VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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U.S. Nuclear Regulatory Commission
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VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNIT 2
STEAM GENERATOR TUBE INSPECTION REPORT

Pursuant to Technical Specification 5.6.7 for North Anna Power Station Unit 2, Dominion is required to submit a 180-day steam generator tube inspection report. The attachment to this letter provides the steam generator tube inspection report for the North Anna Unit 2 fall 2011 refueling outage.

Should you have any questions or require additional information, please contact Mr. Jay Leberstien at (540) 894-2574.

Very truly yours,

Gerald T. Bischof
Site Vice President

Attachment

Commitments made in this letter: None

A001
NRR

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ATTACHMENT

NORTH ANNA UNIT 2
180-DAY NRC REPORT REGARDING STEAM GENERATOR TUBE INSPECTIONS PER TECHNICAL SPECIFICATION 5.6.7

VIRGINIA ELECTRIC AND POWER COMPANY
(DOMINION)

FALL 2011 - NORTH ANNA UNIT 2 STEAM GENERATOR INSPECTIONS

During the North Anna Unit 2 fall 2011 outage, steam generator (SG) inspections were completed in accordance with TS 5.5.8.d for SG "A" and "C". Transmittal of this report satisfies the North Anna Power Station Technical Specification (TS) reporting requirement specified in Section 5.6.7.

The Unit 2 steam generators have accrued 14.4 Effective Full Power Years (EFPY) of operation as of the end of Cycle 21 (August, 2011).

Initial entry into Mode 4 occurred on November 14, 2011 (2323 hours); therefore, this report is required to be submitted by May 12, 2012.

Italicized wording represents TS verbiage. The required information is provided under each reporting requirement as follows:

A report shall be submitted within 180 days after the initial entry into Mode 4 following completion of an inspection performed in accordance with the Specification 5.5.8, "Steam Generator (SG) Program." The report shall include:

a. *The scope of inspections performed on each SG*

The following primary side inspections were performed in SG "A" and "C":

- Video examination of both channel heads (as-found / as-left) including previously installed tube plugs
- 100% full-length inspection utilizing bobbin coil probe for all tubes except for Row 1 U-bends
- 26% of hot leg top of tubesheet (+/- 3") utilizing rotating coil probe with tube selection including 50% of the secondary side critical area in the sludge zone, 50% of all tubes within five tubes of the bundle periphery, and other randomly sampled locations
- 16% of cold leg top of tubesheet (+/- 3") utilizing rotating coil probe with tube sample constituting 50% of all tubes within five tubes of the bundle periphery
- 100% Row 1 U-bend region utilizing rotating coil probe/steam generator
- Special interest inspections of dents/dings with rotating coil probe (Sample: 100% of dents/ding $\geq$ 5 Volts; 3% of dents/ding $\geq$ 2 Volts and < 5 Volts)
- Inspection of all bobbin identified I-codes (i.e. possible damage indications) with rotating coil probe (Sample: 2 tests in each SG)
- Special interest rotating coil probe exams of largest voltage tubesheet overexpansions (OXP) (SG "A" sample: 28 hot leg and 6 cold leg tests; SG "C" sample: 72 hot leg and 22 cold leg tests)
- Rotating coil probe examinations of all hot leg historical manufacturing brandish mark (MBH) indications

The following secondary side inspections were performed in SG "A" and "C":

- Steam drum visual inspections to evaluate the cleanliness and structural condition of all accessible subcomponents including moisture separators, drain systems, and interior surfaces.
- Drop down examinations through the primary separators to assess the cleanliness and structural condition of the upper tube bundle and anti-vibration bar (AVB) supports.
- Visual inspections of J-nozzle to feedring internal interface for flow assisted corrosion.
- Visual inspections of upper tube support plates via 7th tube support plate (TSP) handholes to assess structural condition and cleanliness, including that of TSP wedges and associated welds.
- Ultrasonic thickness measurement of selected feedring locations.

b. *Active degradation mechanisms found*

No tube degradation was identified during this examination and no new tube denting was identified during this examination.

c. *Nondestructive examination techniques utilized for each degradation mechanism*

The 2011 tube inspections focused on the degradation mechanisms listed in Table 1 utilizing the referenced eddy current techniques.

Table 1 – Inspection Method for Applicable Degradation Modes

Classification	Degradation Mechanism	Location	Probe Type
Potential	Tube Wear	Anti-Vibration Bars	Bobbin – Detection Bobbin and +Point™ – Sizing
Potential	Tube Wear	Flow Distribution Baffle (FDB)	Bobbin – Detection Bobbin and +Point™ – Sizing
Existing	Tube Wear	Tube Support Plate (TSP)	Bobbin – Detection Bobbin and +Point™ – Sizing
Potential	Tube Wear	Freespan & AVB tangents (Row 8, 14, 26)	Bobbin – Detection Bobbin or +Point™ – Sizing
Potential	Tube Wear (foreign objects)	Freespan, Top-of-Tubesheet (TTS), FDB, and TSP	Bobbin and +Point™ – Detection +Point™ - Sizing
Potential	Intergranular attack (IGA)/outside diameter stress corrosion cracking (ODSCC)	Hot Leg TTS sludge pile critical area	Bobbin and +Point™ – Detection +Point™ - Sizing
Potential	OD Pitting	TTS sludge pile critical area	Bobbin – Detection +Point™ - Sizing
Relevant/Informational Inspection	Primary water stress corrosion cracking (PWSCC)	Hot leg TTS sludge pile critical area and within-tubesheet anomaly locations	+Point™ – Detection and Sizing
Relevant/Informational Inspection	IGA/ODSCC PWSCC	Row 1 U-bends	+Point™ – Detection and Sizing
Relevant/Informational Inspection	IGA/ODSCC	Freespan, FDB, TSP	Bobbin – Detection +Point™ - Sizing
Relevant/Informational Inspection	IGA/ODSCC	TTS outside the critical area	+Point™ – Detection and Sizing

d. *Location, orientation (if linear), and measured sizes (if available) of service induced indications*

No service induced tube indications were identified during the fall 2011 examination.

UT thickness measurements were taken in selected regions of the SG "A" and SG "C" feedring during this outage for the purpose of monitoring flow assisted corrosion (FAC) related degradation. All measurements exceeded the minimum design requirement of 0.350 inch by a significant margin.

e. *Number of tubes plugged during the inspection outage for each active degradation mechanism*

No tubes were plugged during this inspection.

f. *Total number and percentage of tubes plugged to date*

Table 2 summarizes the current tube plugging status for North Anna Unit 2 steam generators.

Table 2 – Current Tube Plugging Status

Steam Generator	Number of Plugged Tubes	Percent Plugged
A	1	0.03%
B	0	0.00%
C	5	0.14%
Total	6	0.06%

g. *The results of condition monitoring, including the results of tube pulls and in-situ testing*

The Condition Monitoring Assessment concluded that SG "A" and "C" did not exceed any performance criteria during the period preceding the fall 2011 inspection. No findings from the fall 2011 inspection invalidated previous operational assessments for any of the three steam generators and the condition monitoring requirements were met. Therefore, tube pulls and in-situ pressure testing were not necessary.

h. The effective plugging percentage for all plugging in each SG

There are no sleeves installed in the North Anna Unit 2 steam generators; therefore, the effective plugging percentage remains the same as stated in (f) above.