

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 20, 1991

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Gentlemen:

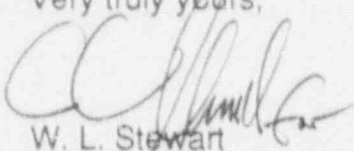
VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT 1
STEAM GENERATOR TUBE PLUGGING REPORT

North Anna Unit 1 recently completed its 1991 refueling outage. During the outage, we completed eddy current examination of all three steam generators. As required by Technical Specification 4.4.5.5.a, this letter provides a summary of the tube plugging activities performed during the outage.

Attachment 1 provides a listing of those tubes that were plugged during the outage due to eddy current indications. In addition to the tubes plugged due to indications, several other tube plug related activities were accomplished during the outage. Due to the concern for tube plug integrity, tube plugs with suspect heat numbers were removed and new plugs installed. Attachment 2 provides a listing of tubes for which the plugs were replaced. Also, several tubes had previously been plugged with sentinel plugs as a preventative measure due to a concern for susceptibility for U-bend fatigue. The plugs for most of these tubes were removed and the tubes returned to service. Attachment 3 provides a listing of those tubes from which plugs were removed. These tubes were previously identified in our letter to the NRC, Serial No. 90-274, dated June 21, 1990. This letter informed the NRC of our intent and provided justification for removal of these plugs and returning the tubes to service. Attachment 4 provides a summary of the current tube plugging levels in each steam generator.

Should you have any questions or require additional information, please contact us.

Very truly yours,



W. L. Stewart
Senior Vice President - Nuclear

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Attachments

1. North Anna Unit 1 Steam Generators - Tubes Plugged Summary
2. North Anna Unit 1 Steam Generators - Plugs Repaired
3. North Anna Unit 1 Steam Generators - Tubes Returned to Service
4. North Anna Unit 1 Steam Generators - Tube Plugging Levels Summary

cc: U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, N.W.
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Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

ATTACHMENT 1

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA UNIT 1
STEAM GENERATOR TUBES PLUGGED SUMMARY
REFUELING OUTAGE - 1991

Virginia Electric and Power Company
North Anna Power Station Unit 1

Steam Generators A, B, & C Tubes Plugged Summary

The following tables list those tubes in the North Anna Unit 1 Steam Generators which were plugged during the 1991 refueling outage.

Table No. 1A: Tubes plugged in Steam Generator A.

Table No. 1B: Tubes plugged in Steam Generator B.

Table No. 1C: Tubes plugged in Steam Generator C.

Table No. 1A

Steam Generator A

A total of one hundred ninety (190) tubes were plugged in Steam Generator A during the 1991 refueling outage.

The following tubes were plugged based on eddy current indications:

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
4	4	32	26
2	5	38	26
10	5 ***	2	27
11	5 ***	8	27
10	6	20	27
13	6	28	27
4	9	16	28
9	9	18	28
14	9	33	28
17	9	17	29
2	10	18	29
21	10	22	29
4	11	9	30
24	12	16	30
4	13	17	30 *
31	13	20	30 *
14	14	35	30
25	16	8	31
4	17	18	31 *
28	18	9	32 *, ***
3	19	17	32
18	19	18	32
36	21	3	33
6	22	9	33
35	22	14	33
6	23	19	33
14	23	28	33
12	24	9	34
13	24	19	34
16	24	30	34
39	24	14	35
7	25	23	35
16	25	24	35
20	25 *	39	35
11	26	10	36 ***
23	26	11	36

Table No. 1A
Steam Generator A

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
14	36	25	50
23	36	5	51
34	36	28	51
12	37	5	52
14	37	13	52
21	37	14	52
25	37	12	52
33	37	24	52
9	38 ***	30	52
10	38 ***	3	53
12	38	8	53
18	38	10	53 ***
2	39	16	53
4	39	18	53
25	39	27	53
6	40	31	53
13	40	32	53
16	40	33	53
21	40 *	5	54
27	40	6	54
28	40	25	54
31	41	29	54
32	41	34	54
6	42	38	54
19	42 *	40	54
23	42	10	55
15	43	26	55
22	43	32	55
23	43	24	56
32	43	27	56
12	44	33	56
17	44	4	57
9	45 ***	29	57
14	45	14	58
8	46	23	58
14	46	10	59 ***
24	47	30	59
33	48	35	59
45	48	15	60
11	49	5	61
16	49	4	62
25	49	13	62
33	49	25	62
4	50	2	63
7	50	41	63
15	50	6	64
20	50	23	64

Table No. 1A
Steam Generator A

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
2	66	17	74
11	66 *	27	74
3	68	16	76
40	69	20	77
6	70	11	78 ***
7	70	24	81
8	70	5	83
11	71	6	83
37	71	29	83
9	72	17	91
4	73	8	92
10	74 *	7	45 **

* Stabilizers installed on hot leg side of these tubes.

** Tube plugged and stabilized by mistake.

*** Tubes scheduled to be restored to service this outage (i.e., plugs removed during this outage). However, the tubes were inspected and replugged due to eddy current indications or other anomalies.

Table No. 1B

Steam Generator B

A total of one hundred fifty-six (156) tubes were plugged in Steam Generator B during the 1991 refueling outage.

The following tubes were plugged based on eddy current indications:

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
3	2	17	37
4	2	27	37
3	7	3	38
7	7	4	38
2	8	5	38
2	9	12	38
5	9 *	14	38
2	10	19	38
2	12	21	38
9	12	3	39
19	13	4	39
11	14 **	6	39 *
6	15 *	12	39
11	15	37	39
25	15	5	40
9	16	11	40
23	16	20	40 *
7	18	31	40
10	19	11	41
10	20	21	41
15	20	25	41
16	23	27	41
37	23 *	5	42
5	24	11	42
7	25	15	42
17	25	2	43
7	30	6	43
5	32	7	43
15	33	12	43
21	35	17	43
3	36	27	43
14	36	29	43
16	36	2	44
3	37	3	44
10	37	17	44
15	37	31	44

Table No. 1B
Steam Generator B

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
5	45	27	57
12	45	29	57
17	45	9	58
22	45	21	58
21	46 *	27	58
25	46	27	59
7	47	44	59
24	47 *	36	60
21	48	11	61
22	48 *	38	62
24	48	22	63
8	49	4	64
22	49 *	11	64
24	49	17	66
14	50	38	66
22	50	11	68
23	50	9	69
25	50	7	70
5	51	8	70 *
12	51	35	70
19	51	2	71
25	51	2	74
29	51	10	74 *
2	52	35	74
6	52	17	75
13	52 *	37	75
16	52	15	78
25	52	7	80
30	52	29	80
39	52	7	81
44	52	11	82
14	53	16	84
27	53	24	84
4	54	2	85
28	54	7	85
26	56	2	86
27	56	7	86
9	57	5	87
13	57	12	88
14	57	4	89
25	57	2	90
26	57	2	93

* Stabilizers installed on hot leg side of these tubes.
 ** Tube pulled for evaluation.

Table No. 1C

Steam Generator C

A total of two hundred sixty-one (261) tubes were plugged in Steam Generator C during the 1991 refueling outage.

The following tubes were plugged based on eddy current indications:

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
3	3	6	26
10	5 ***	13	26 *
11	7	14	26
6	8	16	26
10	8	19	26
11	8	3	27
17	8	5	27
7	9	20	27
6	10	14	28
28	10	18	28
11	11	19	28 *
16	11	22	28
5	12	13	29
7	14	19	29
10	14	20	29
25	14	3	30
16	15	12	30
10	16	14	30 *
3	17	19	30
12	18	20	30
21	18	24	30
32	18	16	31
19	19	18	31
8	20	19	31
16	20	21	31 *
7	22	10	32 ***
11	22 *	15	32
3	23	16	32
11	23	22	32
10	24 ***	29	32
14	24 *	17	33 *
5	25	18	33
10	25 *, ***	22	33
17	25	6	34
22	25	16	34
39	25	18	34

Table No. 1C
Steam Generator C

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
24	34	29	44
25	34	3	45
19	35	12	45
22	35	13	45
24	35 *	14	45
18	36	18	45
19	36 *	24	45
21	36	45	45
2	37	15	46
11	37	23	46
19	37 *	25	46
21	37	32	46
24	37	8	47
27	37	9	47 *, **
25	38	18	47
27	38	20	47
17	39	25	47
19	39	14	48 *
20	39	23	48
22	39	24	48
25	39	32	48
29	39	33	48
2	40	12	49
18	40	32	49
19	40 *	17	51
23	40	19	51
24	40	25	51 *
28	40	31	51
2	41	7	52
5	41	13	52 *
7	41	21	52
20	41	23	52
23	41	20	53
24	41	25	53
26	41	17	55
41	41	25	55
3	42	26	55
16	42	2	56
19	42	13	56
24	42	17	56
25	42	27	56
27	42	28	56
18	43	29	56
25	43	9	57
31	43	17	57
19	44	19	57
24	44	26	57

Table No. 1C
Steam Generator C

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
28	57	23	71
5	58	28	71
14	58	35	71
25	58	8	72
14	59 *	11	72
16	59	12	72
17	59	13	72
25	59	2	73
26	59 *	4	73 *
31	59	6	73
13	60	7	73
14	60	10	73
17	60	11	73 *
23	60 *	18	73
26	60 *	10	74
14	61 *	5	75
21	61	7	75 *
26	61 *	20	75
14	62	7	76
24	62	10	76 *
14	63	14	76
7	64	16	76
13	64	27	76
15	64	10	77 *
26	64	18	77
27	64	5	78
2	65	11	78
7	65	13	78
13	65	6	79
25	65	10	79
6	66	28	79 *
22	66 *	2	80
23	66	6	80
31	66	7	80
4	67	10	80
11	67	5	83
5	68	17	83
33	68	18	83
4	69	8	84
5	69	16	84
8	69	3	85
20	69 *	7	87
22	69	2	90
41	69	7	90
11	70	11	90
29	70	16	90

Table No. 1C
Steam Generator C

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
12	93 ***	9	46 **
2	94		

-
- * Stabilizers installed on hot leg side of these tubes.
 - ** Tube plugged and stabilized by mistake.
 - *** Tubes scheduled to be restored to service this outage (i.e., plugs removed during this outage). However, the tubes were inspected and replugged due to eddy current indications or other anomalies.

ATTACHMENT 2

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA UNIT 1

STEAM GENERATOR PLUGS REPAIRED

REFUELING OUTAGE - 1991

Virginia Electric and Power Company
North Anna Power Station Unit 1

Steam Generators A, B, & C

The following tables list those tubes in North Anna Unit 1 for which the plugs were removed due to the potential for plug degradation and the plug replaced during the 1991 refueling outage.

Table No. 2A: Tubes for which plugs were repaired in Steam Generator A.

Table No. 2B: Tubes for which plugs were repaired in Steam Generator B.

Table No. 2C: Tubes for which plugs were repaired in Steam Generator C.

Table No. 2A

Steam Generator A

The plugs in a total of sixty-six (66) tubes were repaired in Steam Generator A during the 1991 refueling outage.

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
5	1	10	48
11	2	5	49
12	2	16	50
15	3	20	51
13	4	23	52
3	9	23	53
5	10	26	54
6	12	30	54
7	18	20	55
7	19	4	56
7	21	2	58
15	21	3	59
3	23	29	59
4	23	2	60
19	23	5	60
11	24	14	60
18	25	27	61
3	26	4	63
4	26	40	63
5	26	11	64
7	26	12	65
16	27	4	68
17	28	6	68
16	36	4	69
20	36	3	70
3	39	18	71
5	39	9	75
4	40	18	78
5	40	3	84
3	41	11	84
21	42	5	86
3	44	25	87
7	48	17	90

Table No. 2B

Steam Generator B

The plugs in a total of seventy-seven (77) tubes were repaired in Steam Generator B during the 1991 refueling outage.

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
10	2	18	44
11	2	11	45
11	3	26	45
12	3	9	46
13	3	16	46
2	5	26	46
2	6	14	47
2	7	18	47
3	11	11	48
34	18	12	48
7	19	23	48
2	21	28	51
3	21	5	53
7	22	15	53
9	23	16	53
24	23	30	53
3	25	13	54
2	28	16	54
7	28	26	54
9	30	4	56
39	33	10	60
9	34	11	60
13	34	41	66
9	35	12	67
13	35	35	68
24	35	11	70
6	37	10	73
14	39	24	73
28	39	34	74
2	40	34	75
3	40	8	77
13	40	4	79
7	41	14	83
24	41	25	87
25	42	2	92
11	43	10	93
34	43	11	93
9	44	12	93
16	44		

Table No. 2C

Steam Generator C

The plugs in a total of one hundred thirty-four (134) tubes were repaired in Steam Generator C during the 1991 refueling outage.

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
11	2	21	35
3	4	2	36
9	5	6	36
4	6	27	36
3	8	16	37
4	8	2	38
24	8	3	38
3	9	26	38
5	9	14	39
6	9	11	41
3	10	13	41
2	11	2	43
3	11	14	43
6	11	45	43
4	12	32	45
11	12	2	47
29	15	24	47
12	16	31	47
6	17	9	48
12	19	21	48
15	20	26	48
19	21	25	49
20	21	34	49
4	22	2	50
6	22	8	50
6	23	9	50
4	24	10	50
2	26	11	50
3	26	12	50
5	28	13	50
4	29	14	50
12	29	8	51
2	30	12	51
22	31	13	51
21	32	15	51
19	33	34	51
20	33	8	52
9	35	9	52

Table No. 2C
Steam Generator C

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
10	52	23	67
11	52	3	69
12	52	3	71
14	53	6	71
13	54	15	71
14	54	18	71
15	54	31	71
17	54	6	72
33	54	6	74
46	54	7	74
3	55	8	74
13	55	8	75
4	56	14	77
24	57	7	81
8	58	11	81
2	59	20	81
3	59	24	81
4	59	25	81
1	60	6	85
3	60	13	90
4	60	3	91
6	60	6	91
8	60	6	92
9	60	11	93
2	61		
3	61		
4	61		
6	61		
30	62		
8	63		
25	64		
8	66		
10	66		
5	67		

ATTACHMENT 3

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA UNIT 1
STEAM GENERATOR TUBES RETURNED TO SERVICE
REFUELING OUTAGE - 1991

Virginia Electric and Power Company
North Anna Power Station Unit 1

Steam Generators A, B, & C

The following tables list those tubes in North Anna Unit 1 for which the plugs were removed and the tubes returned to service during the 1991 refueling outage.

Table No. 3A: Tubes returned to service in Steam Generator A.

Table No. 3B: Tubes returned to service in Steam Generator B.

Table No. 3C: Tubes returned to service in Steam Generator C.

Table No. 3A

Steam Generator A

A total of seventy (70) of the attempted (80) tubes were successfully returned to service in Steam Generator A during the 1991 refueling outage.

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
9	2	9	47
10	2	10	47
8	3	11	47
10	3	9	48
11	3	10	52
12	3	11	52
13	3	12	52
8	4	12	53
10	4	9	54
11	4	10	54
10	7	11	54
11	7	12	54
10	8	9	59
11	8	11	59
9	14	9	60
9	24	11	60
10	32	9	61
10	33	10	61
9	35	11	61
10	35	9	66
10	37	10	72
11	37	10	73
11	38	10	76
10	39	10	77
11	39	10	78
9	40	12	78
10	40	10	79
11	40	11	79
9	41	12	79
10	41	10	93
11	41	11	93
9	42	12	93
9	43		
10	44		
10	45		
9	46		
10	46		
11	46		

Table No. 3B

Steam Generator B

There were no tubes returned to service in Steam Generator B during the 1991 refueling outage.

Table No. 3C

Steam Generator C

A total of fifty (50) of the attempted (56) tubes were successfully returned to service in Steam Generator C during the 1991 refueling outage.

<u>Row</u>	<u>Column</u>	<u>Row</u>	<u>Column</u>
10	2	11	30
12	2	9	31
10	3	10	31
10	4	11	31
10	6	11	32
9	15	9	37
9	17	9	42
10	18	9	44
9	19	9	45
10	19	10	45
10	20	9	46
10	22	10	46
10	23	10	47
9	24	10	48
11	24	9	49
9	25	9	56
11	25	9	61
10	26	9	63
11	26	9	64
10	27	9	65
9	28	9	66
10	28	9	67
10	29	9	68
9	30	9	75
10	30	10	93

ATTACHMENT 4

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA UNIT 1

SUMMARY

TUBE PLUGGING LEVELS IN EACH STEAM GENERATOR

REFUELING OUTAGE - 1991

**Virginia Electric and Power Company
North Anna Power Station Unit 1**

The following table is a summary of tube plugging levels for Unit 1 steam generators:

	A	B	C
Previously Plugged Tubes	353	269	445
* Tubes Returned-to-Service	80	0	56
** Tubes Plugged in 1991 Outage	190	156	261
Total Tubes Plugged	463	425	650
% Plugged	13.7	12.5	19.2

* Includes recovered tubes which required replugging.

** Includes new indications and recovered tubes which required re-plugging.
Excludes repaired plugs.