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

July 12, 2024

Jamie M. Coleman
Regulatory Affairs Director
Southern Nuclear Operating Co., Inc.
3535 Colonnade Parkway
Birmingham, AL 35243

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNIT 1 - REVIEW OF THE REFUELING OUTAGE 1R24 STEAM GENERATOR TUBE INSPECTION REPORT (EPID L-2023-LRO-0067)

Dear Jamie Coleman:

By letter dated September 22, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23265A249), Southern Nuclear Operating Company (SNC, the licensee) submitted information summarizing the results of the steam generator (SG) inspections performed at Vogtle Electric Generating Plant (Vogtle), Unit 1, during refueling outage 24. The licensee provided additional information concerning the inspections in letters dated January 22, and April 25, 2024 (ML24022A222 and ML24116A302, respectively). The SG tube inspection report was submitted in accordance with Technical Specification 5.6.10, “Steam Generator Tube Inspection Report.”

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the information provided by SNC and concludes that the licensee provided the information required by Vogtle, Unit 1, technical specifications and no follow-up is required at this time. The NRC staff’s review of the report is enclosed.

If you have any questions, please contact me at (301) 415-3100 or via email at John.Lamb@nrc.gov.

Sincerely,

JOHN LAMB Digitally signed by JOHN LAMB
Date: 2024.07.12 10:39:33 -04'00'

John G. Lamb, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-424

Enclosure:
Review of the SG Tube Inspection Report

cc: ListServ

REVIEW OF THE REFUELING OUTAGE 24 STEAM GENERATOR

TUBE INSPECTION REPORT

SOUTHERN NUCLEAR OPERATING COMPANY, INC

VOGTLE ELECTRIC GENERATING PLANT, UNIT 1

DOCKET NO. 50-424

By letter dated September 22, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23265A249), Southern Nuclear Operating Company (SNC, the licensee) submitted information summarizing the results of the steam generator (SG) inspections performed during refueling outage (RFO) 24 at Vogtle Electric Generating Plant (Vogtle), Unit 1. The licensee provided additional information concerning the inspections in letters dated January 22, and April 25, 2024 (ML24022A222 and ML24116A302, respectively).

Vogtle, Unit 1, has four Westinghouse Model F SGs, each of which contains 5,626 U-bend thermally treated Alloy 600 tubes. Each tube has a nominal outside diameter of 0.688 inches and a nominal wall thickness of 0.040 inches. During SG fabrication, the tubes were hydraulically expanded, at both ends, over the full depth of the tubesheet. Stainless steel support plates, which have broached quatrefoil holes, support the vertical section of the tubes, and chrome-plated Alloy 600 anti-vibration bars support the U-bend section of the tubes.

The licensee provided the scope, extent, methods, and results of the SG tube inspections in the letters referenced above. In addition, SNC described corrective actions (e.g., tube plugging), if any were taken in response to the inspection findings. Based on the review of the information provided, the U.S. Nuclear Regulatory Commission (NRC) staff has the following observations:

- SNC plugged tubes with circumferential outside diameter stress corrosion cracking (ODSCC) indications at the top of the tubesheet hot leg expansion transition. The percent degraded area (PDA) for these indications, based on eddy current testing, ranged from 5.3 percent to 34.7 percent. The NRC staff requested additional information related to circumferential ODSCC and SNC responded with letters dated January 22, and April 25, 2024. An alternative technique, based on data developed for Electric Power Research Institute (EPRI) report TR-107197, is being used to size circumferential ODSCC at Vogtle. The licensee's letter dated January 22, 2024, stated that Examination Technique Specification Sheet (ETSS) 21410.1 is used to size circumferential ODSCC is incorrect. The NRC staff noted that the average PDA for circumferential ODSCC approximately doubled from RFO 23 to RFO 24. In the letter dated April 25, 2024, SNC stated that the RFO 24 results appear to be an outlier relative to the long term ODSCC data. The licensee also responded that the operational assessment (OA) benchmarking for circumferential ODSCC has provided confidence that the OA process can reasonably predict the extent of future ODSCC in the SGs. SNC also stated during the closed meeting held on May 29, 2024, that there were no plant operational changes or water chemistry transients that would have significantly increased the circumferential ODSCC crack growth rates. All tubes with circumferential indications during RFO 24 were plugged and stabilized. No tubes exhibited degradation beyond the condition monitoring limits and, therefore, in situ pressure tests were not required.

- SNC's letter dated April 25, 2024, provided details of a 2021 Westinghouse study of analyst reporting probability (ARP) that showed use of the EPRI default ARP values was appropriate for EPRI Model Assisted Probability of Detection (MAPOD) application to circumferential ODSCC at the tubesheet expansion transition.

- There was one axial ODSCC indication detected at a tube freespan ding in SG 4 during RFO 24. This is the first occurrence of axial ODSCC at a ding in the Vogtle, Unit 1, SGs.

- The SNC letter dated January 22, 2024, stated that the RFO 23 SG tube inspection report response to a request for additional information, included a description of the probability of detection (POD) curve for circumferential ODSCC. The letter also stated that the NRC staff had previously reviewed and accepted (ML22220A134) this POD curve. The NRC staff takes exception to the statement that the POD curve was reviewed and accepted by the NRC staff. In general, the NRC staff review of SG tube inspection reports submitted by licensees (and any supplemental letters from the licensee that address NRC questions) conclude whether the licensee provided the information required by their technical specifications (TSs) and that there are no technical issues that require additional regulatory follow-up action at that time. The NRC staff performs a review of the submitted inspection information and results but does not assess all of the information submitted by the licensee with the intent of formal acceptance of analytical methods. Based on the above, SNC should not consider the POD curve mentioned above to have been reviewed and accepted by the NRC staff.

  Based on a review of the information provided, the NRC staff concludes that SNC provided the information required by its TSs. In addition, the NRC staff concludes that there are no technical issues that warrant additional follow-up action, at this time, since the inspections appear to be consistent with the objective of detecting potential tube degradation and the inspection results appear to be consistent with industry operating experience at similarly designed and operated units.

SUBJECT: VOGTLE ELECTRIC GENERATING PLANT, UNIT 1 - REVIEW OF THE REFUELING OUTAGE 1R24 STEAM GENERATOR TUBE INSPECTION REPORT (EPID L-2023-LRO-0067) DATED JULY 12, 2024

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DATE	6/10/2024	6/13/2024	6/10/2024	6/14/2024	7/12/2024

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