



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

January 16, 2020

Mr. Robert S. Bement  
Executive Vice President Nuclear/  
Chief Nuclear Officer  
Mail Station 7602  
Arizona Public Service Company  
P.O. Box 52034  
Phoenix, AZ 85072-2034

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNIT 1 – REVIEW OF THE  
2019 STEAM GENERATOR TUBE INSPECTIONS DURING REFUELING  
OUTAGE 21 (EPID L-2019-LRO-0083)**

Dear Mr. Bement:

By letter dated October 18, 2019, as supplemented by letter dated December 6, 2019, Arizona Public Service Company (the licensee) submitted information summarizing the results of the spring 2019 steam generator tube inspections performed at Palo Verde Nuclear Generating Station (Palo Verde), Unit 1. These inspections were performed during Refueling Outage 21. 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 1, 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 1, 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](mailto: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 50-528

Enclosure:  
Review of SG Tube Inspection Report

cc: Listserv

REVIEW OF THE SPRING 2019 STEAM GENERATOR TUBE INSPECTIONS

PERFORMED DURING REFUELING OUTAGE 21

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION, UNIT 1

DOCKET NO. STN 50-528

By letter dated October 18, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19291F576), as supplemented by letter dated December 6, 2019 (ADAMS Accession No. ML19340B214), Arizona Public Service Company (the licensee) submitted information summarizing the results of the spring 2019 steam generator (SG) tube inspections performed at Palo Verde Nuclear Generating Station (Palo Verde), Unit 1. These inspections were performed during Refueling Outage 21. The NRC held a clarification call on the additional information with the licensee on January 7, 2020.

Palo Verde, Unit 1, 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 its SG tube inspections in the above referenced letters. In addition, the licensee described corrective actions (e.g., tube plugging) taken in response to the inspection findings. After reviewing the information provided by the licensee, the U.S. Nuclear Regulatory Commission (NRC) staff has the following observations and comments:

- The licensee performed an inspection of the blowdown patch plate welds in SGs 11 and 12 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 these patch plate welds to be cracked during Refueling Outage 15.
- The licensee confirmed that there was a typographical error in Table 2, "Indication Summary," of the spring 2019 SG tube inspection report. The licensee confirmed, consistent with the Plug Map for SG 12 in Appendix E of the spring 2019 SG tube inspection report, that a total of 183 tubes have been plugged in SG 12.
- The licensee clarified that the three-letter code RLW, used in the spring 2019 SG tube inspection report, stands for Retest Large Wear Standard and is typically used on bobbin or rotating coil wear indications that are greater than 50 percent. During the clarification call on January 7, 2020, the licensee discussed the use of the calibration standard for large wear indications.
- The licensee clarified during the January 7, 2020, call that the SG tube in Row 41, Column 88 that contained a 65 percent wear indication exceeded the condition

Enclosure

monitoring limit when initially evaluated. Therefore, the licensee performed eddy current flaw profiling to more accurately calculate the burst pressure, which demonstrated that the structural integrity performance criterion was met. The licensee clarified that the 65 percent wear indication was within the previous operational assessment predictions and no changes were needed to the future operational assessment. The SG tube in Row 41, Column 88 was plugged.

Based on a review of the information provided, the NRC staff concludes that the licensee provided the information required by its technical specifications. In addition, the NRC staff concludes that there are no technical issues that warrant followup 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 1 – REVIEW OF THE  
2019 STEAM GENERATOR TUBE INSPECTIONS DURING REFUELING  
OUTAGE 21 (EPID L-2019-LRO-0083) DATED JANUARY 16, 2020

**DISTRIBUTION:**

PUBLIC  
PM File Copy  
RidsACRS\_MailCTR Resource  
RidsNrrDorLpl4 Resource  
RidsNrrPMPaloVerde Resource  
RidsNrrLAPBlechman Resource

RidsRgn4MailCenter Resource  
RidsNrrDnrINcsg Resource  
PKlein, NRR  
AJohnson, NRR  
LTerry, NRR

**ADAMS Accession No.: ML20015A012****\*SE memorandum by email**

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NRR/DNRL/NCSEG/BC*
NAME	SLingam	PBlechman	SBloom
DATE	1/15/20	1/15/20	01/14/20
OFFICE	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM	
NAME	JDixon-Herrity	SLingam	
DATE	1/16/20	1/16/20	

**OFFICIAL RECORD COPY**