

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Point Beach Nuclear Plant, Unit 2

DOCKET NUMBER (2)

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TITLE (4)

Steam Generator Tube Degradation

EVENT DATE (5)

LER NUMBER (6)

REPORT DATE (7)

OTHER FACILITIES INVOLVED (8)

MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)	
1	0	2	2	9	9	2	0	0	5	0 0 1 1 1 3 9 2	0 5 0 0 0

OPERATING MODE (9)

N

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

POWER LEVEL (10)	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
0.1010	20.405(a)(1)(ii)	50.38(a)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(iii)	50.38(a)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract Below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(v)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(vi)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

TELEPHONE NUMBER

G. R. Sherwood, Sr. Project Engineer-ISI Engineering

AREA CODE

4 1 4 7 5 5 1 - 1 2 3 2 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	A	B	SIG W	1 2 0	Y				

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

YES (If yes, complete EXPECTED SUBMISSION DATE)

X NO

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

ABSTRACT

Point Beach Nuclear Plant (PBNP) Unit 2 was shut down for refueling 18 (U2R18) on September 26, 1992. Leak testing and eddy current examination of the steam generator tubes began on October 10, 1992, and was completed on October 21, 1992. Inspection of the "A" steam generator hot leg revealed 36 tubes with axial indications in the tube end area. All 36 tubes were plugged.

In the "B" steam generator, eddy current testing revealed 5 tubes degraded $\geq 40\%$ of the wall thickness, 43 tubes with axial indications in the tube end area, and one restricted tube. All of these tubes (49 total) were plugged.

The results of the 800 psid leak test were satisfactory, revealing only 4 tubes with excessive leakage. The "A" steam generator revealed 6 sleeves and 2 plugs leaking ≤ 4 drops/min. The "B" steam generator revealed 1 sleeve, 2 open tubes, and 4 mechanical plugs leaking ≤ 4 drops/min. Four explosive plugs were found with excessive leakage (10-12 drops/min). These 4 explosive plugs were subsequently removed, inspected, and replaced with mechanical plugs.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

EVENT DESCRIPTION800 PSID Leak Test

Prior to eddy current inspection on both steam generators, 800 psid secondary-to-primary leak tests were performed in each steam generator. Remote video equipment was utilized to inspect for leakage at the primary tubesheet face. The results of the leak test follow:

Extent of Inspection	Steam Generator	
	"A"	"B"
Tubes with evidence of potential leakage (<3 drops/min)	0	2
Mechanical plugs with evidence of potential leakage (<=4 drops/min)	2	4
Explosive plugs with excessive leakage (10-12 drops/min)	0	4
Sleeved tubes with evidence of potential leakage (<=4 drops/min)	6	1
Total	8	11

Most of the moisture observed during the tests was believed to be either condensation from the tubesheet, trapped water in the recesses of plugs and sleeves, or minor seepage from sleeves. Based on the leak rate performance of the Unit 2 steam generators during the last operating cycle (approximately 3 gal/day leakage), no major corrective actions as a result of these tests were required during this outage. However, 4 explosive plugs in the "B" steam generator were replaced with mechanical plugs due to excessive leakage.

Eddy Current Testing

Eddy current testing began shortly after the leak tests were completed. The eddy current program scope included the following items:

1. A 20% full-length inspection of all in-service tubes. (PBNP Technical Specifications require a 3% sample including all previously degraded tubes that had not been repaired.) Prior to this outage, 309 of 3260 tubes in the "A" steam generator and 273 of 3260 tubes in the "B" steam generator had been plugged.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

2. Previously degraded tubes that had not been repaired.
3. All hot leg unsleeved tubes not included in the full-length sample were inspected to the first tube support plate, searching particularly for tubesheet crevice corrosion.
4. A 20% sample of cold leg sleeved tubes.
5. All cold leg tubes susceptible to wastage and pitting were inspected to the first support plate.
6. All hot and cold leg distorted indications identified via the bobbin coil inspection method were reexamined using the more sensitive rotating pancake coil (RPC) inspection method to detect axial tube degradation.
7. Due to an indication of a defect in the hot leg of the "B" steam generator at the sixth tube support plate during the full-length inspection program, additional tubes (a Technical Specification Table 15.4.2-1 "2S" sample, or 1200 tubes) were examined to the sixth tube support plate. No additional defective tubes were identified.

"A" Steam Generator Tube Plugging

On October 22, 1992, review and verification of all eddy current data for tubes with indications exceeding the plugging limit were completed. A total of 36 tubes were plugged in the "A" steam generator. No tubes were found having degradation \geq the plugging limit of 40% of the nominal wall thickness (PBNP Technical Specification 15.4.2.A.5). However, 36 tubes with axial indications were plugged as a preventive measure.

Below is a list of affected tubes in the "A" steam generator, including a list of abbreviations used in the following two tables:

HL - Hot Leg	CL - Cold Leg
TEH - Tube end (HL)	TSH - Tubesheet (HL)
SAI - Single Axial Indication	2H - #2 Tube Support Plate (HL)
MAI - Multiple Axial Indications	6H - #6 Tube Support Plate (HL)
TRH - Tube end Roll (HL)	1C - #1 Tube Support Plate (CL)
RST - Restricted Tube	

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Tubes plugged in "A" Steam Generator		
Tube	Defect	Location
R03C02	MAI	2.11" TRH HL
R02C07	MAI	2.96" TEH HL
R08C09	SAI	7.16" TEH HL
R02C10	MAI	5.10" TEH HL
R10C11	MAI	8.26" TEH HL
R05C12	SAI	6.88" TEH HL
R10C12	SAI	9.79" TEH HL
R03C13	SAI	8.33" TEH HL
R19C13	SAI	7.90" TEH HL
R21C13	SAI	8.12" TEH HL
R13C13	SAI	6.80" TEH HL
R33C19	MAI	6.66" TEH HL
R35C28	MAI	0.07" TRH HL
R34C36	MAI	0.00" TRH HL
R40C38	MAI	6.01" TRH HL
R42C47	MAI	4.07" TEH HL
R44C47	SAI	3.47" TEH HL
R33C55	MAI	3.33" TEH HL
R36C56	SAI	5.12" TEH HL
R34C58	MAI	5.75" TEH HL
R32C64	SAI	2.00" TEH HL
R34C64	SAI	3.15" TEH HL
R36C65	MAI	2.98" TEH HL
R37C65	SAI	6.41" TEH HL
R38C65	MAI	2.19" TEH HL

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Tubes plugged in "A" Steam Generator		
Tube	Defect	Location
R34C66	MAI	7.18" TEH HL
R40C66	SAI	4.56" TEH HL
R38C67	MAI	0.55" TEH HL
R34C70	SAI	6.42" TEH HL
R33C73	MAI	4.44" TEH HL
R06C74	SAI	13.89" TEH HL
R22C77	SAI	7.61" TEH HL
R26C77	SAI	.00" TEH HL
R19C80	SAI	3.23" TEH HL
R13C81	MAI	5.50" TEH HL
R07C88	SAI	4.22" TEH HL

"B" Steam Generator Tube Plugging

In the "B" steam generator, a total of 49 tubes were plugged. Five tubes were found with degradation \geq the plugging limit of 40% of the nominal wall thickness. In addition, 43 tubes with axial indications in the tube end area and one restricted tube were plugged as a preventive measure.

Tubes plugged in "B" Steam Generator		
Tube	Defect	Location
R01C05	MAI	3.91" TEH HL
R15C05	SAI	10.61" TEH HL
R11C09	SAI	12.87" TEH HL
R16C09	SAI	3.03" TEH HL
R17C09	MAI	5.61" TEH HL
R19C09	MAI	6.57" TEH HL

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Tubes plugged in "B" Steam Generator		
Tube	Defect	Location
R15C11	SAI	2.37" TEH HL
R06C12	MAI	5.79" TEH HL
R29C14	73%	0.00" 6H HL
R20C15	SAI	3.32" TEH HL
R23C15	MAI	12.63" TEH HL
R26C15	MAI	2.28" TEH HL
R24C21	69%	33.45" TSH HL
R37C28	MAI	7.41" TEH HL
R39C33	SAI	14.70" TEH HL
R41C35	SAI	7.15" TEH HL
R37C41	47%	0.00" 6H HL
R01C42	MAI	3.97" TEH HL
R38C42	MAI	6.24" TEH HL
R42C43	MAI	5.42" TEH HL
R01C47	SAI	3.51" TEH HL
R32C48	42%	0.00" 1C CL
R01C51	MAI	3.33" TEH HL
R01C52	SAI	3.44" TEH HL
R01C59	SAI	3.57" TEH HL
R37C60	51%	6.74" TEH HL
R39C61	SAI	8.51" TEH HL
R30C63	MAI	7.99" TEH HL
R33C63	SAI	6.76" TEH HL
R37C64	SAI	3.06" TEH HL
R33C66	MAI	11.40" TEH HL

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TEXT (If more space is required, use additional NRC Form 366A's) (17):

Tubes plugged in "B" Steam Generator		
Tube	Defect	Location
R27C68	MAI	8.48" TEH HL
R36C68	MAI	9.37" TEH HL
R37C70	MAI	7.13" TEH HL
R33C71	SAI	6.71" TEH HL
R01C72	SAI	4.05" TEH HL
R23C73	MAI	7.18" TEH HL
R05C74	SAI	8.38" TEH HL
R33C74	MAI	7.55" TEH HL
R23C76	MAI	2.18" TEH HL
R22C77	SAI	3.36" TEH HL
R26C77	SAI	3.71" TEH HL
R13C80	SAI	5.51" TEH HL
R24C80	MAI	5.59" TEH HL
R22C81	SAI	1.57" TEH HL
R02C84	RST	0.00" 6H HL
R40C85	SAI	3.91" TEH HL
R22C85	SAI	2.09" TEH HL
R19C86	MAI	2.04" TEH HL

COMPARISON TO LAST YEAR'S RESULTS

Last year's examination was compared to this year's data to determine growth rates and/or trending. The results are as follows:

1. In the "A" steam generator, 36 tubes were plugged compared to 49 tubes in 1991, totalling 345 of 3260 tubes plugged thus far. The "B" steam generator required 49 tubes to be plugged compared to 29 tubes in 1991, totalling 322 of 3260 tubes plugged thus far.

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2. A comparison of the data revealed the average growth rate of previous indications to be 4-5 percent/year with new indications found during the full-length tests. These indications will be monitored during future examinations as required by Technical Specification 15.4.2.

STEAM GENERATOR TUBESHEET CLEANING

Sludge lancing of the steam generator tubesheet areas removed 144 pounds of sludge from the "A" steam generator (compared to 187.5 pounds in 1991) and 215 pounds from the "B" steam generator (compared to 162 pounds in 1991). Post cleaning checks were performed on both steam generators to verify the effectiveness of the cleaning.

COLD LEG WASTAGE AND PITTING

In the "A" steam generator, 15 tubes showed signs of wastage (compared to 7 tubes in 1991). In the "B" steam generator, 6 tubes showed signs of wastage (compared to 6 tubes in 1991). Additionally, a review of the geometry of the indications verified that tube pitting continues not to be a problem at Point Beach Nuclear Plant, Unit 2.

TUBESHEET CREVICE CORROSION

Most plugs were installed as a result of tubesheet crevice corrosion in the tube end area. Tubesheet crevice corrosion is still active in both steam generators and is monitored with the first tube support plate inspection.

PROBE ACTIONS

In the "A" steam generator, 47 tubes would not pass a .720 inch probe; 2 of these tubes would not pass a .700 inch probe. A .680 inch probe was able to pass through these 2 tubes.

In the "B" steam generator, 13 tubes would not pass a .720 inch probe. All of these tubes were tested successfully with a .700 inch probe except for one tube, which would not pass a .650 inch probe. This tube was subsequently plugged. The restriction in this tube appears to be the result of bending at the #6 tube support plate.

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STEAM GENERATOR CLOSEOUT INSPECTIONS

Closeout inspections were performed following the maintenance of each steam generator. No abnormalities were encountered during the primary closeout inspection. During last year's secondary closeout inspection, a piece of hard sludge was found lodged in the "A" steam generator annulus region. A 10 CFR 50.59 Safety Evaluation Report (SER 91-097) justified the decision not to remove the sludge. This year's secondary closeout inspection revealed that this piece of sludge is still intact. Monitoring will continue during future examinations.