



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

November 19, 2021

Mr. Eric Carr
President and Chief Nuclear Officer
PSEG Nuclear, LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 - CLOSEOUT OF BULLETIN 2012-01, "DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM"

Dear Mr. Carr:

The purpose of this letter is to inform you that the U.S. Nuclear Regulatory Commission (NRC) staff has verified that PSEG Nuclear LLC (PSEG, the licensee) has provided the necessary information requested in 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 Salem Nuclear Generating Station, Units 1 and 2 (Salem). The NRC staff has completed its review of this information and has closed out BL 2012-01 for this facility.

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 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 designs 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).

By letter dated October 23, 2012 (ADAMS Accession No. ML12312A062), the licensee provided its response to BL 2012-01 for Salem. By letter dated January 30, 2014 (ADAMS Accession No. ML14030A478), 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 March 2020, the NRC staff performed an inspection at Salem using TI 2515/194 dated October 31, 2017. In September 2021, the NRC staff performed an inspection at Salem using TI 2515/194 Revision 2. The inspections 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.

- Salem Nuclear Generating Station, Units 1 and 2 – Temporary Instruction 2515/194 Report 05000272/2020010 and 05000311/2020010, dated April 8, 2020 (ADAMS Accession No. ML20107H134)
- Salem Nuclear Generating Station, Units 1 and 2 – Temporary Instruction 2515/194 Report 05000272/2021011 and 05000311/2021011, dated September 30, 2021 (ADAMS Accession No. ML21272A282)

The NRC staff reviewed the information submitted by the licensee and the results of the TI 2515/194 inspections for Salem. A minor exception was identified as the Updated Final Safety Analysis Report was updated with an incorrect as-built configuration of the open phase detection system, and the licensee captured this exception in their corrective action program.

The staff found this acceptable. 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 Salem.

If you have any questions, please contact me at 301-415-4125 or James.Kim@nrc.gov.

Sincerely,

/RA/

James S. Kim, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

cc: Listserv

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT 1 AND 2 – CLOSEOUT OF BULLETIN 2012 01, “DESIGN VULNERABILITY IN ELECTRIC POWER SYSTEM” DATED NOVEMBER 19, 2021

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