



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

April 19, 2021

Mrs. Maria L. Lacal
Executive Vice President/
Chief Nuclear Officer
Mail Station 7605
Arizona Public Service Company
P.O. Box 52034
Phoenix, AZ 85072-2034

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNIT 2 – REVIEW OF THE
2020 STEAM GENERATOR TUBE INSPECTIONS DURING REFUELING
OUTAGE 22 (EPID L-2020-LRO-0064)**

Dear Mrs. Lacal:

By letter dated October 13, 2020, Arizona Public Service Company (the licensee) submitted information summarizing the results of the spring 2020 steam generator tube inspections performed at Palo Verde Nuclear Generating Station (Palo Verde), Unit 2. These inspections were performed during Refueling Outage 22. The steam generator tube inspection report was submitted in accordance with Technical Specification (TS) 5.6.8, "Steam Generator Tube Inspection Report."

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the submittal and concludes that the licensee provided the information required by Palo Verde, Unit 2, TS 5.6.8. In addition, the NRC staff concludes that there are no technical issues that warrant followup actions at this time. Enclosed is the NRC staff's review of the Palo Verde, Unit 2, steam generator tube inspection report.

If you have any questions, please contact me at (301) 415-1564 or via e-mail at Siva.Lingam@nrc.gov.

Sincerely,

/RA/

Siva P. Lingam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. STN 50-529

Enclosure:
Review of Steam Generator Tube
Inspection Report

cc: Listserv

REVIEW OF THE SPRING 2020 STEAM GENERATOR TUBE INSPECTIONS

PERFORMED DURING REFUELING OUTAGE 22

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNIT 2

DOCKET NO. STN 50-529

By letter dated October 13, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20288A298), Arizona Public Service Company (the licensee) submitted information summarizing the results of the spring 2020 steam generator (SG) tube inspections performed at Palo Verde Nuclear Generating Station (Palo Verde), Unit 2. These inspections were performed during Refueling Outage (RFO) 22.

Palo Verde, Unit 2, has two replacement SGs designed by Combustion Engineering and manufactured by Ansaldo. Each SG contains 12,580 thermally treated Alloy 690 tubes with an outside diameter of 0.750 inches and a wall thickness of 0.042 inches. Ferritic stainless steel eggcrate tube supports, diagonal bars, and vertical straps support the tubes at various locations.

The licensee provided the scope, extent, methods, and results of the SG tube inspections in the letter referenced above. In addition, the licensee described corrective actions (e.g., tube plugging), if 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 and comments:

- The licensee performed inspections of the blowdown patch plate welds in SG 21 and SG 22 as part of the foreign object search and retrieval effort. The inspections confirmed that the weld material near the cracked welds on the four patch plates (two per SG) is intact, and a loose parts concern is not being created. The licensee initially found that these patch plate welds were cracked during RFO 15.
- There was a transcription error in Table 2, "Indication Summary," of the spring 2017 and spring 2014 SG tube inspection reports, with both reports indicating SG 22 had 235 plugged tubes. The plug map for SG 22 in Appendix E of both the 2014 and 2017 reports correctly identified that 231 had been plugged in SG 22. The transcription error has been corrected in the spring 2020 report.
- In the spring 2020 outage, 46 tubes were plugged in SG 21 and 31 tubes were plugged in SG 22. The cumulative number of tubes plugged in SG 21 is 234 and in SG 22 is 262.
- No foreign object wear indications were reported in either SG in RFO 22. Four pieces of gasket material were identified within the tube bundle of SG 21 that could not be retrieved. An engineering analysis for three of the four pieces of gasket material supported leaving the objects in place for the next three operating cycles. The fourth

Enclosure

piece, near the tube in row 4 column 193, was in a high flow region of the SG, so the tubes surrounding the piece were staked and plugged.

- During secondary side inspection activities, the head of a pole-mounted camera became lodged in a narrow gap adjacent to the divider plate. During camera removal, two of the camera's lenses were chipped. Inspection of the camera showed that the lens' chips were less than 1/8 of an inch in any dimension, which were evaluated to be not large enough to become trapped or wedged by a tube and subsequently wear against the tube wall.
- Based on operating experience with the original SGs, the licensee made a commitment to inspect the feedwater box set screws after five cycles of operation in each replacement SG. This inspection was performed during RFO 22. The licensee reported that the feedwater box set screw inspection showed all set screws are in good condition and free of erosion.

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 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: PALO VERDE NUCLEAR GENERATING STATION, UNIT 2 – REVIEW OF THE
2020 STEAM GENERATOR TUBE INSPECTIONS DURING REFUELING
OUTAGE 22 (EPID L-2020-LRO-0064) DATED APRIL 19, 2021

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