July 26, 2006

James M. Levine
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P.O. Box 52034
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SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 2 AND 3 - REVIEW OF STEAM GENERATOR TUBE INSPECTION SUMMARY REPORTS (TAC NOS. MC8938 AND MC8939)

Dear Mr. Levine:

The Nuclear Regulatory Commission (NRC) staff has completed its review of the reports submitted by Arizona Public Service (APS or the licensee) summarizing the steam generator tube inspections performed during the spring 2005 and fall 2004 refueling outages at the Palo Verde Nuclear Generating Station (Palo Verde), Units 2 and 3, respectively. These reports were provided in APS letters dated November 9, 2004, April 27, October 18, October 24, 2005, and March 20, 2006. Additional information pertaining to the Palo Verde, Unit 3, 2004 outage was summarized by the staff in a letter dated February 23, 2005. The information summarized in the staff's February 23, 2005, letter was consistent with the information subsequently provided by the licensee.

As discussed in the enclosed review, the NRC staff concludes that APS has provided the information required by the Palo Verde, Units 2 and 3, technical specifications. In addition, the NRC staff did not identify any technical issues that warranted follow-up action at this time.

Sincerely,
/RA/

Mel B. Fields, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-529 and 50-530

Enclosure: Review of Steam Generator Tube Inspection Reports

cc: See next page

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ACCESSION NO: ML062000194 **NRR-106**

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REVIEW OF THE 2004 AND 2005 STEAM GENERATOR TUBE INSPECTION REPORTS

PALO VERDE NUCLEAR GENERATING STATION, UNITS 2 AND 3

DOCKET NOS. 50-529 AND 50-530

By letters dated November 9, 2004 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML043210473), April 27 (ADAMS Accession No. ML051300346), October 18 (ADAMS Accession No. ML052980549), October 24, 2005 (ADAMS Accession No. ML053130156), and March 20, 2006 (ADAMS Accession No. ML060890657), Arizona Public Service (the licensee) submitted information related to the steam generator (SG) tube inspections at the Palo Verde Nuclear Generating Station, Units 2 and 3, for their spring 2005 and fall 2004 outages, respectively. Additional information pertaining to the Unit 3 2004 outage was summarized by the Nuclear Regulatory Commission (NRC) staff in a letter dated February 23, 2005 (ADAMS Accession No. ML050490197). The information summarized in the staff's February 23, 2005, letter was consistent with the information subsequently provided by the licensee.

Palo Verde, Unit 2, has two Asea Brown Boveri-Combustion Engineering, Inc. replacement SGs, which are a modification of the original System 80 design. There are 12,580 thermally treated Alloy 690 tubes in each SG. The tubes have an outside diameter of 3/4-inch, a wall thickness of 0.042-inch, and are supported at various locations by ferritic stainless steel eggcrate supports, diagonal bars, and/or vertical straps.

Palo Verde, Unit 3, has two Combustion Engineering System 80 SGs. There are 11,012 mill-annealed Alloy 600 tubes in each SG. The tubes have an outside diameter of 3/4-inch, a wall thickness of 0.042-inch, and are supported at various locations by ferritic stainless steel eggcrate tube supports, diagonal bars, and/or vertical straps.

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

As a result of the review of the reports, the NRC staff has the following comments/observations:

> This was the first operating cycle for the Unit 2 replacement SGs. It was expected that the replacement SG design would not have high-wear rates in the Batwing Stay Cylinder (BWSC) and the Cold Leg Corner (CLC) regions. Based on the 2005 inspection, the high-wear rates were not observed in the CLC; however, wear conditions similar to that observed in the original SGs were observed in the BWSC region.
>
> Approximately 30 wear indications were detected in each SG. Most of the wear indications (if not all) were located at the batwing or the vertical straps.
>
> The Unit 2 replacement SGs have an economizer with a similar set screw configuration as that in Unit 3 (which experienced degradation). To monitor the set screws, the

licensee has implemented a routine Preventive Maintenance Task to inspect this region every 6 years.

Unit 2 experienced a primary-to-secondary leak during the 1st cycle of operation. Additional information concerning this leak is available in letters dated May 4 (ADAMS Accession No. ML041260002) and June 1, 2004 (ADAMS Accession No. ML041600565).

During the NRC staff's review of the reports describing the 2004 SG tube inspections at Unit 3, the licensee performed another inspection of the Unit 3 SG tubes. The staff participated in a conference call to discuss the SG tube inspections at Unit 3 on April 21, 2006. The 2006 inspection is the last scheduled inspection for the Unit 3 SGs since they are scheduled to be replaced in fall 2007.

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 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.

Palo Verde Generating Station,
Units 1, 2, and 3

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Units 1, 2, and 3

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March 2006