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

September 4, 2014

Mr. David A. Heacock
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 – STAFF EVALUATION OF THE 2013 REFUELING OUTAGE STEAM GENERATOR TUBE INSPECTION (TAC NO. MF2919)

Dear Mr. Heacock:

By letters to the U.S. Nuclear Regulatory Commission (NRC), dated October 2, 2013, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13284A065), and February 26, 2014 (ADAMS Accession No. ML14069A173) Dominion Nuclear Connecticut, Inc. (the licensee), submitted information summarizing the results of its 2013 Steam Generator (SG) inspections at Millstone Power Station, Unit 3 (MPS3). These inspections were performed during the fifteenth refueling outage.

The NRC staff has completed its evaluation of these reports and concludes that the licensee provided the information required by its Technical Specifications. The SG tube inspections at MPS3 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. The NRC's staff's evaluation is enclosed.

Please contact me at (301) 415-1476 or by email at Mohan.Thadani@nrc.gov, if you have any questions on this issue.

Sincerely,

Mohan C. Thadani

Mohan C. Thadani, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No.: 50-423

Enclosure: Staff Evaluation

cc w/encl: Distribution via Listserv

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STAFF EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE STEAM GENERATOR TUBE INSPECTIONS

PERFORMED DURING THE 2013 REFUELING OUTAGE NO. 15

MILLSTONE POWER STATION, UNIT NO. 3

DOMINION NUCLEAR CONNECTICUT,INC.

DOCKET NO. 50-423

By letters dated October 2, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13284A065), and February 26, 2014 (ADAMS Accession No. ML14069A173), Dominion Nuclear Connecticut, Inc. (the licensee), submitted information summarizing the results of the 2013 Steam Generator (SG) tube inspections at Millstone Power Station, Unit 3 (MPS3). These inspections were performed during the fifteenth refueling outage, (RFO15).

MPS3 has four Westinghouse Model F SGs, each of which contains 5,626 thermally treated Alloy 600 tubes. Each tube has a nominal outside diameter of 0.688 inch and a nominal wall thickness of 0.040 inch. 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 Tube Support Plates (TSPs), which have broached quatrefoil holes, support the vertical section of the tubes, and six anti-vibration bars (AVBs) support the U-bend section of the tubes.

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

Based on the review of the information provided by the licensee, the U.S. Nuclear Regulatory Commission (NRC) staff has the following comments/observations:

- An inspection of the upper internals (i.e., the steam drum and upper bundle region) was performed in SG C, following an upper bundle flush. Deposit bridging of the tubes to the AVBs was observed, but much of the loose deposit material had been removed by the upper bundle flush process. Some blockage of the TSP openings was observed. Accumulated deposit material in the TSP flow holes was observed during a visual examination and with a low frequency eddy current technique called Deposit Mapping. The overall deposit inventory on the secondary side of the steam generators is considered heavy.

- A number of new wear indications were reported during RFO15. The licensee concluded that the most recent TSP inspection results might be due to the heavy deposit inventory on the secondary side of the SGs. Two corrective actions are being implemented to address the deposit loading on the secondary side of the SGs which has caused the TSP blockage. Deposit Minimization Treatment consists of a soft chemical-cleaning technique developed by AREVA. The chemical cleaning will be applied in the fall of 2014 to reduce the deposit loading and clear the TSP blockage. This chemical cleaning process will be repeated again in the spring of 2016. The second corrective action is the injection of Poly Acrylic Acid. Poly Acrylic Acid is a high molecular weight polymer designed to "wrap up" incoming iron from the feed train and allow that iron to be bypassed through to the SG blowdown line, and reduce deposition in the SGs.

Based on the review of the information provided by the licensee, the NRC staff concludes that the licensee provided the information required by its Technical Specifications. The SG tube inspections at MPS3 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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Sincerely,
/RA/
Mohan C. Thadani, Senior Project Manager
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Office of Nuclear Reactor Regulation

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