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

June 20, 2011

Mr. Randall K. Edington
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 2010 STEAM GENERATOR TUBE INSPECTIONS DURING REFUELING OUTAGE 15 (TAC NO. ME5009)

Dear Mr. Edington:

By letter dated November 8, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103210208), Arizona Public Service Company (the licensee), submitted information summarizing the results of the 2010 steam generator tube inspections performed during refueling outage 15 at Palo Verde Nuclear Generating Station, Unit 1 (PVNGS 1). By letter dated April 22, 2011 (ADAMS Accession No. ML111250573), the licensee provided its response to the Nuclear Regulatory Commission (NRC) staff's request for additional information dated March 18, 2011 (ADAMS Accession No. ML110800026).

The NRC staff has completed its review of the submittal and concludes that the licensee provided the information required by the PVNGS 1 technical specifications. No additional follow-up is required at this time. The staff's review is enclosed. If you have any questions, please contact me at (301) 415-1056 or via e-mail at Lauren.Gibson@nrc.gov.

Sincerely,

Lauren Kate Gibson

Lauren K. Gibson, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. STN 50-530

Enclosure:
As stated

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OFFICE OF NUCLEAR REACTOR REGULATION

REVIEW OF RESULTS OF 2010 STEAM GENERATOR TUBE INSPECTIONS

PERFORMED DURING REFUELING OUTAGE 15

PALO VERDE NUCLEAR GENERATION STATION, UNIT 1

DOCKET NO. STN 50-528

By letter dated November 8, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103210208), Arizona Public Service Company (the licensee), submitted information summarizing the results of the 2010 steam generator (SG) tube inspections performed during refueling outage 15 at Palo Verde Nuclear Generating Station, Unit 1 (PVNGS 1). By letter dated April 22, 2011 (ADAMS Accession No. ML111250573), the licensee provided its response to the Nuclear Regulatory Commission (NRC) staff's request for additional information dated March 18, 2011 (ADAMS Accession No. ML110800026).

PVNGS 1 has two SGs, each having 12,580 thermally treated Alloy 690 tubes with an outside diameter of 0.75 inches and a wall thickness of 0.042 inches. Ferritic stainless steel egg-crate tube supports, diagonal bars, and/or vertical straps support the tubes at various locations.

The licensee provided the scope, extent, methods, and results of its 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.

The following observation is noted in regards to the licensee's 2010 inspections:

- There are two blowdown duct patch plates in each SG. These patch plates minimize the amount of feedwater flow that can bypass the economizer (preheater) and enter the hot leg side of the SG. These patch plates are welded to a divider plate on the secondary side of the SG. This divider plate is welded to the central stay cylinder and has a tongue-and-groove attachment to the upper and lower divider plate lugs. These divider plate lugs are welded to the SG shell. As a result of this design, the divider plate can move relative to the divider plate lugs. The design of the patch plate, however, indicated that the patch plate should be welded to both the divider plate and the lower lug.

  During the fifteenth refueling outage in 2010, the four welds (two per SG) between the blowdown patch plate and the lower divider plate lug were completely cracked. The licensee indicated that the most likely cause of this cracking was the relative movement of the divider plate relative to the lower divider plate lug. Although the divider plate is intended to slide within the tongue-and-groove arrangement allowing relative motion between the lugs and the divider plate, the weld between the patch plate and both the divider plate and the lower lug would restrict such movement.

Analysis of the blowdown patch plate weld cracking, by the licensee, indicates that: (1) the plates will continue to meet their function of minimizing the amount of feedwater that can exit the preheater region of the SG, and (2) the likelihood of forming loose parts as a result of the cracking is minimal. The licensee will inspect the blowdown patch plates whenever a top of the tubesheet foreign object search and retrieval is performed to confirm these conclusions. The inspections will examine the remaining welds and verify they are intact and that the cracked welds are not disintegrating (chipping away) or forming a loose parts concern.

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 staff concludes 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.

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Sincerely,
/RA/

Lauren K. Gibson, Project Manager
Plant Licensing Branch IV
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ADAMS Accession No. ML111680042 *Concurrence by Memo

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NAME	LKGibson	JBurkhardt	RTaylor*	MMarkley	LKGibson
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