VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

September 28, 2016

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No. 16-196A
SPS LIC/CGL R1
Docket No. 50-281
License No. DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNIT 2
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
2015 STEAM GENERATOR INSERVICE INSPECTION REPORT

By letter dated May 10, 2016 (Serial No. 16-196), Virginia Electric and Power Company (Dominion) submitted information summarizing the results of steam generator (SG) tube inspections performed at Surry Power Station Unit 2 during the Fall 2015 refueling outage. On August 29, 2016, the NRC requested additional information related to the SG inspections. The NRC's questions and Dominion's responses are provided in the attachment to this letter.

If you have any questions or require additional information, please contact Ms. Candee Lovett at (757) 365-2178.

Very truly yours,

Douglas C. Lawrence
Director Station Safety & Licensing
Surry Power Station

Attachment - Response to NRC Request for Additional Information Regarding Fall 2015 Steam Generator Inservice Inspection Report - Surry Power Station Unit 2

Commitments made in this letter: None

IE47
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Serial No.: 16-196A
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ATTACHMENT

Response to NRC Request for Additional Information Regarding Fall 2015 Steam Generator Inservice Inspection Report

Surry Power Station Unit 2

Virginia Electric and Power Company (Dominion)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING SURRY UNIT 2 FALL 2015 STEAM GENERATOR TUBE INSPECTIONS

By letter dated May 10, 2016 (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML16141A117), Virginia Electric and Power Company (Dominion) submitted steam generator tube inspection results from the Fall 2015 inspections at Surry Power Station, Unit 2. In order to complete its review, the NRC staff requests the following additional information. The Dominion responses are provided below.

1. **For the bobbin coil exams in rows 1 – 5 in Table 1, it appears that there is one less exam reported for the cold-leg than for the hot-leg in SG C (463 versus 464). Please confirm these numbers and clarify the reason, if correct.**

   Response:

   Four hundred sixty-four (464) tubes in Rows 1 to 5 were inspected with bobbin probes from the cold leg in SG C. These tubes included 463 that were inspected from 07C to TEC with a 0.720 inch diameter bobbin probe and one tube (SG C R1C58) that was inspected from 07C to TEC with a 0.700 inch diameter probe.

   Tube R1 C58 was included in the original Table 1 under the "C/L Straight Restricted" category. This tube has a relatively large historical dent at the top of the tubesheet on the cold leg. The dent prevents passage of the 0.720 inch diameter bobbin probe, but allows passage of the 0.700 inch diameter bobbin probe. The cold leg straight section of this tube was inspected with a 0.700 inch diameter probe. To ensure effective examination of the tube, the entire cold leg and u-bend of this tube were also examined with a 0.680 inch diameter +Point™ probe. The hot leg was examined with a 0.720 inch diameter bobbin probe.

   During review of Table 1 while preparing this response, it was discovered that one inspection in SG C R20C62 was included in the "C/L Straight Restricted" category, but should have been included in the "H/L Straight Restricted" category. Following is a revised Table 1 which reclassifies this inspection and also includes additional clarifying information on the restricted tubes.

   Altogether, there were three restricted tubes (SG A R3C9, SG C R1C58, and SG C R20C62) that required inspections of different extents and/or inspections with 0.700 inch diameter bobbin probes. The restrictions in these three tubes have been present in previous examinations. No degradation was detected in any of these tubes.

Table 1 - Eddy Current Testing Examination Scope

Scope Description	Extent	S/G A	S/G B	S/G C
Bobbin Coil Exams				
Full Length	TEHTEC	2849		2831
H/L CandyCane (Row 3-5)	07CTEH	278		282
H/L Straight (R1-2)	07HTEH	185		182
H/L Straight Restricted (SG C R20C62)	02HTEH			1
H/L Straight Restricted (SG C R20C62*)	07HTEH			1
C/L CandyCane Restricted (SG C R20C62)	03HTEC			1
C/L Straight Restricted (SG A R3C9; SG C R1C58*)	07CTEC	1		1
C/L Straight (R1-5)	07CTEC	462		463
Array Exams				
H/L TSH Array (Non-Baffle Plate)	TSH01H	834	444	843
H/L TSH Array (Baffle Plate)	TSHBPH	2478	1260	2453
C/L TSC Array (Non-Baffle Plate)	TSC01C	834		842**
C/L TSC Array (Baffle Plate)	TSCBPC	2478		2453
MRPC Exams				
Ubend +PT (Row 1-2)	07H07C	185		182
MRPC Special Interest				
H/L Previous Indications	Various	120		172
H/L Previous Restricted	02H03H			1
C/L Previous Restricted	Various			8
H/L Current Indications	Various	97	7	92
Ubend Current Indications	Various	2		1
C/L Previous Indications	Various	8		7
C/L Current Indications	Various	36		20
Indications For MagBias Probe	Various	1		2
Additional RPC	TEHTSH		2	
	Total	10848	1713	10838

* The noted inspections of SG C R1C58 and SG C R20C62 were performed with 0.700 inch diameter bobbin probes. All other bobbin inspections were performed with 0.720 inch diameter probes.

** The cold leg tubesheet region of SG C R1C58 was inspected with a downsized +Point™ probe in lieu of array due to a restriction at the top of the tubesheet. Hence, the number of cold leg array inspections is one less than the number of hot leg array inspections.

2. **For the array exams in Table 1, it appears that there is one less array exam reported for the cold-leg tubesheet than for the hot-leg tubesheet in SG C (842 versus 843). Please confirm these numbers and clarify the reason, if correct.**

Response:

This discrepancy in the number of tubes is also related to tube R1C58 in SG C. As noted in the Response to Question 1, the dent at the top of the cold leg tubesheet prevents passage of the 0.720" diameter array probe. Therefore, the cold leg tubesheet region of this tube was examined with a 0.680 inch diameter +Point™ probe in lieu of an array probe. The +Point™ examination of the cold leg tubesheet region of this tube is counted in the "Special Interest" section of Table 1. No degradation was identified.

3. **According to Table 5, two foreign object wear indications in SG A, and three foreign object wear indications in SG C, were initially reported in 2015 that were present in prior outages. Table 5 shows that these indications had maximum depths ranging from 19 - 27 percent through-wall and had not changed since they were initially detected in the previous outages. Please confirm and discuss why these indications were not reported previously, or clarify the information in the table (since volumetric indications of these depths would normally be readily detectible with a high probability of detection).**

Response:

The five indications in question were not reported in previous outages due to either re-characterization of the flaws from previous outages or reduced probability of detection (POD) for these low voltage signals. The depths provided by Examination Technique Specification Sheet (ETSS) 27901.1 are believed to be conservative, as discussed below. Newly reported foreign object wear indications in this depth range have been common at Surry since implementation of ETSS 27901.1.

The two indications in tube SG A R4C37 have been present and reported as either local geometry variation (LGV) or manufacturing burnish mark (MBM) for the last several inspections. Upon closer review of the eddy current signals, these two indications were re-characterized as foreign object wear during the 2015 outage.

The indications in SG C (R30C48, R36C32, and R45C42) were all low voltage signals that had not been previously reported with +Point™. Two of the indications (R36C32 and R45C42) were included with the array results during the previous inspection (and were not specifically reported because there was no degradation found (NDF) with +Point™). EPRI ETSS 27901.1 was used for depth sizing these

flaws. Relative to other available techniques, this technique can give relatively deep measurements for low voltage signals. The deepest of these indications in SG C had a maximum +Point™ voltage of 0.13 volts and a corresponding measured depth of 21%TW. Signals of this small amplitude are subject to analyst discretion, as well as signal interference from support structures, tubesheet interfaces, and/or sludge buildup on the outer diameter of the tube.

The sizing obtained for low voltage signals using ETSS 27901.1 is believed to be overestimated for signals below approximately 0.2 volts. This is based on a review of the calibration setpoints relative to the calibration curve built with the setpoints. The setpoint for a 0.1 volt flaw in ETSS 27901.1 is 13%TW. However, when the calibration curve is built, a 0.1 volt flaw has a measured depth of 19%TW. Hence, the depths of flaws in this voltage range are believed to be overestimated by approximately 6%TW.