick using TI 2515/194 Revision 2. These inspections at Brunswick were performed to verify the licensee’s implementation of the voluntary industry initiative at this facility. To address the open phase condition design vulnerability issue at this facility, the licensee implemented open phase isolation system plant modifications, which provide detection and alarm in the control room, and necessary plant procedures that allow operators to diagnose and take manual action to mitigate an open phase condition. The NRC inspection reports listed below document the results of the TI 2515/194 inspections.

- Brunswick Steam Electric Plant – Temporary Instruction 2515/194 Inspection Report 05000325/2019012 and 05000324/2019012, dated November 20, 2019 (ADAMS Accession No. ML19324D085)
- Brunswick Steam Electric Plant – Integrated Inspection Report 05000324/2021001 and 05000325/2021001, dated May 14, 2021 (ADAMS Accession No. ML21134A126)

Conclusion

The NRC staff reviewed the information submitted by the licensee and the results of the TI 2515/194 inspections for Brunswick. No findings or exceptions were identified. Based on this review, the NRC staff concludes that the licensee provided the necessary information requested in BL 2012-01 and has completed the implementation of its open phase isolation system. Therefore, the NRC staff closes BL 2012-01 for Brunswick.

If you have any questions, please contact me at 301-415-8480 or Andrew.Hon@nrc.gov.

Sincerely,

/RA/

Andrew Hon, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos.: 50-325
50-324

cc: Listserv

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2012-01, “DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM”
DATED OCTOBER 12, 2021

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