

January 18, 2007

Mr. Rick A. Muench
President and Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
Post Office Box 411
Burlington, KS 66839

SUBJECT: WOLF CREEK GENERATING STATION - SAFETY EVALUATION OF THE
2005 STEAM GENERATOR TUBE INSPECTIONS IN REFUELING OUTAGE 14
(TAC NO. MD1231)

Dear Mr. Muench:

By letter dated April 14, 2006 (ET 06-0016), Wolf Creek Nuclear Operating Corporation, the licensee for Wolf Creek Generating Station, submitted the steam generator (SG) tube inservice inspection (ISI) report in accordance with Technical Specification (TS) Section 5.6.10.b for Refueling Outage 14 in the spring of 2005 (the thirteenth SG tube ISI report). Previously, by letter dated May 4, 2005 (ET 05-0004), the licensee submitted the plugging report from the thirteenth SG tube inspection in accordance with TS Section 5.6.10.a. The licensee provided additional information about these SG tube inspections in a letter dated November 7, 2006 (ET 06-0047).

Enclosed is the Nuclear Regulatory Commission (NRC) staff's evaluation of the reports submitted in the letters dated May 4, 2005, and April 14, 2006. Based on its review, the NRC staff concludes that the licensee has provided the information required by the TSs and no additional follow-up on these reports is required at this time. This closes out the TAC number MD1231.

Sincerely,

/RA/

Jack Donohew, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RESULTS OF THE 2005 STEAM GENERATOR TUBE INSPECTIONS

WOLF CREEK NUCLEAR OPERATING CORPORATION

WOLF CREEK GENERATING STATION

DOCKET NO. 50-482

1.0 INTRODUCTION

By letters dated May 4, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML051370402), April 14, 2006 (ML061100519), and November 7, 2006 (ML063190301), Wolf Creek Nuclear Operating Corporation (the licensee) submitted information summarizing the results of the steam generator (SG) tube inservice inspection (ISI) performed in SGs "B" and "C" at Wolf Creek Generating Station (WCGS) during Refueling Outage 14 in the spring of 2005.

2.0 BACKGROUND

The licensee has four Westinghouse Model F SGs at WCGS, each with 5,626 thermally treated Alloy 600 tubes. The tubes have an outside diameter of 0.688 inch, a wall thickness of 0.040 inch, and are hydraulically expanded for the full depth of the tubesheet at each end. The tubes are supported by stainless steel tube supports with quatrefoil-shaped holes and V-shaped, chrome-plated Alloy 600 anti-vibration bars. The U-bend section of the first 10 rows of tubes was thermally treated to improve stress-corrosion cracking resistance by reducing fabrication stresses.

3.0 REGULATORY REQUIREMENTS

In the Technical Specifications (TSs) for WCGS, TS Section 5.6.10, "Steam Generator Tube Inspection Report," delineates the following reporting requirements for the licensee:

1. Section 5.6.10.a requires that within 15 days following the completion of each ISI of SG tubes, the licensee reports the number of tubes plugged in each SG to the Nuclear Regulatory Commission (NRC).
2. Section 5.6.10.b requires that within 12 months following the completion of the inspection, the licensee reports the results of the SG tube ISI including (a) number and extent of tubes inspected, (b) location and percent of wall-thickness penetration for each indication of an imperfection, and (c) identification of SG tubes plugged.

3. Section 5.6.10.c requires 30 days and prior to resumption of plant operation, the licensee reports the results of SG tube inspections that fall into Category C-3 to the NRC.

In its letter dated April 14, 2006, the licensee stated that the SG tube ISI was completed on April 22, 2005, during Refueling Outage 14. Therefore, the licensee's letters dated May 4, 2005, and April 14, 2006, were submitted within 15 days and 12 months of when the SG tube ISI was completed in this refueling outage. Therefore, the NRC staff concludes that these reports were submitted within the time frame specified in TS Section 5.6.10.

4.0 EVALUATION

The licensee provided the scope, extent, methods, and results of their SG tube inspections in the three letters referenced in Section 1.0 of this safety evaluation. In addition, the licensee described corrective actions (i.e., tube plugging) taken in response to the inspection findings.

Based on its review of the reports submitted, the NRC staff has the following observations and comments:

- The licensee's eddy current testing detected potential loose parts in both SG B and SG C, and several objects were visually located but not removed. The licensee provided a description of the four parts left in each SG. The objects were identified as pieces of wire, one metal strip, and one planetary gear. The dimensions of the objects ranged from less than 1/32 inch minimum diameter to 1½ inches maximum length.
- The licensee stated that no wear associated with the known loose parts was detected. In addition, the licensee described its evaluation of the effect of these parts on SG tube integrity during subsequent operation. The evaluation concluded the loose parts would not degrade the tubes significantly before the next inspection of the SGs.
- An advanced scale conditioning agent/pressure pulse cleaning process was performed during the outage. This process resulted in the movement of a foreign object that the licensee classified as "fixed in place" during the previous inspection (during Refueling Outage 12 in 2002). The part was not found during the subsequent foreign object search and retrieval activities.
- Some indications listed in the inspection report were first detected in 1996, and then detected but not reported in subsequent inspection reports (e.g., 2003). They were not reported because they were attributed to the 1994 pressure-pulse cleaning and the eddy current signals measured in subsequent inspections were unchanged. Since the indications were service induced, if they measured greater than 20-percent through wall the NRC staff would expect that these indications be reported in all subsequent SG inspection reports (i.e., the location and percent of wall thickness penetration for each indication of an imperfection or a service-induced indication should be reported).

- The licensee provided volumetric flaw sizes based on both (a) the qualified technique Examination Technique Specification Sheet #21998.1 and (b) an alternate technique. Although the NRC staff recognizes that a second technique may provide useful insights, the NRC staff expects that qualified techniques will also be used in assessing tube integrity, and the licensee used a qualified technique.

5.0 CONCLUSION

Based on a review of the information provided by the licensee, the NRC staff concludes that the licensee provided the information required by the TSs and in the time frame required by the TSs. 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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Date: January 18, 2007

Wolf Creek Generating Station

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