Mr. R. T. Ridenoure
Vice President - Chief Nuclear Officer
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Fort Calhoun Station FC-2-4 Adm.
Post Office Box 550
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION, UNIT NO. 1 - SUMMARY OF THE NUCLEAR REGULATORY COMMISSION'S (NRC'S) REVIEW OF FORT CALHOUN STEAM GENERATOR TUBE INSERVICE INSPECTION REPORTS FROM THE 2005 OUTAGE (TAC NO. MC8432)

Dear Mr. Ridenoure:

By letters to the NRC dated April 22 and September 23, 2005, Omaha Public Power District (OPPD) submitted the results of its 2005 steam generator tube inservice inspection pursuant to Section 3.17(5) of the Fort Calhoun Station, Unit 1 (FCS) Technical Specifications. OPPD provided clarifying information related to the submittals in an e-mail dated January 10, 2006. Additional information pertaining to the 2005 outage was summarized by the NRC staff in a letter dated June 3, 2005.

On the basis of its review of the above documents, the NRC staff concludes that OPPD has provided the information required by the FCS Technical Specifications. This completes our review of the 2005 steam generator tube inspections at FCS performed under TAC MC8432.

If you have any questions or comments regarding this summary, please call me at (301) 415-1445.

Sincerely,

/RA/

Alan B. Wang, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-285

Enclosure: Summary of Steam Generator Tube Inspection Reports

cc w/encl: See next page

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SUMMARY OF THE NUCLEAR REGULATORY COMMISSION'S (NRC'S) REVIEW

2005 STEAM GENERATOR TUBE INSPECTION REPORT

FORT CALHOUN, UNIT 1

DOCKET NO. 50-285

By letters dated April 22 and September 23, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML051120297 and ML052700162, respectively), Omaha Public Power District (OPPD) submitted the results of its 2005 steam generator tube inservice inspection pursuant to Section 3.17(5) of the Fort Calhoun Station, Unit 1 (FCS) Technical Specifications. OPPD provided clarifying information related to the submittals in an e-mail dated January 10, 2006. The information provided in this e-mail is summarized below. Additional information pertaining to the 2005 outage was summarized by the staff in a letter dated June 3, 2005 (ADAMS Accession No. ML051430424). A summary of the NRC staff's review of the 2005 steam generator tube inspection results is below.

FCS has two Combustion Engineering steam generators, RC-2A and RC-2B. The steam generator tubes are fabricated with mill-annealed Alloy 600. The tubes were explosively expanded for the full length of the tubesheet. Each steam generator has eight tube supports. The lower six supports (i.e., those nearest the tubesheet) support all of the tubes and are termed "full supports." The highest two supports are considered partial tube supports since they only support a limited number of tubes (i.e., only tubes in the periphery of the tube bundle are supported). The tube supports are numbered from 1 to 8, with 1 being the lowest tube support (i.e., nearest the tubesheet) and 8 being the highest. A more detailed description of the FCS steam generator configuration, including past eddy current tube inspection results, is documented in the NRC staff's review of the 2003 FCS steam generator inspections, dated February 28, 2005 (ADAMS Accession No. ML050530190).

During the 2005 eddy current inspections, OPPD made two modifications to the previously determined scope of inspection. In steam generator A, a single axial indication was identified in the freespan critical area buffer. The single axial indication was in the tube located at Row 75, Line 66, this tube was on the inboard side of the buffer zone around the critical area. It was 32.57 inches above the fifth support and had a signal amplitude of 0.19 volts with an estimated depth of 28 percent and an axial length of 0.74 inch. The critical area for axial outside diameter stress corrosion cracking (ODSCC) is defined as the region where the hot leg drilled plates are superimposed. In the freespan, this area is defined axially as the span beginning just above the fifth tube support plate on the hot leg side (H5) and extending to the diagonal bar on the hot leg side (DBH). Flow is restricted in this region due to deposit accumulation in the patch plate support flow holes and denting at the tube locations. The deposit on the tubes combined with the hoop stresses makes this area more susceptible to axial ODSCC. The critical area radial boundary is surrounded by a two row buffer zone of tubes. Due to the identification of this indication in the buffer area, the inspection was expanded to include an additional 23 tubes. No additional indications were detected as a result of this expansion.

Enclosure

The original inspection scope was also modified to include a line of tubes near the H4 support. This critical area is defined as the line of overlap of the patch plate and the supporting eggcrate. The ECT data for steam generator B showed that the edge of patch plate H4 was actually one line higher than where it was thought to be. This expansion resulted in an additional 19 tubes being examined.

Similar to the last outage, a 20 percent sample of bobbin signals dispositioned by confirming no signal change in the bobbin signal with time was performed. No defects were detected in this sample.

As a result of the 2005 steam generator inspections, 54 tubes were plugged in steam generator A and 51 tubes were plugged in steam generator B. No tubes were repaired by sleeving during this outage. To date, 362 tubes have been plugged in steam generator A and 391 tubes have been plugged in steam generator B. FCS plans to replace the original steam generators during the fall 2006 outage.

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 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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