



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

July 22, 2020

Mr. Robert T. Simril
Site Vice President
Catawba Nuclear Station
Duke Energy Carolinas, LLC
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA NUCLEAR STATION, UNIT 2 – REVIEW OF THE FALL 2019
STEAM GENERATOR TUBE INSPECTION REPORT
(EPID L- 2019- LRO-0097)

Dear Mr. Simril:

By letter dated December 19, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19353A416), as supplemented by letter dated April 6, 2020 (ADAMS Accession No. ML20097B706), Duke Energy Carolinas, LLC (the licensee), submitted information summarizing the results of their fall 2019 steam generator (SG) tube inservice inspections, performed during the end of cycle 23 refueling outage (RFO) at Catawba Nuclear Station, Unit 2.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the information provided and concludes that the licensee provided the information required by their technical specifications and that no additional follow-up is required at this time. The NRC staff's review summary is enclosed.

If you have any questions, please contact me at 301-415-1438 or via e-mail at Karen.Cotton@nrc.gov.

Sincerely,

/RA/

Karen Cotton-Gross, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-414

Enclosure:
Review Summary

cc: Listserv

CATAWBA NUCLEAR STATION, UNIT 2
NRC STAFF REVIEW OF THE
FALL 2019 STEAM GENERATOR TUBE INSPECTION REPORT
DOCKET NO. 50-414

By letter dated December 19, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19353A416), as supplemented by letter dated April 6, 2020 (ADAMS Accession No. ML20097B706), Duke Energy Carolinas, LLC (the licensee), submitted information summarizing the results of their fall 2019 steam generator (SG) tube inservice inspections, performed during the end of cycle 23 refueling outage (RFO) at Catawba Nuclear Station (Catawba), Unit 2.

Catawba, Unit 2 has four Westinghouse Model D5 SGs, which are designated 2A through 2D. Each SG has 4,570 thermally treated Alloy 600 (Alloy 600 TT) tubes with a nominal outside diameter of 0.750 inches and a nominal wall thickness of 0.043 inches. The tubes are hydraulically expanded for the full-depth of the tubesheet at each end. The tubes are supported by Type 405 stainless steel plates with quatrefoil-shaped broached holes. The U-bend region of the tubes in Rows 1 through 9 was thermally treated after bending, in order to reduce stress. At RFO 23 the SGs had 28.5 effective full power years of operation.

The licensee provided the scope, extent, methods, and results of their SG tube inspections in the documents referenced above. In addition, the licensee described corrective actions (i.e., tube plugging) taken in response to the inspection findings.

Based on the review of the information provided, the NRC staff has the following observations and comments:

- During RFO 23, two tubes with indications of a new degradation mechanism at Catawba, Unit 2, were identified in two SGs. Two of the three axial indications were located just above a tube support plate (TSP) broach while the third indication was partially within the TSP broach:
 - A single axial indication (SAI) of outside diameter stress corrosion cracking (ODSCC) was identified partially above and partially within the broach at the top of the third hot-leg TSP in one tube in SG 2A. The tube was plugged and removed from service.
 - Two SAIs of ODSCC were identified in the freespan just above the fifth hot-leg TSP in one tube in SG 2B. The two indications were separated axially by a short intact ligament. The tube was plugged and removed from service.
 - Neither tube was part of the population considered to have increased susceptibility to stress corrosion cracking due to elevated residual stress from manufacturing (i.e., "high-stress" tubes). The cracking occurred under deposits that had accumulated on top of the support plate broach. This appears to be the first under-deposit cracking above a TSP and not associated with a ding in Alloy 600TT tubing.

Enclosure

- Two tubes in SG 2A and one tube in SG 2B were plugged due to wear from a foreign object. Both tubes were plugged and removed from service. In both cases a foreign object was present and not removed. Foreign objects left in place were evaluated for tube integrity until the next scheduled inspection.
- The 12 previously identified high-stress tubes still in service prior to RFO 23 were preventively plugged during RFO 23. One tube was in SG 2B and 11 tubes were in SG 2D.
- Including the tubes with cracking, the tubes with foreign object wear, and the high-stress tubes preventively plugged, the licensee plugged 3 tubes in SG 2A, 3 tubes in SG 2B, and 11 tubes in SG 2D.
- No change was noted in the appearance of an area of missing stainless-steel cladding identified during RFO 21 in the hot-leg channel head of SG 2D.
- No primary-to-secondary leakage was detected during operating cycle 23 and the calculated leakage rate from the portion of the tubes more than 14.01 inches from the top of the tubesheet was zero.

Based on a review of the information provided, the NRC staff concludes that the licensee provided the information required by their technical specifications. In addition, the NRC staff concludes that there are no technical issues that warrant follow-up action currently, since the inspections appear to be consistent with the objective of detecting potential tube degradation. The licensee will perform inspections at the next refueling outage due to the axial ODSCC that was detected.

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(EPID L-2019-LRO-0097) DATED JULY 22, 2020

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ADAMS Accession No. ML20198M493

***Via e-mail**

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