



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

June 15, 2011

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2 - REVIEW OF THE
2010 STEAM GENERATOR TUBE INSPECTION REPORT FOR REFUELING
OUTAGE 26 (TAC NO. ME5085)

Dear Mr. Schimmel:

By letter dated November 12, 2010 (Agencywide Documents Access and Management System Accession No. ML103190514), Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, submitted information summarizing the results of the 2010 steam generator tube inspections at Prairie Island Nuclear Generating Plant (PINGP), Unit 2. These inspections were performed during the 26th refueling outage.

As discussed in the enclosed review, the U.S. Nuclear Regulatory Commission staff concluded that NSPM provided the information required by the PINGP technical specifications and did not identify any technical issues that warranted follow-up action at this time.

If you have any questions regarding this matter, please contact me at (301) 415-4037.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas J. Wengert".

Thomas J. Wengert, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-306

Enclosure:
As stated

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UNITED STATES NUCLEAR REGULATORY COMMISSION
REVIEW OF 2010 STEAM GENERATOR TUBE INSPECTION REPORT
PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNIT 2
DOCKET NO. 50-306

By letter dated November 12, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103190514), Northern States Power Company, a Minnesota corporation (the licensee), doing business as Xcel Energy, submitted information summarizing the results of the 2010 steam generator (SG) tube inspections at Prairie Island Nuclear Generating Plant (PINGP) Unit 2. The licensee also provided additional clarifying information, as noted below. In addition to this report, the Nuclear Regulatory Commission staff summarized a conference call about the 2010 SG tube inspections at PINGP Unit 2 in a letter dated June 18, 2010 (ADAMS Accession No. ML101620623).

PINGP Unit 2 has two Westinghouse model 51 SGs. Each SG contains 3388 mill-annealed Alloy 600 tubes. Each tube has a nominal outside diameter of 0.875 inches and a nominal wall thickness of 0.050 inches. The tubes were roll-expanded into the tubesheet at both ends for approximately 2.75 inches, i.e., they are expanded for only a fraction of the tubesheet thickness and are considered partial depth hard-rolled tubes. The tubes are supported by a number of carbon steel tube support plates. The original anti-vibration bars were removed and replaced. The row one and two tubes were subjected to an in-situ thermal stress relief in May 2000. Many tubes have been roll-expanded into the tubesheet above the original factory roll expansion to permit flaws below these re-rolled locations to remain in service.

In addition to the depth-based tube repair criteria, the licensee is also authorized to apply the voltage-based tube repair criteria for predominantly axially-oriented outside diameter stress corrosion cracking (ODSCC) at the tube support plate elevations. Although authorized to implement the voltage-based repair criteria, the licensee has not found it necessary to implement these criteria since few, if any, indications subject to this repair criteria have been identified at Unit 2. In addition, the licensee is authorized to leave flaws within the tubesheet region in service, provided they satisfy the F*/EF* repair criterion. The major cause of degradation within the tubesheet region is primary water stress corrosion cracking (PWSCC) at the roll transition zones. Secondary side intergranular attack and ODSCC have also been observed at this location.

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, such as tube plugging, taken in response to the inspection findings. The tubes of both SGs (21 and 22) were inspected during this outage.

Enclosure

The licensee provided additional clarifying information on April 20, 2011 (ADAMS Accession No. ML11161A001). In particular, the licensee:

- Confirmed that Tables 3 through 20 list all service induced indications detected and that no indications were sized with a rotating probe and subsequently left in service.
- Clarified that the scope of the secondary side inspections in SG 22 included the swirl vane moisture separators; the feed ring hangers, holes, and plugs; the upper transition girth weld; and the thermal sleeve. Magnetic particle examination was performed on the feedwater nozzle and ultrasonic inspections of the feed ring tee, the feedwater-to-reducer downcomer, and other upper bundle components were also completed. The SG 22 tube lane and the periphery of the tube bundle was inspected using a camera transporter system. Also, a visual inspection was performed of all installed tube plugs and a magnetically-biased rotating pancake coil inspection was performed on 25 percent of the Alloy 690 rolled plugs on the hot-leg side, in both SG 21 and 22. The licensee confirmed that no degradation was observed during the secondary side inspections or the plug inspections.
- Clarified that the nature of the single axial indication in the tube in row 1 column 8 (R1C8), in SG 21, was attributed to PWSCC in the freespan region near the tangent point of the straight leg to U-bend transition. The licensee further clarified that cracking in the row 1 and 2 u-bend regions has not typically been observed since the in-situ stress relieving of this region in 2000, with only three tubes (all in row 1 in SG 22) having indications attributed to circumferentially oriented PWSCC.
- Clarified that the tube (R3C38 in SG 21) was in-situ pressure tested with a localized pressure test rig that spanned the two larger indications and that there were no indications of leakage during the in-situ pressure test. The post in-situ eddy current inspection was conducted only with a rotating probe and both indications exhibited an increase in voltage (0.11 volts to 0.23 volts, and 0.44 volts to 0.59 volts) with no change in length. These results are consistent with previous post in-situ eddy current inspections on ODSCC axial indications.

Based on a review of the information provided, the NRC staff concludes that the licensee provided the information required by the 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 that inspection results appear to be consistent with industry operating experience at similarly designed and operated units.

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/RA/

Thomas J. Wengert, Senior Project Manager
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ADAMS ACCESSION NO.: ML111520266

*via memo dated 5/13/11

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