

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 1, 2004

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D.C. 20555

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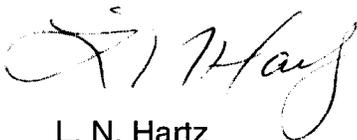
Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
2003 ANNUAL STEAM GENERATOR INSERVICE INSPECTION SUMMARY REPORT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Virginia Electric and Power Company (Dominion) submitted the 2003 Annual Steam Generator Inservice Inspection Summary Report for Surry Power Station in a letter dated February 23, 2004 (Serial No. 03-622). The report included the inspection results for the Surry Unit 1 and Unit 2 steam generator inspections conducted during the Spring 2003 and Fall 2003 refueling outages, respectively. In a letter dated September 3, 2004, the NRC informed Dominion that additional information was necessary to complete their evaluation of our submittal and included four questions in the enclosure to the letter for Dominion's response. We have reviewed these questions and provided our response in the enclosure.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Very truly yours,



L. N. Hartz
Vice President – Nuclear Engineering

Commitments made in this letter: None

Enclosure

cc: U. S. Nuclear Regulatory Commission
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Enclosure

Response to NRC Request for Additional Information Surry 2003 Annual Steam Generator Report

1. *The Plugging/Repair Record table on page 3 of Attachment 1 to your submittal dated February 23, 2004, indicates that 7 tubes are plugged in the B steam generator of Unit 1. A historical review of the 2000 and 2001 inservice inspection summary reports indicates that 14 tubes were plugged in the B steam generator prior to the 2003 inspection. Please verify the total number of tubes plugged in Unit 1, Steam Generator B following the 2003 steam generator tube inspections.*

Response

The NRC observation is correct. Only the tube plugging data for the outage was included. The cumulative plugging for the "B" steam generator should be 21 tubes. A revised Attachment 1 tabulation is included for your use.

2. *The February 23, 2004, submittal indicates that the steam generators at both units have experienced denting in peripheral tubes near the 6th and 7th tube support plates. Please discuss whether new dents were identified during your 2003 inspections and whether existing dents have "grown." If existing dents are increasing in magnitude, please discuss how this condition (i.e., increased stresses and associated increase in the propensity for stress corrosion cracking) was addressed in your operational assessment.*

Response

This issue has been previously addressed in the Steam Generator Annual Reports for the 2001 inspections and 2002 inspections. For the sake of background information, please refer to those reports and the related follow-up responses to requests for additional information.

For the 2003 inspections on Units 1 and 2, attention continued to be given to these signals in our "DNT" monitoring program. For the respective routine inspections on the "B" steam generator on each unit, the reporting threshold was lowered to 2.0 volts with history resolution required as defined in the 2003 Annual Report. Included in this population of tubes subject to tracking are obviously the referenced signals at the tube support plate (TSP) locations. As observed in other generators, the voltage levels continue to be low relative to a level that would cause any concern of significant stresses induced on the tubes. This is supported by the fact that standard size (i.e. 0.720") bobbin and rotating probes continue to pass at these locations. Even though some of these locations do not meet the signal change criteria that require a rotating coil examination, these locations or a sample thereof are included in the 20% "DNT" sampling program. Confirming with rotating probe

examinations that these locations are non-degraded forms the basis for acceptance going forward in the operational assessment. It should be noted that no corrosion cracking degradation has been identified to date at these or other locations in the generators on either of the Surry units.

With regard to new incidences and “growth” of existing signals, the following provides relevant information on “DNT” signals at these locations.

Unit	Located @ 7 th TSP	Located @ 6 th TSP	Rotating Coil (RC) tested at 6 th and 7 th	Max Bobbin V (P1 Channel)
1 “B”	29	None	18 ¹	9.01 V and RC tested
2 “B”	153	6	43 ²	11.45 V and RC tested

- Note: 1. Not indicated in the data as being required due to signal change, hence not exhibiting “growth”.
2. Some of the signals exceeded the signal change criteria and were by analysis guideline requirement included in the “special Interest” examination population. Specific “growth” evaluations have not been typically conducted nor have they been deemed necessary based on observed voltage levels and continued resolution by sample rotating coil examinations.

The monitoring of this category of signals will be continued. Ensuing inspections provide the opportunity to develop data using similar analysis and resolution criteria. This will provide additional data relative to further understanding this possible phenomenon or determining if any ongoing additional monitoring is necessary. As previously noted, no degradation has been observed at these locations based on rotating probe sample inspections.

3. *The indications identified at the top of the tubesheet for hot leg locations R22C82 and R23C82 were attributed to interaction with a foreign object that is believed to no longer be in the area. These indications were identified during an inspection of the “critical area” of the hot leg top of tubesheet. Please discuss the nature of this critical area (i.e., the low velocity region in the middle of the tube bundle). It was assumed that the object was no longer in this area. Please discuss the basis for this conclusion. Specifically address whether a visual inspection was performed in this critical area and the possibility that the part was not in contact with the tube during the eddy current inspections (or does not conduct eddy currents). Please discuss how other forms of degradation, such as intergranular attack and closely spaced pits, were ruled out as possible causes of the indications.*

Response

With regard to the question of “critical area”, the hot leg side top-of-tubesheet rotating coil inspections are typically focused in the area in the center of the bundle coincident with the low velocity region below the baffle plate. This is the area of the bundle where the largest accumulation of sludge and particulate fallout occurs as the bundle flow is directed upward through the baffle hole opening. Although no corrosion related degradation has been observed to date, this condition presents the potential for sludge and scale pockets and hence increased potential for secondary side tube corrosion. Therefore, the majority of any routine sample set is driven by the observed conditions through mapping the extents of sludge and scale distribution across the tubesheet from prior eddy current and visual inspections. This area is typically bounded by R1 C27 to C67 and Row 30 C37 to C57. This is somewhat larger than the baffle hole opening to account for previous sludge area observations. Remaining tubes in the sample set outside the critical area include peripheral area tubes, tubes in the blowdown pipe lane, and others randomly selected in the inner bundle. It should be noted that a 100% bobbin inspection was also conducted on the subject generator.

Two (2) locations (R22C82 @ TSH + 0.31” and R23C82 @ TSH + 0.06”) were identified with volumetric indications. It was determined with a high level of confidence that both indications did not have morphology representative of closely spaced pits or intergranular attack (IGA). This determination was based on the rotating coil signal attributes (length and width), data from previous indications with the similar responses, and past Surry operating experience. Additionally, the signals were in adjacent tubes consistent with a foreign object wear-type indication. Pitting and cracking type indications have a distinct signal not represented in these tubes. Pitting has not been observed on this generator in other locations and specifically would not be expected at these locations, since they are in an area outside the sludge region. Commensurately, corrosion degradation (i.e. OD/IGA) would not be expected outside the sludge zone area. History reviews also confirm the presence of small foreign objects in this general area of the generator during past tubesheet lancing and visual inspections. Objects of concern were retrieved and removed from the generator.

Bounding inspections were conducted in the area using the plus point coil probe to determine if additional damage or foreign objects were present. The increased inspection identified no other indications of wear degradation or conductive loose parts. No visual examination was deemed necessary since as a part of a planned one-time expanded hot leg top-of-tubesheet rotating probe inspection program 71% of the tubes across the tubesheet were inspected. This was intended to capture tubes not previously subjected to a rotating coil examination. Based on: 1) “boxing in” the tubes in the area of the observed wear, 2) inspection of an expanded population of tubes, 3) the thoroughness of the examinations performed, and 4) no observed corrosion degradation, evidence of objects or other damage, adequate assurance of tube integrity is maintained.

4. *A search of our document management system indicates that the NRC staff does not have a "15-day" plugging report on file for the 2003 Unit 2 steam generator tube inspection. Please provide another copy of this report.*

Response

A copy of the 2003 Surry Unit 2 steam generator tube plugging report is provided in Attachment 2.

Attachment 1

Virginia Electric and Power Company (Dominion)
Annual Steam Generator Report
(Rev. 1 – 10/04)

Dominion
Surry Power Station Unit 1

Virginia Electric and Power Company (Dominion)
Surry Unit 1
Annual Steam Generator Report
(Rev. 1 – 10 /14/04)

Station	Unit	Outage Date	Generator Examined		Date of Report
Surry	1	April, 2003	B	C	October 20, 2003

SG Design Information						
SG Model	TSP Type.	TSP Mat'l	# TSP	Baffle Mat'l	AVB Mat'l	# AVB
51F	Quatrefoil	Type 405 SS	7	Type 405 SS	Chrome Plated IN-600	2
# Tubes	Tube Dia.	Tube Mat'l	Tube Pitch	Tube Tks	Expansion	Heat X-fer Area
3342	0.875"	Alloy 600TT	1.281"	0.050"	Full Hydraulic	51,500 sq. ft.

Scope of Inspection					
SG	Inspection Program	Planned	Inspected	Inspection Method	Extent
B	Bobbin	3328	3328	Bobbin	TSH-TSC
B	Row 1 U-Bend RC	90	90	+U-Bend Point RC	7H – 7C
B	TTS Hot Leg RC	678	678	+ Point RC	TSH +/- 3"
C	Special Interest Bobbin	NA	17	Bobbin	1H-TEH
C	Special Interest Bobbin	NA	3	Bobbin	BPH-TEH
C	Special Interest Bobbin	NA	20	Bobbin	1C-TEC
C	HL Special Interest RC	NA	2	+Point RC	1H - TSH
C	HL Special Interest RC	NA	3	+Point RC	BPH - TSH
C	CL Special Interest RC	NA	2	+Point RC	1C - TSC
C	CL Special Interest RC	NA	1	+Point RC	BPC - TSC

Indications of Imperfections Detected							
SG	NDE Method	Row	Column	Indication Code	Location	Active Yes/No	Measured Wall Penetration
B	Bobbin	35	17	Percent	AV2	No	12%
		35	17	Percent	AV3	No	17%
B	Bobbin	35	18	Percent	AV2	No	13%
		38	21	Percent	AV1	No	13%
B	Bobbin	38	21	Percent	AV2	No	12%
		38	22	Percent	AV2	No	10%
B	Bobbin	39	25	Percent	AV3	No	10%
B	Bobbin	40	25	Percent	AV2	No	19%
B	Bobbin	41	27	Percent	AV2	No	12%
		41	27	Percent	AV3	No	13%
B	Bobbin	42	29	Percent	AV2	No	16%
B	Bobbin	42	30	Percent	AV4	No	12%
B	Bobbin	34	58	Percent	AV2	No	22%
		34	58	Percent	AV3	No	17%
		34	58	Percent	AV4	No	10%
B	Bobbin	26	61	Percent	AV3	No	13%

Indications of Imperfections Detected							
SG	NDE Method	Row	Column	Indication Code	Location	Active Yes/No	Measured Wall Penetration
B	+Point RC	1	9	VOL (Wear)	TSH + 15.56"	No	39%
		1	9	VOL (Wear)	TSC + 15.49"	No	28%
B	+Point RC	1	28	VOL (Wear)	TSH + 15.51"	No	31%
		1	28	VOL (Wear)	TSC + 16.18"	No	41%
B	+Point RC	1	67	VOL (Wear)	TSH + 15.63"	No	20%
		1	67	VOL (Wear)	TSC + 16.16"	No	18%
B	+Point RC	1	86	VOL (Wear)	TSC + 15.27"	No	36%
C	+Point RC	1	9	VOL (Wear)	TSH + 16.07"	No	16%
		1	9	VOL (Wear)	TSC + 15.81"	No	15%
C	+Point RC	1	28	VOL (Wear)	TSH + 15.92"	No	30%
		1	28	VOL (Wear)	TSC + 16.44"	No	21%
C	+Point RC	1	67	VOL (Wear)	TSH + 16.72"	No	26%
		1	67	VOL (Wear)	TSC + 15.96"	No	35%
C	+Point RC	1	86	VOL (Wear)	TSH + 16.91"	No	34%

Tube Plugging		
SG	Reason/Mechanism	Tubes Plugged
B	Sludge Lance Monorail Wear (VOL)	4
B	Dent (DNT)	2
B	Permeability Variation (PVN)	1
C	Sludge Lance Monorail Wear (VOL)	4
Total Tubes Plugged		(SG B – 7) (SG C – 4)

Repair Attributions				
SG	Row	Column	Reason/Mechanism	Repair Method
NA	NA	NA	NA	NA

Plugging/Repair Record						
SG	Tubes Plugged	Tubes Repaired (Not Plugged)	Percent Plugged	Percent Repaired (Not Plugged)	Percent Plugged or Repaired	Average Plugging Limit (See Note 1)
A	16	0	0.48	0	0.48	15%
B	21	0	0.63	0	0.63	
C	17	0	0.51	0	0.51	

Note 1: As described in the safety evaluation and plant LOCA analyses, steam generators are restricted to an equivalent plugging limit of 15% average and 15% in any one steam generator with no greater than a 5% differential between any two steam generators expressed in number of tubes per generator.

Attachment 2

Letter from Virginia Electric and Power Company to USNRC dated October 23, 2003
Steam Generator Tube Inspection Report

Dominion
Surry Power Station Unit 2

October 23, 2003

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

Serial No.: 03-538
NL&OS/mm RO
Docket No.: 50-281
License No.: DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
SURRY POWER STATION UNIT 2
STEAM GENERATOR TUBE INSPECTION REPORT

Planned inservice inspection of the Surry Unit 2 "B" steam generator was completed during the Fall 2003 Refueling Outage. In accordance with Surry Power Station Technical Specification 4.19.F.a, this letter provides notification of the number of steam generator tubes that were plugged during the outage.

Steam Generator "B"

The following three (3) tubes were plugged in "B" steam generator as a result of this inspection:

Location	Plugging Attribute	Maximum Measured Through-Wall Penetration	Comments
Row 21 Column 10	Wear caused by foreign object	20%	Preventatively plugged
Row 22 Column 10	Wear caused by foreign object	17%	Preventatively plugged
Row 22 Column 11	Wear caused by foreign object	16%	Preventatively plugged

No new commitments are being made as a result of this letter. If you have any questions concerning these results, please contact Mr. Gary Miller at (804) 273-2771.

Very truly yours,



C. L. Funderburk , Director
Nuclear Licensing and Operations Support
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for Virginia Electric and Power Company

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