



April 27, 2022

NRC 2022-0015
TS 5.6.8

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Point Beach Nuclear Plant, Unit 2
Docket 50-301
Renewed License No. DPR-27

Fall 2021 Unit 2 (U2R38)
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 Point Beach, LLC is submitting the 180-day Steam Generator Tube Inspection Report. The enclosure to this letter provides the results of the fall 2021, Unit 2 (U2R38) steam generator tube inspections.

If you have questions or require additional information, please contact me at 920-755-7854.

Sincerely,

NextEra Energy Point Beach, LLC

A handwritten signature in black ink that reads "Eric Schultz" with "for Eric Schultz" written below it in a smaller, less legible script.

Eric Schultz
Licensing Manager

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

ENCLOSURE 1

**NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNIT 2**

**FALL 2021 UNIT 2 (U2R38)
STEAM GENERATOR TUBE INSPECTION REPORT**

5 pages follow

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Point Beach Unit 2 U2R38 Steam Generator Tube Inspection Report

Introduction:

The enclosed Steam Generator Tube Inspection Report for Point Beach Unit 2 is submitted for the inspection of the SGs during refueling outage 38 (hereafter referred to as the U2R38 inspection or outage), as required by Technical Specification section 5.6.8. The inspection in U2R38 was performed in accordance with Technical Specification 5.5.8, and was the 3rd (and last) inspection of the SGs in the 2nd ISI period. The previous inspection of the SGs was completed in U2R35 (Spring 2017). References to past SG Tube Inspection Reports for Point Beach Unit 2 provided in Appendix A along with a list of acronyms used in this report. At unit shutdown for the U2R38 inspection, the SGs had operated for approximately 21.4 EFPY since installation and 102.0 EFPM in the 2nd ISI period. This included operation for approximately 17.6 EFPM, 16.4 EFPM and 18.0 EFPM in the last 3 consecutive fuel cycles, respectively, since the last SG inspection. Initial entry into Mode 4 following completion of the U2R38 inspection was made on October 30, 2021.

Point Beach Unit 2 is a Westinghouse 2-loop PWR with Model Delta 47F steam generators. The SGs are U-tube heat exchangers with tube bundles fabricated using thermally treated Alloy 690 tubing. Each SG contains 3,499 tubes arranged in 86 rows and 105 columns with a triangular pitch configuration. Nominal tube OD is 0.875 inch with a 0.050-inch nominal wall thickness. Each SG tube bundle is supported by one flow distribution baffle (FDB) and 7 trefoil-shaped, broached-hole tube support plates (TSPs) all fabricated from stainless steel. Three (3) sets of stainless-steel anti-vibration bars (AVBs) in the U-bends also provide tube bundle support. Rows 1-14 of tubing in each SG were stress relieved in the U-bend region after bending.

A. Scope of Inspections Performed on each SG

The U2R38 inspection scope was selected to meet the requirements of the plant Technical Specifications, NEI 97-06 Rev 3 and its referenced EPRI SGMP Guidelines. In addition, Point Beach intends to submit a License Amendment Request (LAR) to adopt "Revised Frequencies for Steam Generator Tube Inspections" (TSTF-577 Rev. 1)¹. SG inspections in U2R38 will be credited during the LAR process as the implementation outage for TSTF-577 Rev. 1; therefore, the scope of inspections performed was also selected to meet the requirements therein. Unless otherwise noted, the U2R38 base scope inspection in each SG was:

Primary-side:

- 100% full-length bobbin probe exams of all active tubes except low row U-bends (rows 1 & 2).
- Low row U-bends were inspected with the +Point™ probe between the uppermost TSP on the HL and the CL.
- Peripheral tube inspection with the +Point™ probe: 3 outermost tubes exposed to the annulus, and rows 1-4 along the no-tube lane in the HL and CL. The test extent was from the TTS ± 3 inches.
- Various diagnostic/special interest exams using the +Point™ probe including all I-codes from bobbin probe exams, tubes in the vicinity of newly identified or prior PLPs, tubes adjacent to the locations of known foreign objects, tubes with new ding/dent signals and tubes with HL tubesheet BLG/OXP signals.
- Visual inspection of all mechanical or welded plugs.

¹ TSTF-577 Rev. 1, "Revised Frequencies for Steam Generator Tube Inspections", NRC ADAMS Accession No. ML21099A086.

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- Visual inspection of all channel head bowl components and bowl scan everywhere within the channel head bowl with remote visual camera in both the HL and CL per Westinghouse NSAL 12-1 Rev 1, "Steam Generator Channel Head Degradation," October 2017.

Secondary-side:

- Cleanliness inspection at the TTS (annulus, no-tube lane) after sludge lancing.
- Foreign object search and recovery (FOSAR) at the TTS including in-bundle exams.
- Visual inspection of components of the Upper Internals including the feedwater ring and supports, and moisture separator components.
- UT thickness measurements at select locations on the feedwater ring.

B. Degradation Mechanisms Found

The following degradation mechanisms were identified during the U2R38 inspection:

- Wear at AVB contact points.
- Wear at broached TSPs.

No new degradation mechanism was identified. No corrosion damage mechanism was found.

Inspection Expansion: None required.

C. NDE Techniques utilized for each Degradation Mechanism

Table 1a is the list of the EPRI ETSSs used for degradation detection during the U2R38 ECT inspection.

Table 1a - NDE Detection Techniques for Degradation Mechanisms

Detection probe	ETSS used for Detection	Degradation Mechanism	Location / Applicability
Bobbin	96041.1 Rev 3	Wear	AVB locations
	96004.1 Rev 13		TSP and FDB locations
	27091.2 Rev 2		Due to foreign objects
+Point™	21998.1 Rev 4	ODSCC	TSP and FDB locations
	96910.1 Rev 11		At Dents/Dings ≤ 5V
Bobbin	24013.1 Rev 2	ODSCC	At Dents/Dings > 5V
	10013.1 Rev 1		low row U-bends (Rows 1 & 2)
+Point™	22401.1 Rev 4	Diagnostic inspection	
	21409.1 Rev 7		
	21410.1 Rev 6		
	21998.1 Rev 4		

Table 1b is the list of the EPRI ETSSs used for degradation sizing based on the degradation mechanisms reported during the U2R38 ECT inspection.

Table 1b - NDE Sizing Techniques for Degradation Mechanisms

Sizing probe	ETSS used for Sizing	Degradation Mechanism	Location / Applicability
Bobbin	96041.1 Rev 3	Wear	AVB locations
+Point™	96910.1 Rev 11		At broached TSPs

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D. Location, orientation (if linear), and measured sizes (if available) of service induced indications

For each SG, Table 2 provides the listing of service-induced indications identified during the U2R38 inspection, including locations and measured sizes.

Table 2 – U2R38 Wear Indications

SG	Row	Col	Per	Location	Volts	
A	1	98	5	05C	-0.58	0.13
A	1	98	7	05C	0.35	0.17
A	1	98	4	05C	0.42	0.1
A	1	98	6	04C	-0.57	0.14
A	1	98	4	04C	0.43	0.09
A	1	98	5	04C	0.45	0.11
A	5	28	8	06C	0.46	0.2
A	9	56	5	04H	-0.6	0.12
A	11	54	4	03H	-0.62	0.1
A	12	53	6	06H	-0.66	0.16
A	12	53	5	06H	-0.59	0.13
A	13	50	4	06H	-0.66	0.11
A	13	54	4	05H	-0.63	0.1
A	13	104	4	04C	-0.66	0.08
A	13	104	7	04C	0.36	0.16
A	13	104	3	04C	0.43	0.08
A	15	64	5	05H	-0.35	0.12

SG	Row	Col	Per	Location	Volts	
A	50	13	4	07C	-0.64	0.09
A	59	16	4	07H	-0.69	0.1
A	69	22	5	06C	-0.65	0.11
A	78	59	5	AV4	0	0.11
A	78	59	3	AV5	0	0.06
A	79	62	9	AV3	-0.07	0.21
A	79	62	7	AV4	0	0.13
A	79	66	6	AV5	0	0.12
A	82	69	4	AV1	-0.12	0.06
A	84	45	9	AV5	0	0.22
A	84	63	3	AV5	-0.05	0.05
B	1	20	5	03H	-0.51	0.15
B	1	20	6	04H	-0.62	0.19
B	1	26	10	05C	-0.51	0.26
B	1	26	5	05C	-0.36	0.14
B	11	52	5	06H	-0.63	0.15
B	13	40	5	06C	0.42	0.13

E. Number of tubes plugged during the inspection outage for each degradation mechanism

No tubes were plugged based on the U2R38 SG inspection.

F. Number and percentage of tubes plugged to date, and the effective plugging percentage in each steam generator

The number and percentage of SG tubes plugged to-date, and the effective plugging percentage in each SG are summarized in Table 3.

Table 3 - Tubes plugged to-date and effective plugging percentage

	SG-A	SG-B	Total
Tubes Plugged	0	4	4
Percent Plugged	0%	0.114%	0.057%

G. Results of Condition Monitoring, including the results of tube pulls and in-situ testing

1. The largest AVB wear indication reported (9%TW) was significantly less than the CM limit of 46%TW, and less than the worst-case projected AVB wear of 19%TW from the previous

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operational assessment (OA). No AVB wear indication was detected in SG-B. The deepest TSP wear indication reported (10%TW) was also considerably less than the CM limit of 42%TW, and less than the worst-case projected TSP wear of 16%TW from the previous OA. In summary, CM assessment of the inspection data demonstrated that no tubes exhibited degradation more than the CM limits. There was no reported SG primary-to-secondary leakage since the last inspection. No tubes required in-situ pressure testing (ISPT) to demonstrate structural and leakage integrity. No tube pulls were performed. The U2R38 inspection results validate the projections and conclusions of the OA from the previous inspection. Therefore, all indications found in U2R38 satisfied the SG performance criteria for structural and leakage integrity of plant Technical Specifications.

2. Channelhead Components Visual Inspection:

- Tube Plug Inspection: During the inspection of tube plugs in U2R38, all installed plugs were confirmed to be in their correct location. In addition, all plugs were found to be dry; no dripping plugs were identified. No degradation or visible signs of leakage were noted on the plugs during the visual inspection.
- Other Channelhead Inspections: Visual inspection of various channelhead components were performed to identify degradation per guidance in Westinghouse NSAL 12-1 Rev 1, "Steam Generator Channel Head Degradation". Areas inspected include the divider plate-to-channelhead weld, the channelhead-to-tubesheet girth weld seam region, the divider plate, and all clad surfaces of the channelhead bowl and tubesheet. No degradation of channelhead components was observed in U2R38.

3. Secondary-side Inspections and Maintenance:

- Sludge lancing and FOSAR: A total of 18 lbs. of sludge was removed from the 2 SGs based on secondary-side cleaning in U2R38. During TTS FOSAR, 3 foreign objects (wire bristles) were retrieved from SG-2A. The remaining foreign objects (FO) consisted of small sludge rocks, scale, wire bristles, and a possible gasket material. A FO evaluation was completed for all objects identified during FOSAR which were not retrieved. No tube damage was observed in any SG during FOSAR activities.
- Upper Bundle Inspection: No evidence of blockage or occlusion of the trefoil openings of the TSPs or the flow slots was observed during upper tube-bundle visual inspection in both SGs. The tubes in the U-bend also looked clean without the buildup of debris.
- Upper Internals Inspection: Visual inspections performed in both SGs (for erosion/corrosion, mechanical damage, foreign material, and unusual conditions) included accessible portions of the feedwater ring and supports and J-nozzles, and a sample of the primary moisture separators. UT thickness measurements on the feedwater ring revealed no degradation or erosion concerns. No damage or degradation was observed during the inspection of steam drum components.

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APPENDIX A - Additional Information

References to SG Tube Inspection Reports (SGTIR) in the 2nd ISI period

EOC #	Outage	ADAMS Accession No.
EOC-32	U2R32	ML13140A015
EOC-35	U2R35	ML17264A354

Abbreviations and Acronyms:

AVB	Anti-Vibration Bar	NSAL	Nuclear Safety Advisory Letter
BLG	Bulge	OA	Operational Assessment
CL	Cold Leg	OD	Outside Diameter
CM	Condition Monitoring	ODSCC	Outside Diameter SCC
DNG	Ding	OMP	Over-expansion
DNT	Dent	Per	Percent thru-wall (%TW)
ECT	Eddy Current Testing	PLP	Possible Loose Part
EFPM	Effective Full Power Months	SG	Steam Generator
EFPY	Effective Full Power Years	SGMP	SG Management Program
EOC	End of Cycle	TEC	Tune End Cold
EPRI	Electric Power Research Institute	TEH	Tube End Hot
ETSS	Exam Technique Spec Sheet	TS	Tubesheet
FDB	Flow Distribution Baffle	TSC	Tube Sheet Cold
FO	Foreign Object	TSH	Tube Sheet Hot
FOSAR	Foreign Object Search and Retrieval	TSP	Tube Support Plate
HL	Hot Leg	TTS	Top of Tube Sheet
ISPT	In-Situ Pressure Test	TW	Through Wall
NEI	Nuclear Energy Institute		