

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

February 11, 2015

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555


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Docket No. 50-339  
License No. NPF-7

**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 2014 outage.

Should you have any questions or require additional information, please contact Mr. Page Kemp at (540) 894-2295.

Very truly yours,

  
Gerald T. Bischof  
Site Vice President

Attachment

Commitments made in this letter: None

A001  
NRK

cc: U.S. Nuclear Regulatory Commission  
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**ATTACHMENT**

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

**VIRGINIA ELECTRIC AND POWER COMPANY  
(DOMINION)**

## FALL 2014 - NORTH ANNA UNIT 2 STEAM GENERATOR INSPECTIONS

During the North Anna Unit 2 fall 2014 refueling outage, steam generator (SG) inspections were completed in accordance with Technical Specification (TS) 5.5.8.d for SG "B". Transmittal of this report satisfies the reporting requirement specified in TS 5.6.7.

The Unit 2 Steam Generators have accrued 17.0 Effective Full Power Years (EFPY) of operation as of the end of Cycle 23 (September, 2014).

Initial entry into Mode 4 occurred on October 8, 2014 (1458 hours); therefore, this report is required to be submitted by April 6, 2015.

*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 "B":

- Video examination of both channel heads (as-found / as-left).
- 100% full-length inspection utilizing bobbin coil probe for all tubes except for Row 1 U-bends
- 28% 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
- 17% of cold leg top of tubesheet (+/-3") utilizing rotating coil probe with tube sample constituting 56% of all tubes within five tubes of the bundle periphery
- 100% Row 1 (98 tubes) U-bend region utilizing rotating coil probe
- Special interest inspections of dents/dings with rotating coil probe (Sample: 100% of dents/dings  $\geq$  5 Volts; all new dents)
- Special interest rotating coil probe exams of largest voltage tubesheet over-expansions (OXP) (20 hot leg and 4 cold leg tests)
- Inspection of all bobbin coil I-codes (i.e., possible indications) with rotating coil probe. Results identified in Table 1 below.

**Table 1 – Bobbin Probe Indication / Special Interest Exam Summary**

KEY: tubes / indications / indications tested with +Point	SG "B"
I-Codes	6 / 6 / 6
New Dent	1 / 1 / 1
Dents $\geq$ 5 Volts**	2 / 2 / 2
Hot Leg Straight Dent	12 / 12 / 0
U-bend Dent	7 / 8 / 1
Cold Leg Straight Dent	9 / 9 / 1
Hot Leg Straight Manufacturing Burnish Mark (MBH)	19 / 20 / 20
U-bend MBH	2 / 2 / 0
Cold Leg Straight MBH	14 / 14 / 0
Historical Hot Leg OXP	323 / 445 / 20
Historical Cold Leg OXP	490 / 657 / 4
No Tube Expansion (all are on cold leg)	4 / 4 / 4

\*\*Included in the dent totals

The following secondary side inspections were performed in steam generator "B":

- 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 feeding internal interface for flow assisted corrosion in the carbon steel portions of the tee and inlet sections.
- Visual inspections of upper tube support plates via 7<sup>th</sup> tube support plate (TSP) handholes to assess structural condition and cleanliness, including that of TSP wedges and associated welds.
- Ultrasonic thickness measurement of selected feeding locations.

*b. Degradation mechanisms found*

No tube degradation was identified during this examination.

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

The 2014 tube inspections focused on the degradation mechanisms listed in Table 2 utilizing the referenced eddy current techniques.

**Table 2 – Inspection Method for Applicable Degradation Modes**

<b>Classification</b>	<b>Degradation Mechanism</b>	<b>Location</b>	<b>Probe Type</b>
Potential	Tube Wear	Anti-Vibration Bars (AVB)	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	IGA/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	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 2014 examination.

UT thickness measurements were taken in selected regions of the SG “B” feedring during the outage and identified localized exterior erosion on the side of the feedring Thermal Sleeve below the discharge of nozzle #35, with a minimum measured wall thickness of 0.291”. The localized erosion has been evaluated and determined to be acceptable for continued operation until the next scheduled refueling outage in the spring of 2016.

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

No tubes were plugged during this inspection.

- f. *The number and percentage of tubes plugged to date, and the effective plugging percentage in each steam generator,*

Table 3 summarizes the current tube plugging status for North Anna Unit 2 steam generators.

**Table 3 – Current Tube Plugging Status**

<b>Steam Generator</b>	<b>Number of Plugged Tubes</b>	<b>Percent Plugged</b>
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 “B” did not exceed any performance criteria during the period preceding the fall 2014 inspection. No findings from the fall 2014 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.

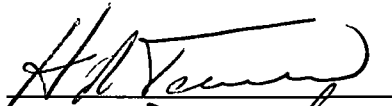
The fall 2014 inspection was the first inspection of the Unit 2 SG “B” following the August 2011 earthquake. It was concluded in the inspection results in 2011 of steam generators “A” and “C” that there was no evidence of earthquake-related damage. In the absence of any degradation reported following the current outage primary side and secondary side examinations, the North Anna Unit 2 steam generators continue to satisfy the structural and leakage integrity requirements delineated in the Dominion Steam Generator Program and North Anna Technical Specifications.

bc: (\*paper copy; remainder electronic distribution)

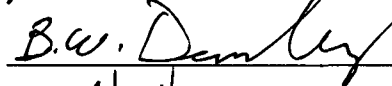
Ms. L. Hilbert- NAPS  
Mr. D. C. Lawrence – SPS  
Mr. L. J. Armstrong – MPS  
Mr. J. T. Stafford - KPS  
Mr. P. A. Kemp – NAPS  
Mr. R. P. Repshas - KPS  
Mr. B. A. Garber- SPS  
Mr. W. D. Bartron – MPS  
Mr. D. A. Sommers - IN2SE  
Mr. E. T. Shaub - IN2SE\*  
Mr. J. H. Leberstien – NAPS  
Mr. B. Derreberry - NAPS  
Mr. H. A. Tessier - NAPS  
Mr. T. M. Mayer - SPS  
Mr. H. V. Le - NAPS  
Licensing File\*  
MSRC Coordinator - IN2SE  
Records Management - (bc original) - IN-GW\*

**CONCURRENCE**

H. A. Tessier



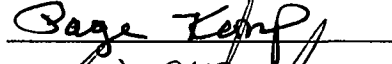
B. W. Derreberry



H. V. Le



P. A. Kemp



L. Hilbert





**Commitments (Stated or Implied)**

1. None

**Verification of Accuracy**

1. E-mail from Harry A. Tessier to Jay Leberstien dated February 3, 2015 entitled North Anna Unit 2 180 Day Report
2. Initial entry into Mode 4 occurred on October 8, 2014 (1458 hours); submit by April 6, 2015.

**Required Changes to the UFSAR or the Topical Report:**

1. None

**Action Plan/Commitments (Stated or Implied):**

1. None