



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

March 13, 2018

Mr. Richard D. Bologna  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Beaver Valley Power Station  
Mail Stop A-BV-SEB1  
P.O. Box 4, Route 168  
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT 2 – REVIEW OF THE STEAM GENERATOR TUBE INSPECTION REPORTS FOR THE 19<sup>TH</sup> REFUELING OUTAGE IN SPRING 2017 (CAC NO. MG0086; EPID L-2017-LRO-0025)

Dear Mr. Bologna:

By letter dated August 8, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17221A034), FirstEnergy Nuclear Operating Company (the licensee) submitted information summarizing the results of the steam generator tube inspections for the 19<sup>th</sup> refueling outage in spring 2017 at Beaver Valley Power Station, Unit 2.

The U.S. Nuclear Regulatory Commission staff has completed its review of these reports and concludes that the licensee provided the information required by its Technical Specifications. The NRC staff's review of the report is enclosed.

If you have any questions, please contact me at 301-415-2328 or via e-mail at [Jennifer.Tobin@nrc.gov](mailto:Jennifer.Tobin@nrc.gov).

Sincerely,

A handwritten signature in black ink that reads "Jennifer C. Tobin".

Jennifer C. Tobin, Project Manager  
Plant Licensing Branch I  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosure:  
Review of the Steam Generator Tube  
Inspection Report

cc: Listserv

REVIEW OF THE STEAM GENERATOR TUBE INSPECTION REPORTS

FOR THE 19<sup>TH</sup> REFUELING OUTAGE IN SPRING 2017

FIRSTENERGY NUCLEAR OPERATING COMPANY

BEAVER VALLEY POWER STATION, UNIT 2

DOCKET NO. 50-412

By letter dated August 8, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17221A034), FirstEnergy Nuclear Operating Company (the licensee) submitted information summarizing the results of the steam generator (SG) tube inspections for the 19<sup>th</sup> refueling outage in spring 2017 at Beaver Valley Power Station (BVPS), Unit 2.

The BVPS, Unit 2, is a 3-loop plant with Westinghouse Model 51M SGs. Each SG contains 3,376 mill-annealed 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 a number of carbon steel tube support plates (TSP) and Alloy 600 anti-vibration bars. The tubes were roll expanded at both ends for the full depth of the tubesheet. The entire length of tube within the tubesheet was shot-peened on both the hot-leg and cold-leg side of the SG, prior to operation. In addition, the U-bend region of the small radius tubes were in-situ stress relieved prior to operation.

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

After reviewing the information provided by the licensee, the staff has the following comments/observations:

- The Cycle 20 operational assessment predicts that SG B will be the limiting SG for projected leakage. The limiting maximum leak rate for SG B is projected to be 0.220 gallons per minute (gpm), which is below the allowable limit of 2.2 gpm for the faulted SG.
- Nearly all hot and cold leg TSP intersections were inspected using 0.720 inch diameter probes. Two tubes containing sleeves were inspected using a 0.630 inch diameter probe, which has not been approved by the U.S. Nuclear Regulatory Commission. If a distorted support indication (DSI) was observed with the 0.630 inch probe, the licensee would attempt to obtain inspection results at that location using the 0.720 inch probe. If the 0.720 inch probe could not pass through the tube, it was to be plugged. The licensee stated that evaluation of DSIs at other plants using a 0.640 inch probe (which the licensee states has performance characteristics consistent with the 0.630 inch probe) indicates its voltage response is conservative compared to the 0.720 inch probe.
- Among the three SGs, a total of 1098 TSP locations had DSI indications and only 19 indications had amplitudes greater than 1.0 volt, with none greater than 1.5 volts. The licensee compared the results with the previous inspection and identified eight new

locations with single/multiple axial indications, with none having a voltage amplitude greater than 1.0 volt.

- The licensee's distribution of indications as a function of support plate location continues to show a strong predisposition of outside diameter stress corrosion cracking to occur in the first few hot leg TSPs, which is consistent with data observed at other plants and is commonly attributed to the temperature dependence of outside diameter stress corrosion cracking.

Based on a review of the information provided, the U.S. Nuclear Regulatory Commission staff concluded that the licensee provided the information required by the Technical Specifications. In addition, the staff concluded that there are no technical issues that warrant 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: BEAVER VALLEY POWER STATION, UNIT 2 – REVIEW OF THE STEAM GENERATOR TUBE INSPECTION REPORT FOR THE 19<sup>TH</sup> REFUELING OUTAGE IN SPRING 2017 (CAC NO. MG0086; EPID L-2017-LRO-0025) DATED MARCH 13, 2018.

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**ADAMS Accession No. ML18065A982**

\*by e-mail

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