



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

October 27, 2021

Mr. Tom Ray
Site Vice President
Duke Energy Carolinas, LLC
12700 Hagers Ferry Road
Huntersville, NC 28078-8985

SUBJECT: MCGUIRE NUCLEAR STATION UNITS 1 AND 2 – CLOSEOUT OF BULLETIN
2012-01, "DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM"
(EPID L-2017-CRS-0063)

Dear Mr. Ray:

The purpose of this letter is to inform you that the U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of Duke Energy Carolinas, LLC (the licensee) responses to NRC's Bulletin (BL) 2012-01, "Design Vulnerability in Electric Power System," dated July 27, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12074A115), for McGuire Nuclear Station Units 1 and 2 (McGuire), and has closed out BL 2012-01 for McGuire.

The NRC issued BL 2012-01 on July 27, 2012, to all holders of operating licenses and combined licenses for nuclear power reactors, except those who have ceased operation permanently and have certified that fuel has been removed from the reactor vessel. The Bulletin requested information about each facility's electric power system designs that would allow the NRC staff to verify the system's capability to address open phase conditions. Specifically, the NRC requested licensees to:

- describe 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 a credited offsite power circuits or another power source; and
- describe 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).

The above information was requested to confirm that licensees comply with 10 CFR 50.55a(h)(2) "Protection systems", 10 CFR 50.55a(h)(3) "Safety systems", and Appendix A to 10 CFR Part 50, GDC 17 "Electric Power Systems", or principal design criteria specified in the updated final safety analysis report.

By letter dated October 25, 2012 (ADAMS Accession No. ML12307A018), the licensee provided its response to BL 2012-01 for McGuire. By letter dated January 30, 2014 (ADAMS Accession ML14043A112), 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 the purpose of verifying 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.

In October 2019, the NRC staff performed inspections at McGuire using TI 2515/194 dated October 31, 2017. In December 2020, the NRC staff performed inspections at McGuire using TI 2515/194 Revision 2. These inspections at McGuire 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.

- McGuire Nuclear Station – Temporary Instruction 2510 cfr 15/194 Inspection Report 05000369/2019011 and 05000370/2019011, dated November 26, 2019 (ADAMS Accession No. ML19330D480)
- McGuire Nuclear Station – Integrated Inspection Report 05000369/2020004 and 05000370/2020004, dated January 26, 2021 (ADAMS Accession No. ML21026A254)

The NRC staff reviewed the information submitted by the licensee and the results of the TI 2515/194 inspections for McGuire. No findings or exceptions were identified. Based on the

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above, the NRC staff concludes that the licensee provided the necessary information requested in BL 2012-01 and has completed implementation of its open phase isolation system. Therefore, the NRC staff closes BL 2012-01 for McGuire.

If you have any questions, please contact me at 301-415-5136 or John.Klos @nrc.gov

Sincerely,

/RA/

John Klos, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369, 50-370

cc: Listserv

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 2012-01, “DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM”
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***by email**

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