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

December 12, 2008

Mr. David A. Christian
President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 3 – SUMMARY OF CONFERENCE CALL WITH DOMINION NUCLEAR CONNECTICUT, INC. TO DISCUSS 2008 STEAM GENERATOR TUBE INSPECTIONS (TAC NO. MD9954)

Dear Mr. Christian:

On October 23, 2008, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Dominion Nuclear Connecticut, Inc. (DNC) to discuss the steam generator inspection activities taking place at Millstone Power Station, Unit No. 3 in response to an NRC letter dated October 21, 2008 (Agency Documents Access and Management System Accession No. ML082910831). Enclosed is a summary of the conference call prepared by the NRC staff. The NRC staff has no follow up actions at this time, and the TAC will be closed.

Please contact me at 301-415-1603, if you have any questions.

Sincerely,

Carleen J. Sanders, Project Manager
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure: As stated

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SUMMARY OF CONFERENCE CALL

FALL 2008 STEAM GENERATOR TUBE INSPECTION RESULTS

MILLSTONE POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

On October 23, 2008, the Nuclear Regulatory Commission (NRC) staff participated in a conference call with Dominion Nuclear Connecticut, Inc. (DNC or the licensee) regarding the steam generator (SG) tube inspection activities at Millstone Power Station, Unit No. 3 (MPS3). At the time of the call, SG tube inspections were ongoing. Data acquisition and analysis were progressing at approximately equal rates. The original inspection scope for this outage included SGs 'A' and 'C'. Based on preliminary findings (of tube cracking near the tube ends) the inspection scope had been expanded to include SGs 'B' and 'D'; however, examination of SGs 'B' and 'D' had not yet started at the time of the call. Prior to the call, the licensee was provided with discussion points to help facilitate the conference call (Agencywide Documents Access and Management System Accession No. ML082910831).

The SGs at MPS3 are Westinghouse Model F SGs, each of which contains 5,626 U-bend thermally treated Alloy 600 tubes. Each tube has a nominal outside diameter of 0.688 inches and a nominal wall thickness of 0.040 inches. During SG fabrication, the tubes were hydraulically expanded at both ends, over the full depth of the 21.23-inch thick tubesheet. The tubesheet was drilled on a square pitch with 0.98-inch spacing. There are 59 rows and 122 columns in each SG. The radius of the row 1 U-bends is 2.20 inches. The U-bends in rows 1 through 10 were stress relieved after bending. Eight Type 405 stainless steel support plates, which have broached quatrefoil holes, support the vertical section of the tubes, and six anti-vibration bars support the U-bend section of the tubes.

Primary-to-Secondary Leakage: During the prior cycle, primary-to-secondary leak rate was negligible (less than 0.1 gallon per day).

Secondary-Side Pressure Tests: No secondary side pressure tests had been performed and none were planned.

Industry Guidelines: No exceptions or deviations had been taken to industry guidelines.

Inspection Scope: The scope of the licensee's inspection in SGs 'A' and 'C' were as follows:

- Bobbin coil – 100 percent of tubes from the hot-leg tube-end to cold-leg tube-end.
- Rotating probe coil (RPC)
    - 50 percent of hot-leg tubes from 3 inches above the top of the tubesheet (TTS) to 3 inches below the TTS (i.e., TTS +/- 3 inches). This 50 percent inspection also

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included a 40 percent sample of hot-leg tubes from TTS -3 inches to the tube-end-hot.

- 12.5 percent of cold-leg tubes +/- 3 inches from the TTS, with a bias towards the periphery.
- 100 percent of overexpansions and bulges (when the inspection scope of the last outage (spring 2007) and this outage are combined).
- 100 percent of rows 1 and 2.
- Approximately 600 preplanned special inspections of dents, dings, and manufacturers burnish marks. This included 100 percent of the hot-leg dents and dings that measured greater than two volts.

Inspection Scope Expansion: The expansion of the licensee's inspection scope was as follows:

- Where cracking was found near tube ends, the expansion criteria from Table 3.2 in the Electric Power Research Institute guidelines were followed, which indicates that a 100 percent inspection be performed in the affected SGs and a 20 percent sample inspection be performed in the non-affected SGs. At the time of the call, scope expansion was expected to be completed on October 29, 2008.

Preliminary Inspection Results: As expected, the most prevalent form of tube degradation found was anti-vibration bar (AVB) wear. The maximum depth of AVB wear found was 38 percent and the licensee plans to plug this tube, despite it being below the 40 percent plugging limit.

At the time of the call, axial and circumferential cracking were found in the bottom 1 inch of multiple tubes in both SGs 'A' and 'C'. In SG 'A', four tubes with axial indications and one tube with a circumferential indication were identified. In SG 'C', axial and circumferential indications were identified in 48 tubes. Axial indications were noted in 27 tubes and circumferential indications were noted in 20 tubes. Four of the 20 tubes contained circumferential indications that were greater than 94 degrees in circumferential extent and therefore, will be plugged in accordance with the MPS3 technical specifications. In addition, one tube in SG 'C' was noted to have both an axial and a circumferential indication within the bottom one-half inch of the tube. As a result of these findings, the licensee expanded their inspection to include 100 percent of the hot-leg tube ends in SGs 'A' and 'C' and 20 percent of the hot-leg tube ends in SGs 'B' and 'D'. In addition, the licensee will inspect 20 percent of the cold-leg tube ends in SGs 'A' and 'C'.

No new loose parts and no new loose part wear was noted in either SGs 'A' or 'C'.

As a result of the inspections at the time of the call, the licensee plans to plug four tubes in SG 'C' for circumferential indications in the tubesheet and one tube in SG 'A' for wear at an AVB measuring 38 percent throughwall.

The licensee is not planning to perform any in-situ pressure tests or to pull any tubes.

Foreign object search and retrieval (FOSAR) inspections were performed in the annulus, no-tube lane, and the periphery. All past and new potential loose part (PLP) indications were inspected. For loose part and loose part wear detection, a turbo-mix was applied to the bobbin coil eddy current data at the TTS, and a rotating probe was used to inspect 50 percent of the

tubes at the TTS on the hot-leg and 12.5 percent of the tubes at the TTS on the cold-leg (with emphasis on the tubes in the periphery). In locations where PLPs were identified, a rotating probe coil inspection was performed of at least two neighboring tubes at the elevation where the PLP was detected, unless there was only one tube surrounding the PLP, in which case only one tube was inspected. One PLP was found in SG 'C' and FOSAR revealed broken scale at the location. One historical loose part in SG 'C' was inspected and found to still be wedged in place. The tube affected by this loose part was plugged in a previous outage. One new single volumetric indication (SVI) was detected in SG 'C'. No PLPs were detected at the location and a visual inspection did not reveal a loose part. Sizing of the SVI had not been performed at the time of the phone call. Inspections in SG 'A' were not complete at the time of the phone call.

Deposit mapping was being performed in SGs 'A' and 'C'.

Secondary side inspections of the upper bundle region are normally performed in one of the four SGs, on a rotating basis, one each refueling outage. In 2008, SG 'B' was inspected. The upper bundle inspection in SG 'B' included a visual inspection at the seventh tube support plate, AVBs and U-bend section, deck, primary separators, feedring, J-tubes (including the welds), secondary separators (including the perforations), piping, supports, ladders, and wedges. Flow accelerated corrosion (FAC) was noted during previous inspections on J-tubes 1, 15, 16, and 30 in all four SGs. The FAC was noted on welds of reducers or T's, which are known to have lower chromium content. The FAC at these locations was previously repaired via the weld overlay process in all four SGs. The inspection in SG 'B' this outage revealed no new signs of FAC and the weld overlays were intact with no degradation. Some minor surface rust was observed on the upper internals, which are fabricated from carbon steel.

At the time of the call, the licensee reported that no unexpected or unusual results had been found during the inspection.

The licensee reported that no low row (rows 1 – 10) tubes exhibited an offset in the bobbin coil eddy current data. The offset is indicative of potentially high residual stresses.

Subsequent to the call, the licensee reported that they had expanded their inspection scope to include 100 percent of the hot-leg tube ends in SGs 'A', 'B', 'C', and 'D'. In addition, the licensee inspected 100 percent of the cold-leg tube ends in SG 'D' (in response to finding a crack-like indication), and 20 percent of the cold-leg tube ends in SGs 'A', 'B', and 'C'. On the cold leg of SG 'D', two crack-like indications were found.

In total, four indications of combined cracking (axial and circumferential) were detected and the four tubes with these indications were plugged.

Based on the information provided by the license, the NRC staff did not identify any issues that warranted follow up action at this time.

Principal Contributor: A. B. Johnson

Date: December 12, 2008

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