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United States Nuclear Regulatory Commission
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Subject: Report of Steam Generator Tube Inservice Inspection Results

Ladies and Gentlemen:

The enclosed report is submitted in accordance with the Davis-Besse Nuclear
Power Station, Unit Number 1, Operating License, Appendix A-Technical
Specifications. Technical Specification Surveillance Requirement 4.4.5.5.b and
Administrative Control 6.9.1.5.b require the FirstEnergy Nuclear Operating
Company to submit the results of the Steam Generator (SG) tube inservice
inspection to the NRC. Tubes in both of the Once-Through Steam Generators
(OTSGs) at the Davis-Besse Nuclear Power Station were inspected in April,
1998, during the Eleventh Refueling Outage (April 10 - May 23, 1998). The
enclosed report provides the results from this inspection, including a description
of the number and extent of tubes inspected, the location and percent wall-
thickness penetration for each indication of an imperfection, and the
identification of the number and location of tubes plugged, sleeved or repair
rolled.

The OTSG eddy current examinations were performed with probes utilizing a
Bobbin Coil, a Rotating Plus Point Coil and a Rotating Pancake Coil. The
Bobbin Coil Probe technique was used to perform the standard American
Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code
Section XI examination for flaw detection. This technique was applied to the
complete length of all inservice tubes.

The Rotating Plus Point and Pancake Coil Probe techniques were used to
examine specific areas of interest. These areas included the OTSGs' upper tube
end roll expansion regions, tubes bordering the lane and wedge region, non-
stress relieved roll transitions, and dent/ding locations. The Rotating Plus Point
and Pancake Coil Probe were also used to characterize all indications reported

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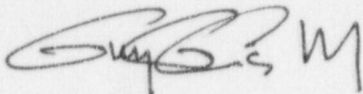
by the Bobbin Coil Probe technique, and the Rotating Pancake Coil technique was used to provide final depth sizing of Tube Support Plate wear indications. Rotating Plus Point Coil and Bobbin Coil Probe techniques were used to examine the sleeves installed over OTSG tubes during previous outages. The Rotating Plus Point Coil technique was also applied to the rolled regions and lower sleeve end of the tubes, while the Bobbin Coil Probe technique was used to examine the unrolled portion. The Rotating Pancake Coil Probe technique was used to examine tube plugs.

As a result of this inservice inspection, eighteen tubes were plugged and three tubes were repair rolled in SG 1-1. In SG 1-2, thirty-three tubes were plugged and one tube was repair rolled. No tubes were sleeved. In addition to the inservice inspection, a portion of a tube was removed from one OTSG for further analysis to characterize tube degradation mechanisms.

Should you have any questions or require additional information, please contact Mr. James L. Freels, Manager - Regulatory Affairs, at (419) 321-8466.

Very truly yours,

KAS/laj

enclosure

cc: S. J. Campbell, NRC Region III, DB-1 Senior Resident Inspector
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       Utility Radiological Safety Board

Docket Number 50-346
License Number NPF-3
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Enclosure

**Davis-Besse Nuclear Power Station
Eleventh Refueling Outage (11RFO)
Steam Generator Inservice Inspection Report**

Number and Extent of Tubes Inspected:

Steam Generator 1-1

Fifteen thousand, three-hundred, ninety-one (15,391) tubes in Steam Generator 1-1 were examined full length. This represents 100% of the tubes available for examination. Tubes with percent through wall (%TW) indications are listed in the table below. All of these are wear type indications which were sized with a qualified technique. All other tubes with imperfections were either repaired or plugged and are listed in that section of this report.

Two-hundred, twelve (212) sleeved tubes were examined with a sleeve Bobbin Coil Probe (100% of installed sleeves) and fifty-six (56) sleeved tubes were examined with a Rotating Plus Point Probe. No indications of through wall degradation were found.

Three-thousand, sixty-eight (3,068) Upper Roll Transitions were examined with a Rotating Plus Point Probe (20% sample). Upper Roll Transitions with indications are listed in the repair section of this report.

Nine (9) plugs were examined with a Rotating Pancake Coil Probe (20% of Installed Plugs in the Upper Tube Sheet). No indications of through wall degradation were found.

Four-hundred, seventeen (417) tubes were examined to determine their proximity to the internal auxiliary feedwater header. All tubes were determined to have a acceptable gap of greater than 0.250 inches.

Steam Generator 1-2

Fifteen-thousand, seventy-six (15,076) tubes in Steam Generator 1-2 were examined full length. This represents 100% of the tubes available for examination. Tubes with percent through wall (%TW) indications are listed in the table below. All of these are wear type indications which were sized with a qualified technique. All other tubes with imperfections were either repaired or plugged and are listed in that section of this report.

One-hundred, ninety-nine (199) sleeved tubes were examined with a sleeve Bobbin Coil (100% of installed sleeves) and forty (40) sleeved tubes were examined with a Rotating Plus Point Probe. No indications of through wall degradation were found.

Two- thousand, nine-hundred, eighty-one (2,981) Upper Roll Transitions were examined with the Rotating Plus Point Probe (20% sample). Upper Roll Transitions with indications are listed in the repair section of this report.

Sixty (60) plugs were examined with the Rotating Pancake Coil Probe (20% of Installed Plugs in the Upper Tube Sheet). No indications of through wall degradation were found.

Three-hundred, ninety-five (395) tubes were examined to determine their proximity to the internal auxiliary feedwater header. All tubes were determined to have an acceptable gap of greater than 0.250 inches.

Location and Percent of Wall Thickness Penetration for Each Imperfection:

STEAM GENERATOR 1-1

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	%TW
2	2	14S	-0.70	20
2	4	14S	-0.67	7
4	16	10S	+0.60	10
4	39	12S	-0.71	8
6	39	9S	+0.53	11
6	50	13S	+0.44	17
7	35	11S	-0.70	6
9	60	9S	+0.13	14
10	24	9S	-0.75	10
10	40	14S	+0.64	12
10	65	13S	+0.59	12
11	48	8S	+0.64	15
11	58	6S	+0.66	9
13	2	12S	+0.62	23
14	73	11S	+0.18	12
14	74	11S	-0.64	13
14	74	11S	+0.55	15
14	74	12S	-0.26	17
15	67	9S	+0.62	8
15	78	14S	-0.69	11
17	77	6S	+0.55	11
17	79	9S	-0.51	20
17	81	10S	+0.72	12
18	4	9S	+0.60	17
18	47	11S	-0.83	10
20	79	9S	+0.70	20
22	5	9S	+0.62	15

22	88	9S	+0.60	12
25	97	10S	+0.66	16
26	14	12S	-0.75	10
27	96	9S	+0.49	6
27	97	9S	+0.66	23
28	96	9S	+0.60	15
28	99	9S	+0.75	15
28	100	10S	-0.53	10
28	100	10S	+0.49	14
29	102	10S	+0.54	17
30	104	10S	-0.74	13
40	52	6S	+0.08	16
41	112	9S	+0.68	14
41	114	5S	-0.78	7
42	112	9S	-0.58	17
46	114	8S	+0.60	14
48	114	7S	+0.18	7
53	126	12S	-0.73	8
54	116	3S	+0.73	10
57	2	5S	-0.76	10
57	13	8S	-0.74	12
60	113	3S	-0.75	9
60	128	10S	+0.54	10
61	121	9S	+0.60	15
61	125	10S	+0.48	14
63	126	9S	+0.74	11
63	126	9S	-0.66	24
64	27	4S	-0.75	15
67	1	12S	+0.50	26
68	3	15S	-0.73	10
69	2	12S	-0.20/+0.66	14
70	2	12S	+0.41	12
70	6	12S	+0.65	4
70	37	6S	+0.43	13
71	2	13S	-0.64	17
72	2	12S	+0.09	19
72	62	6S	-0.05	11
77	68	3S	-0.17	18
78	67	3S	+0.48	16
89	54	6S	+0.37	11
92	1	14S	+0.65	20

94	1	8S	-0.58	19
96	124	5S	+0.20	16
99	94	6S	-0.65	10
101	124	12S	-0.63	8
103	113	7S	+0.49	12
109	69	6S	+0.42	12
112	71	3S	-0.78	5
113	9	8S	+0.65	16
114	4	9S	+0.58	17
115	113	10S	-0.80	13
115	114	7S	-0.65	12
116	111	10S	-0.67	11
117	1	9S	+0.50	15
117	104	5S	+0.66	7
121	41	4S	+0.58	15
121	90	7S	+0.62	8
121	105	10S	-0.71	9
121	105	10S	+0.71	9
122	104	10S	-0.71	21
123	102	10S	-0.69	11
124	100	10S	-0.65	9
126	98	10S	-0.76	8
127	49	9S	-0.82	19
128	94	10S	-0.82	11
129	93	10S	-0.65	13
129	94	11S	-0.75	11
132	6	10S	+0.74	17
134	50	10S	+0.73	10
134	81	6S	+0.55	9
134	84	12S	+0.45	5
135	79	6S	+0.57	15
138	75	10S	-0.67	8
140	2	12S	-0.71	10
140	60	5S	+0.53	17
141	1	12S	-0.75	10
141	47	14S	+0.34	8
141	68	14S	+0.36	6
141	68	14S	-0.42	7
142	37	7S	+0.02	8
147	33	10S	+0.70	13
148	22	9S	-0.57	14

148	39	12S	+0.69	6
148	41	11S	+0.50	3
149	19	9S	-0.76	11
149	26	11S	-0.48	6
149	28	11S	-0.35	10
150	24	12S	+0.55	12
150	24	12S	-0.66	14
151	5	12S	+0.49	12
151	9	14S	+0.47	13
151	14	10S	+0.73	9
151	14	11S	-0.70	12
151	15	12S	-0.68	10
151	15	12S	+0.66	11
151	16	14S	-0.73	10

[1] + is distance above the reference point and - is the distance below the reference point.

S = Support

STEAM GENERATOR 1-2

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	%TW
1	2	11S	-0.50	9
3	3	14S	-0.71	19
3	11	8S	-0.31	8
4	33	9S	+0.50	18
5	20	8S	+0.63	11
7	16	7S	+0.71	8
12	1	13S	-0.76	32
12	2	13S	-0.75	22
13	2	13S	-0.71	21
15	7	13S	-0.69	11
16	2	13S	-0.70	25
16	13	9S	-0.77	7
21	10	3S	-0.76	17
24	46	7S	-0.52	14
24	46	6S	-0.46	17
30	1	14S	-0.53	12
34	6	6S	+0.77	8
34	84	3S	-0.74	8
35	1	11S	-0.71	15
35	1	13S	-0.49	18
36	1	13S	-0.69	19
36	1	12S	+0.72	21
36	2	13S	-0.69	18
37	2	13S	-0.61	10
37	56	6S	+0.60	4
37	75	6S	+0.25	13
39	116	13S	+0.00	22
40	36	7S	-0.65	15
42	1	13S	-0.74	16
42	67	6S	-0.20	11
43	1	13S	-0.66	26
51	54	6S	+0.32	9

52	1	12S	+0.58	18
52	1	13S	-0.65	20
52	125	13S	-0.71	16
54	1	11S	-0.75	9
54	1	7S	+0.61	9
54	50	6S	+0.49	10
58	1	12S	+0.40	14
58	1	11S	-0.77	16
63	1	14S	+0.55	8
63	128	11S	-0.19	5
65	8	3S	-0.59	17
68	1	14S	+0.57	11
70	1	14S	+0.63	13
71	2	14S	-0.67	7
71	4	11S	+0.53	9
71	32	7S	-0.49	9
71	66	3S	+0.38	9
72	1	14S	+0.58	14
72	66	3S	+0.53	7
73	2	6S	+0.71	7
73	2	14S	+0.57	12
73	27	10S	+0.14	13
73	46	3S	-0.51	11
73	76	5S	-0.31	15
74	1	14S	+0.60	15
75	34	4S	+0.69	6
77	48	3S	+0.51	13
78	1	7S	-0.75	10
78		4S	+0.50	6
78		4S	-0.70	14
78	67	15S	-0.65	11
79	25	11S	-0.42	10
80	61	7S	-0.01	12
80	61	4S	-0.64	14
80	61	7S	+0.15	15
81	61	11S	-0.77	13
81	61	7S	+0.62	15
82	1	6S	-0.63	17
82	44	8S	+0.68	10
84	32	9S	+0.69	17
85	63	6S	+0.19	8

85	122	9S	-0.19	5
86	127	13S	+0.67	13
86	127	14S	-0.71	14
89	124	8S	-0.54	12
89	124	8S	+0.61	15
90	7	8S	-0.79	9
92	129	7S	-0.81	9
99	92	6S	+0.00	16
102	4	8S	-0.74	13
110	81	7S	-0.20	2
110	117	13S	-0.63	9
116	22	14S	-0.44	9
116	110	9S	+0.65	10
117	21	15S	+0.87	15
118	104	9S	+0.73	10
119	107	9S	+0.74	6
120	102	9S	+0.74	10
120	104	10S	+0.64	13
121	103	9S	+0.66	5
122	101	4S	-0.75	10
122	104	10S	-0.74	6
123	102	10S	-0.62	11
124	100	10S	-0.59	9
128	5	10S	+0.58	20
128	6	10S	+0.51	18
128	7	10S	+0.58	22
129	8	10S	+0.61	19
130	7	10S	+0.69	19
130	8	10S	+0.66	25
132	1	9S	+0.10	18
133	3	10S	-0.76	27
133	7	10S	+0.80	12
137	6	10S	+0.54	8
137	6	10S	-0.71	12
137	6	10S	-0.72	15
137	6	10S	-0.52	16
139	14	4S	-0.80	23
140	1	10S	-0.81	12
145	11	4S	-0.82	14
146	31	10S	+0.72	16
146	34	10S	+0.69	14

146	37	10S	+0.75	16
147	30	10S	+0.63	5
147	34	10S	+0.76	17
147	36	10S	+0.66	20
148	3	10S	+0.77	18
148	27	10S	-0.74	13
148	30	10S	-0.68	11
148	32	10S	+0.63	5
149	26	10S	+0.61	10
149	27	10S	+0.65	3
150	20	10S	+0.69	11
150	21	10S	+0.64	11
150	25	10S	-0.73	4
150	25	10S	+0.70	11
150	27	10S	-0.75	21
151	1	10S	+0.40	15
151	5	6S	-0.71	16
151	13	10S	+0.78	12
151	15	10S	+0.66	2
151	15	10S	-0.77	3
151	15	13S	-0.72	14

[1] + is distance above the reference point and - is the distance below the reference point.

Tubes Plugged, Sleeved or Repair Rolled:

<u>Steam Generator 1-1</u>

Tubes which were plugged in Steam Generator 1-1 are listed below. A total of eighteen (18) tubes were plugged in this steam generator. The Eddy Current Indications were Single Volumetric Indications (SVI). Three (3) tubes were Repair Rolled due to indications and are listed below. No additional tubes were sleeved in this steam generator.

<u>Steam Generator 1-2</u>

Tubes which were plugged in Steam Generator 1-2 are listed below. A total of thirty-three (33) tubes were plugged in this steam generator. Included in this listing is Tube 79-68 which was a previously plugged tube that was pulled this outage for additional evaluations. This tube cavity was then plugged. The majority of the Eddy Current Indications were Single Volumetric Indications (SVI). One (1) tube was Repair Rolled due to an indication and is listed below. No additional tubes were sleeved in this steam generator.

Tubes Plugged in 11RFO:

STEAM GENERATOR 1-1

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	INDICATION[2] TYPE
7	5	UTS	+12.67	SVI
8	5	UTS	+7.81	SVI
9	61	14S	+32.92	SVI
9	62	14S	+31.82	SVI
11	67	14S	+30.73	SVI
15	78	14S	+31.04	SVI
16	79	14S	+31.86	SVI
16	80	14S	+32.16	SVI
16	81	14S	+31.82	SVI

18	85	14S	+32.40	SVI
57	128	15S	+33.02	SVI
61	20	3S	+33.64	SVI
82	52	UTS	+2.96	SVI
97	109	UTS	+8.53	SVI
99	52	LTS	+19.80	SVI
101	56	15S	+44.44	SVI
128	78	UTS	+4.62	SVI
151	15	15S	-3.93	SVI

[1] + is distance above the reference point and - is the distance below the reference point.
[2] SVI = Single Volumetric Indication
UTS = Upper Tube Sheet
LTS = Lower Tube Sheet

STEAM GENERATOR 1-2

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	INDICATION[2] TYPE
3	1	14S	+33.19	SVI
6	1	14S	+31.29	SVI
6	2	14S	+31.72	SVI
20	38	5S	+12.08	SVI
21	11	5S	+10.71	SVI
24	20	5S	+16.66	SVI
27	56	5S	-0.98	SVI
33	17	14S	+6.49	SVI
58	10	5S	+16.08	SVI
65	62	15S	+29.82	SVI
66	62	15S	+28.79	SVI
78	33	9s	+6.70	SVI
79	68	3S – 07S		SVI/TB PULL
82	8	UTS	+6.1	SVI
82	19	UTS	+7.61	SVI
91	126	15S	+33.01	SVI
95	25	5S	+9.20	SVI
101	23	5S	+10.56	SVI
103	23	5S	+8.77	SVI
103	124	15S	+19.62	SVI

104	22	5S	+11.65	SVI
104	123	15S	+17.35	SVI
112	1	15S	+13.85	SVI
112	117	15S	+19.73	SVI
113	104	LTS	-0.40	SVI
114	13	5S	+0.33	SVI
114	115	15S	+19.80	SVI
115	114	15S	+19.64	SVI
116	93	14S	+3.04	SVI
120	25	11S	+4.95	SVI
127	98	15S	-1.30	SVI
141	53	5S	+14.12	SVI
143	61	15S	-2.00	SAI

[1] + is distance above the reference point and - is the distance below the reference point.
[2] SVI = Single Volumetric Indication, SAI = Single Axial Indication

Tubes Repair Rolled in 11RFO:

STEAM GENERATOR 1-1

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	INDICATION[2] TYPE
11	57	UTE	-0.53	MAI
93	23	UTE	-0.31	SEA
106	4	UTE	-0.39	SEA

[1] + is distance above the reference point and - is the distance below the reference point.
[2] SEA = Single Tube End Anomaly Indication, MAI = Multiple Axial Indication
UTE = Upper Tube End

STEAM GENERATOR 1-2

ROW	TUBE	REFERENCE LOCATION	DISTANCE[1] FROM REFERENCE	INDICATION[2] TYPE
90	2	UTE	-0.22	SEA

[1] + is distance above the reference point and - is the distance below the reference point.

[2] SEA = Single Tube End Anomaly Indication