



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

December 1, 2020

Mr. Don Moul
Executive Vice President, Nuclear Division
and Chief Nuclear Officer
Florida Power & Light Company
Mail Stop: EX/JB
700 Universe Blvd.
Juno Beach, FL 33408

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NO. 4 – REVIEW OF THE
SPRING 2019 STEAM GENERATOR TUBE INSPECTION REPORT
(EPID L-2019-LRO-0103)

Dear Mr. Moul:

By letter dated September 25, 2019, Florida Power & Light Company submitted information summarizing the results of the spring 2019 steam generator inspections performed at Turkey Point Nuclear Generating Unit No. 4. These inspections were performed during refueling outage 31.

The U.S. Nuclear Regulatory Commission staff has completed its review of the information provided and concludes that Florida Power & Light Company provided the information required by the Turkey Point Nuclear Generating Unit No. 4 technical specifications and that no follow-up is needed at this time. The staff's review summary is enclosed.

If you have any questions, please contact me at 301-415-6459 or Eva.Brown@nrc.gov.

Sincerely,

/RA/

Eva A. Brown, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-250

Enclosure: As stated

cc: Listserv

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NO. 4 – REVIEW OF THE
SPRING 2019 STEAM GENERATOR TUBE INSPECTION REPORT
(EPID L-2019-LRO-0103) DATED DECEMBER 1, 2020

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ADAMS Accession No.: ML20287A368

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REVIEW OF THE SPRING 2019 STEAM GENERATOR TUBE INSPECTION REPORT

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT, UNIT NO. 4

DOCKET NO. 50-251

By letter dated September 25, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19268B738), Florida Power & Light Company (the licensee) submitted information summarizing the results of the spring 2019 steam generator (SG) inspections performed at Turkey Point Nuclear Generating Unit No. 4 (Turkey Point Unit 4). These inspections were performed during refueling outage (RFO) 31. The licensee provided additional information concerning the inspections in a letter dated June 24, 2020 (ADAMS Accession No. ML20176A287). The U.S. Nuclear Regulatory Commission (NRC) held a clarification call on the additional information with the licensee on August 20, 2020.

Turkey Point Unit 4 has three Westinghouse Model 44F SGs, which were placed in service in 1983. Each SG contains 3,214 thermally treated Alloy 600 tubes with a nominal outside diameter of 0.875 inches and a nominal wall thickness of 0.050 inches. The tubes are supported by one stainless steel drilled-hole flow distribution baffle, six stainless steel quatrefoil, broached-hole tube support plates, and two sets of anti-vibration bars (AVB) in the U-bends.

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

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

- As part of condition monitoring, the licensee performed a review of historical eddy current inspection data to identify indications that may show wear rates not typical of the inservice tubing population. As a result, the tube in Row 38, Column 58 (R38C58) in SG-B was preventively plugged due to atypical AVB wear growth rates. Specifically, the change in depths at two AVB wear indications in tube R38C58, over the last two operating cycles, were 8 and 10 percent through wall. The licensee reported the growth rates for the two AVB wear indications as 2.9 and 3.7 percent through wall per effective full power year (TW/EFPY), which are both less than the reported 95th percentile AVB wear growth rate of 4.0 percent TW/EFPY. The licensee stated that it is inconclusive to what caused the atypical growth rates based on a historical review of the wear pattern on and around tube R38C58. However, the licensee further stated that no historical possible loose part (PLP) indications have been reported at or around tube R38C58; therefore, it is unlikely that the atypical AVB wear growth rates are due to a foreign object.
- During the clarification call on August 20, 2020, the licensee provided clarification on their use of the terms dent and ding. Specifically, the licensee uses the term ding for any signal that was present in the 1993 eddy current inspection data. The term dent is used for all signals that have been identified subsequent to the 1993 eddy current data. The terms dent and ding are not location specific and can be associated with indications in the freespan or at tube support plates.

- A newly identified foreign object, shaped like a button-head bolt, was identified in SG-B that could not be removed because it was fixed in place between four adjacent tubes. Adjacent tubes Row 28, Column 34 (R28C34), Row 29, Column 34 (R29C34), and Row 29, Column 35 (R29C35) contained ding signals first reported in 1993; and adjacent tube R28C35 contained a dent signal first reported in 2009. These dent and ding signals were reported to be two to three inches above the top of the tubesheet (TTS). An additional ding signal, less than one inch above the TTS, was first reported in adjacent tube R29C34 in 2009 but was discernable back to 1993. A PLP eddy current analysis code had not been assigned to these tubes prior to RFO 31. During the August 20, 2020, clarification call, the licensee stated that the loose part was found by visual inspection initiated due to the presence of dent and ding signals in a square box pattern (the four adjacent tubes) at the same elevation. Based on a review of historical eddy current inspection data, the licensee reported that the object appears to have been lodged between the four adjacent tubes two to three inches above the TTS and visually confirmed in RFO 31 to have subsequently migrated to the TTS. During the August 20, 2020, clarification call, the licensee stated that it most likely migrated to the TTS prior to 1993 since the ding signals were present in the 1993 eddy current data. The licensee plugged the four tubes surrounding the loose part and will continue to monitor the surrounding tubes during future SG tube inspections.
- During RFO 31, ultrasonic testing thickness measurements identified external wall thinning on the feeding in SG-B that appears to have been caused by impingement when feedwater discharges from the neighboring j-tube. The licensee addressed the external wall thinning of the feeding during RFO 31 by adding a weld build-up to the wall of the feeding in the affected area.

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 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.