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VPNPD-89-596  
NRC-89-143

10 CFR 50.73

November 14, 1989

U. S. NUCLEAR REGULATORY COMMISSION  
Document Control Desk  
Mail Station P1-137  
Washington, D. C. 20555

Gentlemen:

DOCKET 50-301  
LICENSEE EVENT REPORT 89-006-00  
DEGRADATION OF STEAM GENERATOR TUBES  
POINT BEACH NUCLEAR PLANT, UNIT 2

Enclosed is Licensee Event Report 89-006-00 for Point Beach Nuclear Plant, Unit 2. This report is provided in accordance with Technical Specification 15.4.2.A.7(a), "After each inservice examination, the number of tubes plugged or repaired in each steam generator shall be reported to the Commission as soon as practicable" and 15.4.2.A.7(c), "Reports required by Table 15.4.2-1, 'Steam Generator Tube Inspection', shall provide the information required by Technical Specification 15.4.2.A.7(b) and a description of investigations conducted to determine the cause of the tube degradation and corrective measures taken to prevent recurrence." LER 89-006-00 is filed according to the above table under the reporting requirement of 10 CFR 50.73(a)(2)(ii).

If any further information is required, please contact us.

Very truly yours,

C. W. Fay  
Vice President  
Nuclear Power

Enclosure

Copies to NRC Regional Administrator, Region III  
NRC Resident Inspector

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)  
Point Beach Nuclear Plant

DOCKET NUMBER (2)  
0 5 0 0 0 3 0 1 1

PAGE (3)  
1 OF 017

TITLE (4)  
Degradation of Steam Generator Tubes

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												
1	0	1	5	8	9	8	9	0	0	6	0	0	1	1	1	4	8	9			
									DOCKET NUMBER (8)			0 5 0 0 0									
									DOCKET NUMBER (8)			0 5 0 0 0									

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

OPERATING MODE (9)	20.602(b)	20.608(e)	60.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	20.605(a)(1)(ii)	60.73(a)(1)	60.73(a)(2)(v)	73.71(c)
	20.605(a)(1)(iii)	60.73(a)(2)	60.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	20.605(a)(1)(iii)	60.73(a)(2)(i)	60.73(a)(2)(vii)(A)	
	20.605(a)(1)(iv)	60.73(a)(2)(ii)	60.73(a)(2)(vii)(B)	
	20.605(a)(1)(iv)	60.73(a)(2)(iii)	60.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: C. W. Fay, Vice President - Nuclear Pwcr

TELEPHONE NUMBER: 4 1 4 2 2 1 - 2 8 1 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
3	A	B	SIGW	1210	Yes				

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

Unit 2 was shut down for Refueling 15 on September 22, 1989. Eddy current examination of the steam generator tubes was conducted from October 4 to October 15, 1989, using a digital multi-frequency eddy current system. In the A steam generator hot leg, inspection results indicated 4 tubes degraded equal to or greater than 40% of the wall thickness, one tube with an undefined signal, 20 tubes with axial indications in the tubesheet area, and 2 restricted tubes. All 27 of these tubes were plugged.

In the B steam generator a total of 7 tubes were degraded equal to or greater than 40% of the tube wall thickness, and 2 tubes had axial indications in the tubesheet area. Six of these tubes were mechanically plugged and the remaining three were included in the sleeving program. A total of 298 tubes were preventively sleeved in the cold leg to address wastage concerns.

The 800 psid leak test revealed 4 mechanically plugged sleeved tubes and two sleeves leaking slightly in the B hot leg while 3 other tubes showed dampness. One explosively plugged tube and three sleeved tubes were leaking slightly in the A hot leg. The leaking mechanical plugs were repaired by the plug-in-plug repair and the others were left as found because of the minimal leakrate (<1 drop/2 min) or the lack of any indications during eddy current testing. The leaking sleeves were left as found as the sleeves are leak limiting by design.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Point Beach Nuclear Plant	DOCKET NUMBER (2)  0 5 0 0 0 3 0 1 8 9	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0 0 6	0 0	0 2	OF	0 7	

TEXT (if more space is required, use additional NRC Form 306A's (17))

EVENT DESCRIPTION

800 PSID LEAK CHECK

Prior to eddy current inspection on both steam generators, 800 psid secondary to primary leak checks were performed in the hot and cold legs of each steam generator. The checks were performed visually with the aid of remote video equipment. The leak check revealed 3 leaking sleeves and 1 explosive plug in the A steam generator hot leg. In the B steam generator hot leg 4 mechanically plugged sleeved tubes, and two sleeves were noted to be leaking. Also, 3 tubes showed signs of dampness in the B steam generator hot leg. Leakage noted was less than or equal to 1 drop/2 min in all cases.

EDDY CURRENT INSPECTION SCOPE

Eddy current inspections began shortly after the leak testing was completed. The eddy current program addressed the following items:

1. A 10 percent full-length sample on B S/G and a 9.6% full length sample on A S/G. (Technical Specifications require 3.0%)
2. Previously degraded tubes that had not been repaired.
3. A 10 percent sample of the tubes which had sleeves installed in the hot leg in each steam generator in 1983.
4. One hundred percent of the remaining unsleeved tubes in the hot leg to the first support plate in each steam generator, looking particularly for tubesheet crevice corrosion.
5. A 10 percent sample of tubes which had sleeves installed in 1988 in the cold leg in each steam generator.
6. One hundred percent inspection of the unsleeved tubes in the B steam generator from the cold leg tube end to the first support plate for wastage and pitting.
7. A 14% sample of the A cold leg unsleeved tubes from the tube end to the first support plate for wastage and pitting. This included all of the peripheral tubes and those tubes in the area where wastage had been noted in previous inspections.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Point Beach Nuclear Plant	DOCKET NUMBER (2)  0 5 0 0 0 3 0 1 8 9	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			0 0 6	0 0	0 3	OF 0 7

TEXT (If more space is required, use additional NRC Form 204A's) (17)

The number of tubes inspected and the extent of the inspections are as follows:

A Steam Generator

<u>Extent of Inspection</u>	Number of Tubes	
	From Hot Leg	From Cold Leg
Full length	138	
Through U-Bend to #6TSPC	20	
#1TSP to tube end	1420	435
Sleeves	138	12
To Top of Hot Leg Sleeve		138
#6TSPC to tube end		20
TOTAL	1716	605

B Steam Generator

<u>Extent of Inspection</u>	Number of Tubes	
	From Hot Leg	From Cold Leg
Full length	150	
Through U-Bend to #6TSPC	21	
#1TSP to tube end	1512	2229
Sleeves	141	48
To Top of Hot Leg Sleeve		141
#6TSPC to tube end		21
TOTAL	1824	2439

- #1TSP First support plate
- #6TSPC Sixth support plate cold leg side

Inspections from the cold leg side were performed due to concerns with cold leg wastage found during the U2R11 outage. As a result of these inspections cold leg sleeves were installed in the B steam generator as part of an optional preventive maintenance program.

Steam Generator Mechanical Tube Plug Repair

During this outage a total of 189 plug-in-plug repairs were made (65 on A, 124 on B) to address industry concerns, described in IE Bulletin 89-01, regarding certain Westinghouse mechanical plugs which were susceptible to intergranular stress corrosion cracking (IGSCC). One hot leg sleeve plug in the B steam generator was removed and replugged following an unsuccessful plug-in-plug insertion attempt in the original plug.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Point Beach Nuclear Plant	DOCKET NUMBER (2)  0 5 0 0 0 3 0 1 8 9	LER NUMBER (3)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			0 0 6	0 0	0 4	OF 0 7

TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 306A (1/77)

A STEAM GENERATOR TUBES EXCEEDING PLUGGING LIMIT

On October 15, 1989, review and verification of all eddy current data for tubes with indications exceeding the plugging limit was completed. A total of 27 tubes were plugged. Four tubes in the unsleeved region of the A steam generator were found having degradation equal to or greater than the plugging limit of 40% of the nominal tube wall thickness (Technical Specification 15.4.2.A.5). In addition, 20 tubes having axial indications were identified using a magnetic rotating pancake coil (MRPC). Another tube had an undefined signal while two other tubes were restricted and failed to pass a .650" probe.

The following is a list of the affected tubes:

TUBES THAT WERE PLUGGED

<u>Tube</u>	<u>Defect</u>	<u>Location</u>	<u>Cause</u>
R5C4	MAI	5.9" ATE HL	Crevice Corrosion
R15C7	SAI	6.1" ATE HL	Crevice Corrosion
R18C7	MAI	8.0" ATE HL	Crevice Corrosion
R20C10	UDI	3.9" ATE HL	Crevice Corrosion
R37C28	SAI	8.6" ATE HL	Crevice Corrosion
R1C30	SAI	0.2" ATS HL	Wastage
R42C31	REST.	#5TSP HL	Denting
R37C33	78%	7.2" ATE HL	Crevice Corrosion
R42C33	REST.	#5TSP HL	Denting
R32C35	90%	8.6" ATE HL	Crevice Corrosion
R37C40	MAI	4.0" ATE HL	Crevice Corrosion
R37C52	85%	10.3" ATE HL	Crevice Corrosion
R39C54	MAI	4.1" ATE HL	Crevice Corrosion
R33C59	SAI	3.8" ATE HL	Crevice Corrosion
R33C61	MAI	4.1" ATE HL	Crevice Corrosion
R5C72	MAI	13.8" ATE HL	Crevice Corrosion
R31C75	MAI	2.8" ATE HL	Crevice Corrosion
R35C76	MAI	4.7" ATE HL	Crevice Corrosion
R6C77	MAI	14.9" ATE HL	Crevice Corrosion
R8C77	MAI	7.3" ATR HL	Crevice Corrosion
R9C79	SAI	10" ATR HL	Crevice Corrosion
R6C80	MAI	6.1" ATE HL	Crevice Corrosion
R11C84	MAI	2.3" ATE HL	Crevice Corrosion
R1C85	MAI	3.2" ATE HL	Crevice Corrosion
R10C85	SAI	1.6" ATE HL	Crevice Corrosion
R12C86	MAI	3.8" ATE HL	Crevice Corrosion
R13C89	80%	8.1" ATE HL	Crevice Corrosion

ATR - Above Tube Roll  
ATE - Above Tube End  
ATS - Above Tube Sheet  
HL - Hot Leg

SAI - Single Axial Indication  
MAI - Multiple Axial Indication  
REST - Restricted  $\leq$  .650" Dia. Probe  
UDI - Undefined Indication  
TSP - Tube Support Plate



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Point Beach Nuclear Plant	DOCKET NUMBER (2)  0 1 5 1 0 1 0 3 0 1 8 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
			- 0 0 6	- 0 0	0 1 6	OF 0 7

TEXT (if more space is required, use additional NRC Form 306A's) (17)

3. In the B steam generator cold leg, 5 tubes with previous reportable indications required repair. Three of these tubes were included in the sleeving program and two were plugged.
4. The rate of indication growth was about 8-10%, which is a slight increase from our 1988 average.

COLD LEG WASTAGE AND PITTING

Tubes in both steam generator cold legs showed signs of being affected by wastage. The B steam generator has been affected more than A. In the B steam generator, 72 tubes (in addition to the 298 sleeved tubes) have indications. In the A steam generator, only 5 tubes showed indications of this type. Pitting, which has been found at other plants, has not been found at Point Beach.

TUBESHEET CREVICE CORROSION

Twenty-four tubes were found in the A steam generator unsleeved portion of the hot leg with signs of crevice corrosion. Three unsleeved tubes were found in the B steam generator hot leg with signs of crevice corrosion. All of these tubes were plugged.

SLEEVED TUBES

A total of 339 previously installed sleeves were inspected (150 in A, 189 in B) with no reportable indications in either steam generator. An additional 298 tubes were sleeved in the B steam generator cold leg as a preventive maintenance measure.

PROBE RESTRICTIONS

Probe restrictions were noted in both steam generators in the unsleeved regions. In the A steam generator, 66 tubes would not pass a 0.720" probe, 18 of these tubes would not pass a 0.700" probe, and 7 of the 18 tubes would not pass a 0.680" probe. A 0.650" probe was able to go through 3 of these tubes. Two tubes would not pass a .650" probe and were plugged. A .610" diameter probe was used to inspect these tubes and showed no defect. In the B steam generator, 58 tubes would not pass a 0.720" probe, and 17 of these tubes would not pass a 0.700" probe. A 0.680" probe was passed through all of these tubes. No tube had to be plugged in the B steam generator because of unacceptable restrictions. The restrictions in both steam generators appear to be a result of denting at the tube support plates in both generators.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO 3150-0104

EXPIRES 8/31/85

FACILITY NAME (1)  Point Beach Nuclear Plant	DOCKET NUMBER (2)  0 5 0 0 0 3 0 1 8 9	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 0 6	0 0	0 0	0 7	0 7

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

SLUDGE LANCING

Sludge lancing was performed this outage. 154 pounds of sludge was removed from the A steam generator and 102 pounds from the B steam generator. Routine visual checks with fiber optics were made to assess the cleanliness after lancing. The visual check results were satisfactory.

MINIMIZATION OF TUBE DEGRADATION

Other measures continue to be taken to minimize degradation of the steam generator tubes. These include crevice flushing prior to heating up to normal operating temperature and maintaining stricter chemistry controls in accordance with the prescribed guidelines.

PREVENTATIVE MAINTENANCE

Wisconsin Electric continues to monitor tube integrity on the hot leg of each steam generator and plug those tubes which exceed or approach the plugging limit in the Technical Specifications. In the cold legs, we are continuing to plug or sleeve tubes which exceed the plugging limit in the Technical Specifications.