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Point Beach Nuclear Plant, Unit 1
Docket 50-266
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Fall 2011 Unit 1 (U133)
Steam Generator Tube Inspection Report

Pursuant to the requirements of Point Beach Nuclear Plant (PBNP) Technical Specification (TS) 5.6.8, "Steam Generator Tube Inspection Report," NextEra Energy, LLC is submitting the 180-day Steam Generator Tube Inspection Report. The enclosure to this letter provides the results of the fall 2011, Unit 1 (U1R33) steam generator tube in-service inspections.

If you have questions or require additional information, please contact Mr. William Hennessy at 920/755-7656.

Very truly yours,

NextEra Energy Point Beach, LLC

James Costedio
Licensing Manager

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
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PSCW

ENCLOSURE 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNIT 1

FALL 2011 UNIT 1 (U1R33)
STEAM GENERATOR TUBE INSPECTION REPORT

14 pages follow

1.0 Introduction

Point Beach Nuclear Plant Unit 1 has two Westinghouse Model 44F replacement Steam Generators (SGs) with thermally treated alloy 600 tubing.

The U1R33 inspection scope and plan were based on the Degradation Assessment that was prepared prior to the U1R33 refueling outage. Anti-vibration bar (AVB) wear, tube support plate wear, and mechanical wear due to maintenance activities were the only previous identified degradation modes in the SGs. Primary water stress corrosion cracking (PWSCC) indications were detected near the hot leg tube end of two tubes in SG B. No new degradation due to maintenance related activities was detected. No new wear due to suspected foreign objects was identified. The secondary side inspection showed no significant degradation.

The wear depth of all AVB indications is below the condition monitoring limit; therefore, the condition monitoring performance criteria are satisfied. The growth in depth of the AVB wear indications is projected to increase due to the power uprate scheduled for Cycle 34. Because the projected growth rate is very small, the projected wear depths at the end of Cycle 35 are expected to remain well below the condition monitoring limits. Therefore the performance criteria will be satisfied for the AVB wear through the next two operation cycles until U1R35. The presence of PWSCC at the tube ends in SG B will require that an inspection for that specific degradation mechanism be performed at the next refueling outage. There was no indication of leakage at the tube ends; therefore the condition monitoring criteria are satisfied. The relatively slow AVB wear growth rates, and the excellent industry experience with replacement SGs with thermally treated Alloy 600 tubing, indicates that no significant degradation is anticipated to occur during the next two operating cycles.

2.0 Scope of Inspections Performed

2.1 The inspection program for Steam Generator A consisted of:

a. Bobbin Inspection – All Accessible Tubes (3209):

Rows 1 and 2 – straight length inspection only (183)
- Straight sections from the hot leg (183)
- Straight sections from the cold leg (183)

Rows 3 and above – full length inspection (3026)
- Rows 3 and 4 - Straight sections plus U-bend from the hot leg (183)
- Rows 3 and 4 - Straight sections from the cold leg (183)
- Rows 5 and above - full length from the hot leg (2843)

b. Motorized Rotating Pancake Coil (MRPC) Inspection (+ Point):

- Hot Leg Top of Tubesheet +/- 3" – 50% of peripheral tubes (282)
- Hot Leg Tubesheet Full Depth (TEH – TSH +3") – 50% of all
- tubes (1605)
- Cold Leg Top of Tubesheet +/- 3" – 100% of peripheral tubes (529)
- 50% Tight Radius U-bends in Rows 1 and 2 (92)

c. Diagnostic and special interest (SI) inspections based on historical data and the results of the initial bobbin and MRPC inspections were performed to characterize and/or size any identified indications.

d. Installed tube plugs were visually inspected.

e. Due to indications described in section 2.2f below, a 50% sample of tubes in SG A were + Point™ tested for hot leg tube end cracking and other anomalies that might be present inside the hot leg tubesheet area.

2.2 The inspection program for Steam Generator B consisted of:

a. Bobbin Inspection – All Accessible Tubes (3208):

Rows 1 and 2 – straight length inspection only (182)
- Straight sections from the hot leg (182)
- Straight sections from the cold leg (182)

Rows 3 and above – full length inspection (3026)
- Rows 3 and 4 - Straight sections plus U-bend from the hot leg (184)
- Rows 3 and 4 - straight sections from the cold leg (184)
- Rows 5 and above - full length from the hot leg (2842)

b. MRPC Inspection (+ Point™):

- Hot Leg Top of Tubesheet +/- 3" – 50% of peripheral tubes (193)
- Hot Leg Tubesheet Full Depth (TEH – TSH +3") – 50% of all
- tubes (1731)
- Cold Leg Top of Tubesheet +/- 3" – 100% of peripheral
- tubes (529)
- 50% Tight Radius U-bends in Rows 1 and 2 (92)

c. Diagnostic and special interest (SI) inspections based on historical data and the results of the initial bobbin and MRPC inspections were also conducted upon completion of the initial inspection program.

d. Installed tube plugs were visually inspected.

e. Based on the identification of a tube end crack in a SG B hot leg tube, the hot leg tubesheet full depth MRPC inspection was expanded to cover

100% of all tubes in the hot leg. These indications are characterized in section 5.1 below.

2.3 Secondary Side

The following secondary side work was performed in both SGs:

- Sludge Lancing
- Foreign Object Search and Retrieval (FOSAR) of hot and cold leg annulus, tube lane, and Possible Loose Parts (PLP) verification.
- Following Extended Power Uprate Modifications, the following components were visually inspected for a baseline; internal feedring, j-nozzles, thermal sleeve, secondary moisture separator, primary moisture separator, mid-deck extension, hatch, hinges, riser barrel, top hats, and externals of the feedring and J-nozzles. UT measurements were performed on the feedring and primary moisture separators, and swirl vanes for baseline information.

3.0 Degradation Mechanisms Found

The following degradation mechanisms were observed in the Point Beach Nuclear Plant Unit 1 SGs during U1R33:

- Two tubes (R1, C48) and (R4, C41) with single circumferential indications of PWSCC near the tube ends in the hot leg of SG B.
- AVB wear continues to be an existing degradation mechanism in both SGs.
- Wear at Tube Support Plates.
- Mechanical wear above top of tubesheet due to insertion/removal of sludge lancing equipment.

4.0 NDE Techniques for Damage Mechanisms

The following is the list of Electric Power Research Institute (EPRI) technique sheets used for detection for the degradation modes that may be present during the SG inspection in U1R33.

AVB Wear	96004.1
TSP/Flow Distribution Baffle (FDB) Wear	96004.1 Bobbin; 96910.1 RPC
Mechanical Wear	27091.2 Bobbin; 21998.1 RPC
PWSCC in Tubesheet and Tube Ends	20511.1A, 20510.1C
Loose Part Wear	27091.2 Bobbin; 21998.1 RPC
Transition Zone Outside Diameter (OD) Stress Corrosion Cracking (ODSCC) and sludge pile	I28424A; I28431A; 21410.1C

Axial ODSCC at Flow Baffle	I28411, I28424, and I28431
Axial ODSCC at Tube Support Plate and free span	I28413, I28425, and I28432
Low Row U-bend ODSCC	10411.1A; 21410.1C
Ding/Dent ODSCC	24013.1A; 22841.3A; 22842.3C
Low Row U-bend Axial PWSCC	96511.2; 99997.1
Transition Zone PWSCC	20511.1A; 20510.1C

5.0 Service Induced Flaws

5.1 PWSCC Indications

Two crack-like indications near hot leg tube ends were reported in SG B and required repair (plugging). The indications were circumferential, with a circumferential extent of approximately 40 degrees, and were located approximately 0.1 inch above the tube end. These two tubes (R1, C48 and R4, C41) were confirmed with a Ghent Probe and taken out of service with the installation of mechanical (rolled) tube plugs. The eddy current technique that identified the PWSCC indications is not qualified to determine the depth of the indications.

5.2 Mechanical Wear Indications at Anti-vibration Bar (AVB)

a. There were 94 indications in 51 tubes in SG A with indications of wear at the AVBs. All 94 AVB wear indications were sized with the bobbin coil. None of these indications were determined to require repair per engineering disposition and all remained in service.

Table 5-1 shows all AVB wear indications for SG A along with historical comparisons.

Table 5-1 AVB Wear History - SG A

Row	Col	Loc	2011 % TW	2008 % TW	2005 % TW	2004 % TW	2001 % TW	1998 % TW	1995 % TW
22	8	AV3	4	3	3	-	-	-	-
		AV4	5	3	-	-	-	-	-
32	14	AV2	6	4	-	-	-	-	-
		AV3	8	7	7	5	3	14	11
		AV4	9	5	7	-	-	-	-
33	18	AV3	21	19	18	25	21	-	-
		AV4	15	10	11	16	13	-	-
35	18	AV2	10	9	11	10	6	INR	9
38	22	AV2	8	7	7	-	-	-	-
		AV3	11	9	10	12	6	10	8
		AV4	8	6	6	-	-	-	-
40	25	AV1	6	6	-	-	-	-	-

Table 5-1 AVB Wear History - SG A									
Row	Col	Loc	2011 % TW	2008 % TW	2005 % TW	2004 % TW	2001 % TW	1998 % TW	1995 % TW
		AV2	8	7	9	6	5	9	6
		AV3	9	7	-	-	-	-	-
40	27	AV3	8	6	8	5	4	6	5
34	33	AV1	13	8	14	10	10	5	11
		AV2	11	6	11	7	7	7	10
33	37	AV3	7	5	-	-	-	-	-
		AV4	12	10	14	9	13	7	8
45	41	AV1	9	7	10	6	6	7	6
		AV4	10	8	8	7	6	7	6
40	42	AV1	10	7	14	12	13	-	23
43	52	AV4	9	-	-	-	-	-	-
43	56	AV4	7	-	-	-	-	-	-
45	42	AV1	10	10	14	-	-	-	-
35	43	AV3	10	9	-	8	-	-	-
		AV4	13	11	-	9	-	-	-
38	43	AV1	27	27	24	23	19	12	11
		AV2 -	22	19	17	16	-	-	-
		AV2 +	25	24	22	23	19	12	8
45	43	AV1	8	7	18	13	12	15	11
		AV4	11	9	9	8	8	-	-
40	44	AV3	12	9	11	13	10	7	5
40	47	AV3	14	10	15	10	13	10	12
33	48	AV3	9	8	9	13	9	-	-
		AV4	7	4	-	-	-	-	-
45	49	AV1	4	4	15	19	14	13	18
		AV2	5	4	-	-	-	-	-
		AV4	9	7	-	-	-	-	-
45	50	AV4	9	6	4	-	-	-	-
45	51	AV4	6	6	-	-	-	-	-
45	52	AV2	9	7	-	-	-	-	-
		AV3	6	6	-	-	-	-	-
		AV4	8	5	5	-	-	-	-
11	53	AV4	9	7	4	-	-	-	-
19	54	AV1	10	7	8	-	-	-	-
		AV2	17	12	17	12	14	13	7
		AV3	11	8	10	-	-	-	-
		AV4	17	13	17	12	16	12	13
38	54	AV3	24	20	26	25	18	14	15
		AV4	11	8	9	-	-	-	-
35	56	AV1	26	21	18	14	15	5	6
		AV2	37	33	27	27	27	9	13
33	57	AV1	10	4	5	-	-	-	-
19	61	AV1	17	12	13	12	18	10	12
		AV2	19	14	16	15	23	13	14

Table 5-1 AVB Wear History - SG A									
Row	Col	Loc	2011 % TW	2008 % TW	2005 % TW	2004 % TW	2001 % TW	1998 % TW	1995 % TW
		AV4	9	6	5	6	8	-	-
42	61	AV4	9	6	5	-	-	-	-
24	63	AV1	12	8	-	14	-	INR	9
		AV2	12	-	-	-	-	-	-
		AV3	16	-	-	-	-	-	-
31	63	AV2	16	13	18	20	14	9	12
		AV3	10	7	11	10	5	5	2
34	65	AV3	13	9	5	9	6	1	-
		AV4	17	14	11	15	12	6	7
33	66	AV1	18	16	14	20	14	9	8
		AV2	15	13	10	13	11	9	4
		AV3	5	5	4	5	5	4	4
40	66	AV1	9	-	-	-	-	-	-
32	68	AV1	12	10	-	9	-	-	-
		AV2	10	8	-	9	-	-	-
39	68	AV2	7	5	-	-	-	-	-
		AV3	6	5	-	-	-	-	-
		AV4	5	5	9	9	8	9	6
34	69	AV1	11	6	8	3	7	1	0
		AV2	16	11	16	11	14	6	9
39	69	AV3	11	7	-	-	-	-	-
27	71	AV2	12	8	10	6	11	5	4
		AV3	18	14	15	10	12	3	2
		AV4	11	8	7	5	6	0	0
32	71	AV2	18	14	15	11	9	10	6
		AV3	12	8	11	-	-	-	-
33	71	AV2	20	16	16	13	17	5	6
		AV3	15	10	14	6	10	0	0
32	78	AV3	6	2	-	-	-	-	-
31	79	AV3	7	5	6	-	-	-	-
32	79	AV1	6	4	9	-	-	-	-
29	81	AV2	6	4	7	-	-	-	-
26	83	AV3	8	6	-	-	-	-	-
26	84	AV1	6	4	-	-	-	-	-
		AV2	5	3	-	-	-	-	-
24	85	AV2	7	5	5	-	-	-	-
15	87	AV2	INR	5	-	-	-	-	-
		AV3	INR	5	-	-	-	-	-

b. There were 74 indications in 52 tubes in SG B with indications of wear at the AVBs. Seventy-two AVB wear indications were sized with the bobbin coil. None of these indications were determined to require repair per engineering disposition and all remained in service.

Table 5-2 shows all AVB wear indications for SG B along with historical comparisons.

Table 5-2 AVB Wear History - SG B

Row	Col	Loc	2011 % TW	2008 % TW	2007 % TW	2004 % TW	2001 % TW	1998 % TW	1995 % TW
24	13	AV2	8	7	4	-	-	-	-
28	13	AV2	9	7	-	-	-	-	-
29	13	AV2	8	-	-	-	-	-	-
32	14	AV2	9	7	3	-	-	-	-
14	15	AV3	8	8	-	-	-	-	-
33	16	AV1	6	4	-	4	-	-	-
33	17	AV2	11	8	-	4	-	-	-
34	17	AV2	11	8	-	5	-	-	-
34	18	AV2	8	5	-	5	-	-	-
35	18	AV2	9	6	-	3	-	-	-
38	22	AV1	10	7	6	-	-	-	-
25	23	AV3	8	6	-	-	-	-	-
31	25	AV4	9	6	5	-	-	-	-
26	28	AV2	10	-	-	-	-	-	-
41	29	AV1	7	5	-	1	-	-	-
		AV4	8	6	-	1	-	-	-
42	31	AV4	10	7	-	6	-	-	-
32	32	AV3	14	10	13	13	12	8	7
		AV4	10	7	7	6	6	-	-
42	32	AV1	13	11	-	-	-	-	-
23	33	AV1	9	8	12	11	6	8	8
		AV2	16	14	16	15	13	16	11
		AV3	25	24	26	25	17	19	18
		AV4	5	4	6	-	-	-	-
42	33	AV1	9	7	-	6	-	-	-
19	36	AV3	9	8	8	9	9	6	6
29	40	AV2	9	8	-	-	-	-	-
28	41	AV4	8	7	-	6	-	-	-
32	44	AV3	5	5	9	8	7	5	4
45	44	AV1	8	6	16	14	14	12	13
		AV2	8	5	-	-	-	-	-
32	46	AV1	8	6	-	-	-	-	-
		AV2	16	14	17	15	11	11	8
		AV3	19	18	21	18	15	17	12
		AV4	14	12	10	-	-	-	-

Table 5-2 AVB Wear History - SG B									
Row	Col	Loc	2011 % TW	2008 % TW	2007 % TW	2004 % TW	2001 % TW	1998 % TW	1995 % TW
45	46	AV1	9	7	12	13	19	9	10
16	47	AV2	9	8	5	-	-	-	-
32	49	AV1	18	17	20	18	14	13	13
		AV2	16	13	16	15	11	10	10
44	50	AV3	8	9	-	-	-	-	-
44	54	AV1	9	9	8	8	8	-	-
		AV3	9	6	-	-	-	-	-
29	55	AV1	13	12	-	11	-	-	-
		AV3	5	4	-	8	-	-	-
22	58	AV1	12	9	10	9	8	8	5
		AV2	21	19	21	21	19	16	16
		AV3	19	17	19	19	16	13	14
		AV4	16	13	15	14	12	11	9
42	59	AV1	10	-	-	-	-	-	-
43	59	AV4	11	-	-	-	-	-	-
39	69	AV2	9	7	-	-	-	-	-
		AV3	9	6	-	-	-	-	-
16	70	AV2	8	-	-	-	-	-	-
17	70	AV3	8	-	-	-	-	-	-
32	70	AV1	14	12	13	11	14	4	5
		AV2	20	16	19	17	17	14	12
33	71	AV1	19	18	20	19	17	13	10
		AV2	11	9	10	10	6	-	-
		AV3	8	4	-	-	-	-	-
16	73	AV2	9	7	-	-	-	-	-
37	73	AV3	10	9	8	-	-	-	-
36	74	AV1	8	5	7	6	7	7	6
		AV4	7	6	-	-	-	-	-
34	75	AV2	10	9	6	-	-	-	-
16	77	AV3	INR	6	-	-	-	-	-
18	77	AV3	7	8	-	-	-	-	-
17	79	AV2	9	8	9	-	-	-	-
21	79	AV2	9	-	-	-	-	-	-
		AV3	7	-	-	-	-	-	-
23	79	AV2	9	-	-	-	-	-	-
28	79	AV2	10	8	-	6	-	-	-
27	82	AV2	8	-	-	-	-	-	-
23	86	AV2	7	7	-	-	-	-	-
		AV3	9	10	-	-	-	-	-

5.3 Wear at Support Plates

There were eight (8) Distorted Support Indication (DSI) codes reported by bobbin; five (5) in SG A and three (3) in SG B).

All of the DSI indications reported from the bobbin coil were located at broached supports. The DSI indications were dispositioned as single and double land contact wear and sized with the + Point™ rotating pancake coil (RPC) probe using EPRI Technique 96910.1.

The results of the sizing showed land contact wear at each of the broached support locations with wear depths ranging from 5% to 16% thru wall. Table 5-3 below shows all tube support plate wear indications along with historical comparisons.

Table 5-3 Wear at Tube Support Plates

SG	ROW	COL	2011	2008	2007	2005	2004	Location
			% TW	% TW	% TW	% TW	% TW	
A	39	24	15	13	N/I	11	12	03C
A	41	65	16	14	N/I	16	18	02C
A	39	67	12	10	N/I	7	N/R	02C
A	21	85	15	13	N/I	12	10	02C
A	18	87	13	N/R	N/R	N/R	N/R	02C
B	34	18	13	12	N/R	N/I	N/R	01H
B	5	45	11	N/R	N/R	N/R	N/R	05C
B	39	69	13 / 5	N/R	N/R	N/R	N/R	01C

N/I = not inspected, N/R = not reported, TW = through-wall

5.4 PLP (Possible Loose Part)

14 PLP indications were reported, 11 in SG A and 3 in SG B. Details are shown in Table 5-4:

Table 5-4 Possible Loose Parts Location

SG	Row	Column	Location	Elevation
A	13	40	TSH	+2.03"
A	19	48	TSH	+0.97"
A	20	50	TSH	+0.25"
A	24	50	TSH	+0.29"
A	26	52	TSH	+0.82"
A	25	53	TSH	+0.88"
A	26	53	TSH	+0.80"
A	28	53	TSH	+0.55"

Table 5-4 Possible Loose Parts Location				
SG	**Row**	**Column**	**Location**	**Elevation**
A	28	55	TSH	+0.19”
A	28	56	TSH	+0.39”
A	20	62	TSH	+0.11”
B	5	48	TSH	+0.98”
B	5	49	TSH	+0.63”
B	29	61	TSH	+0.76”

No degradation was observed in conjunction with the 14 PLP indications. Ten (10) of the PLP indications in SG A were not reported during the previous inspection in 2008; however the PLP indication at R13, C40 was reported at the same elevation as reported during the 2008 inspection. The PLP indications in SG B were not reported during the previous inspection in 2008.

All tubes adjacent to these PLP indications were also tested with + Point™ RPC in the area of interest with no degradation observed. A focused foreign object search and retrieval (FOSAR) inspection was performed after sludge lancing on accessible locations with no foreign objects identified.

5.5 Historic Loose Part Wear

The current 2011 data confirmed historical wear attributed to loose parts in SG B at tube location R1C5 (See Table 5-5). The wear indication was sized using the volumetric flaw standard using the + Point™ RPC EPRI Technique Examination Technique (ETSS) 21998.1 to be 16% through-wall which is essentially unchanged from U1R31. Since the depth is below the repair criterion and further wear is unlikely, the tube was determined to be acceptable to remain in service by engineering disposition.

Table 5-5 Historic Loose Part Wear							
SG	Row	Column	% Through-wall U1R33	% Through-wall U1R31	% Through-wall U1R30	Location / Inch U1R33	
B	1	5	16	17	-	TSC	0.33

5.6 Mechanical Wear Indications above the Top of Tubesheet Hot and Cold Legs

There were 21 tubes with 22 indications in SG A. SG B contained one (1) tube with a single indication. The majority of these indications were on the extreme outer periphery of the generator with indications attributed to mechanical wear above the top of tubesheet. When both bobbin and + Point™ RPC probes detected clearly defined wear indications at these locations, the indications were sized using the volumetric flaw standard and data analysis technique specified in EPRI Technique ETSS #21998.1 for the + Point™ RPC coil. When the + Point™ rotating coil confirmed that only a geometric distortion was present (without wear), the “GEO” three-letter code was used to identify the tube for further attention in future inspections. Of the 22 indications in SG A, 5 indications on four tubes were classified as "GEO." The suspected cause of these indications is attributed to sludge lancing equipment. The inspection results at the location of indications that were sized in U1R31 are shown in Table 5-6.

None of these indications were determined to require repair per engineering disposition and all tubes listed remain in service.

Table 5-6 Mechanical Wear Indications								
SG	Row	Column	% Through-Wall U1R33	% Through-Wall U1R31	% Through-Wall U1R29	% Through-Wall U1R28	Location / Inch U1R33	
A	37	20	2	2	4	4	TSH	0.74
A	41	28	7	7	5	-	TSH	0.62
A	42	30	11	6	5	5	TSH	0.56
A	43	33	10	7	3	5	TSH	0.71
A	44	36	2	5	4	6	TSH	0.7
A	45	41	INR	5	3	4	TSH	0.74
A	45	42	INR	2	1	3	TSH	0.79
A	45	43	3	2	2	1	TSH	0.72
A	45	44	INR	4	3	4	TSH	0.64
A	45	45	4	10	4	10	TSH	0.7
A	45	46	INR	3	2	7	TSH	0.71
A	45	47	3	3	2	5	TSH	0.71
A	43	60	INR	11	7	7	TSH	0.61
A	42	63	11	19	11	11	TSH	0.68
A	40	68	7	-			TSH	0.63
A	33	78	INR	1	1	-	TSH	0.89
A	31	80	INR	9	4	3	TSH	0.7
B	1	92	INR	6	7	9	TSH	6.19

6.0 Plugging

Two tubes in SG B (R1, C48 and R4, C41) were plugged for PWSCC near the tube ends. No tubes in SG A required tube plugging.

Table 6-1
Total Tubes Plugged and Plugging Percentage

	SG A	SG B
Total Tubes Plugged	5	8
Plugging Percentage	0.15%	0.20%

7.0 Condition Monitoring Assessment Results

All existing and potential degradation mechanisms identified in the Degradation Assessment were searched for according to the inspection plan. Four types of wear were detected. These wear indications were evaluated for acceptability according to the criteria specified in the Degradation Assessment.

AVB Wear

The previous operational assessment for SG A and SG B provided predictions for the number and depth of expected AVB wear at the end of Cycle 33. The prediction for AVB wear for the end of Cycle 33 (U1R33) was 107 indications in SG A and 86 in SG B. The deepest indication was predicted to be less than 43% through-wall. This prediction presumed that a power uprate would occur in Cycle 33. If the consideration of the uprate is removed, the predicted maximum depth would be 41%. The actual number of indications detected at U1R33 is 94 in SG A and 74 in SG B. The deepest indication measured was 37% through-wall. The predominance of wear depth less than 10% through-wall and the observation that the predictions overestimate the number of deeper indications illustrates that the growth in depth is very slow compared to the conservative growth rate used in the prediction. The maximum depth indication is below the condition monitoring limit. Those figures show that the predictions were very conservative for the deeper indications. This is a consequence of using a bounding wear rate in the predictive calculation.

Wear at Tube Support Plates

Wear at tube support plates in SG A is described in Table 5-3. The wear depths in the four indications in SG A and one in SG B that were reported in the previous inspection are small and essentially unchanged. The newly identified wear indications in SG A and SG B are also small. All of these indications are below the condition monitoring limit curve.

Mechanical Wear

Mechanical wear is described in Table 5-6. The indications that could be sized are small and essentially unchanged. All indications are below the condition monitoring limit.

Loose Parts wear

Loose parts wear is described in Table 5-5. No change in the wear has occurred in the previous two cycles. There were no foreign objects present near this indication so it is expected that no further wear will occur. The indication depth is well below the condition monitoring limit.

PWSCC Indications

Two crack-like indications at hot leg tube ends were reported and required repair as a result of this U1R33 SG Eddy Current Inspection. These two tube locations (R1, C48 and R4, C41) were taken out of service with the installation of mechanical (rolled) tube plugs. Prior to plugging, the tubes were rolled to provide assurance against leakage and pull-out if the cracking extended in future operation.

The eddy current technique that identified the PWSCC indications is not qualified to determine the depth of the indications so it is not known if the indications are through-wall. The long term (small) leakage rate at Point Beach Unit 1 has been constant for many cycles, and has not increased with the development of the two PWSCC indications, so there is no normal operational leakage from these indications. At accident conditions the tubesheet bending at the low row location of the indications causes an increased compression on the primary side of the tubesheet resulting in greater compression between the tube and tubesheet decreasing the propensity for leakage. Therefore, leakage from any similar tube end indications that may develop in the next cycle of operation are not likely to cause primary-to-secondary leakage under normal or accident conditions.

All wear indications are below the condition monitoring limit considering material property and NDE measurement and analyst uncertainty as specified in the Degradation Assessment. The tubes with stress corrosion cracking at the tube end were plugged. Due to the location of these indications, tube burst and leakage criteria were satisfied during the previous operation cycle. The secondary side inspection showed acceptable conditions. Therefore, the condition monitoring criteria of Nuclear Energy Institute (NEI) 97-06, Revision 3 are satisfied.

8.0 Observed Leak Rates

The primary-to-secondary leak rate from both SGs combined is in the range of 0.2 to 0.4 gallons per day (gpd). The Unit 1 primary-to-secondary SG leakage remains constant and was evident prior to the spring 1991 outage. The leak may have existed since SG replacement. The current Unit 1 primary-to-secondary leak rate is too low to accurately differentiate leakage between individual SGs. Therefore, the total leakage will be conservatively reported as being from only a single SG. This normal operation leakage is very small compared to the operating leakage limit of 150 gpd per SG.

One hundred percent of the tubes in both SGs have been tested several times since this leakage has been detected and no degradation that would lead to leakage has been identified. The current leak rate has remained essentially the same for many cycles and is expected to remain at these low levels.

9.0 <u>Secondary Side Inspections/Cleaning</u>

Sludge Lancing (SL) was performed in both SGs following the SG modifications for extended power uprate.

A Foreign Object Search (FOS) was performed in SG A after sludge lancing. The inspection included the hot and cold leg annulus, tube lane and PLP verification. During the annulus inspection there were no signs of any hard scale or soft sludge on the hot and cold legs. The tube lane was clear of any sludge piles. During the FOS, 11 objects were recorded. The objects were listed as sludge rocks, slag, wire, and bristles. Five foreign objects (slag and wire) were retrieved. During in-bundle inspections, hard sludge was observed.

FOS was performed in SG B after sludge lancing. The inspection included the hot and cold leg annulus, tube lane and PLP verification. During the annulus inspection no soft sludge or hard scale was observed on the hot and cold legs. There were no foreign objects observed in the annulus. The tube lane was clear of any sludge piles. There were no foreign objects observed.

The general area of the steam drum in both SGs was visually inspected following the modifications for the extended power uprate. All 35 J-nozzles, the thermal sleeve and the feedring were inspected using a video probe. The interior of the feedring was clear of any foreign material. The 112 primary moisture separators (PMS) were visually inspected. In addition, 8 PMS swirl vanes and riser barrels had informational UT thickness measurements recorded for trending purposes. There were no abnormal thickness values. Also, informational UT thickness measurements were made on the feedring for trending. There were no abnormal thickness values.