



Carolina Power & Light Company

Brunswick Nuclear Project
P. O. Box 10429
Southport, N.C. 28461-0429
April 17, 1990

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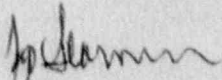
U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

BRUNSWICK STEAM ELECTRIC PLANT UNIT 2
DOCKET NO. 50-324
LICENSE NO. DPR-62
SUPPLEMENT TO LICENSEE EVENT REPORT 2-89-013

Gentlemen:

In accordance with Title 10 of the Code of Federal Regulations, the enclosed Supplemental Licensee Event Report is submitted. The original report fulfilled the requirement for a written report within thirty (30) days of a reportable occurrence and was submitted in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,


J. L. Harness, General Manager
Brunswick Nuclear Project

TH/

Enclosure

cc: Mr. S. D. Ebnetter
Mr. N. B. Le
BSEP NRC Resident Office

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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&30), 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) Brunswick Steam Electric Plant										DOCKET NUMBER (2) 0 5 0 0 0 3 2 4				PAGE (3) 1 OF 04							
TITLE (4) Failure of the HPCI Auxiliary Oil Pump Seal																					
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)								
0	9	0	9	8	9	0	1	3	0	2	0	4	1	7	9	0	0	5	0	0	0
OPERATING MODE (9) 2		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 8. (Check one or more of the following) (11)																			
POWER LEVEL (10) 0.00		20.402(b)				20.405(e)				B0.73(a)(2)(iv)				73.71(b)							
		20.405(a)(1)(i)				B0.36(c)(1)				X B0.73(a)(2)(v)				73.71(c)							
		20.405(a)(1)(ii)				B0.36(c)(2)				B0.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
		20.405(a)(1)(iii)				B0.73(a)(2)(i)				B0.73(a)(2)(viii)(A)											
		20.405(a)(1)(iv)				B0.73(a)(2)(ii)				B0.73(a)(2)(viii)(B)											
		20.405(a)(1)(v)				B0.73(a)(2)(iii)				B0.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME Tony Harris, Regulatory Compliance Specialist										TELEPHONE NUMBER 9 1 9 4 5 7 1 2 0 3 1 9											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS											
X	B	J	EAL	T3 4 3	Yes																
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)

While performing overspeed testing of the HPCI turbine during plant shutdown for the pending Unit 2 refuel outage, the HPCI turbine auxiliary oil pump developed a shaft seal leak of approximately 1 gallon per minute (gpm). The HPCI turbine was secured and an event investigation begun. The remaining plant Emergency Core Cooling Systems (ECCS) were operable.

Review of the event with the pump vendor identified three potential failure modes. Subsequent testing and analysis performed by CP&L and an outside laboratory attributed the failure of the seal to degradation of the adhesive which bonds the seal elastomer to the metal retaining ring. No definitive reason for the degradation of the adhesive could be determined. The event was determined to have minimal safety significance.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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)

DOCKET NUMBER (2)

LER NUMBER (8)

PAGE (3)

Brunswick Steam Electric Plant

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
05	00032489	0130202

0500032489-0130202 OF 04

TEXT (If more space is required, use additional NRC Form 355A's) (17)

EVENT

Failure of the Unit 2 High Pressure Coolant Injection (HPCI) auxiliary oil pump seal, causing HPCI to be inoperable.

INITIAL CONDITIONS

The Unit 2 reactor was being shut down for a scheduled Maintenance/Refuel outage. The reactor was in Mode 2 (Hot Standby/Startup). Reactor power was 0%, control rods were fully inserted and reactor pressure was at 245 psig. The High Pressure Coolant Injection (HPCI) System (EIIS/BJ) was placed under clearance at 0940 on 9/9/89 to permit uncoupling of the HPCI turbine (EIIS/BJ/TRB) for overspeed testing. The Residual Heat Removal (RHR)/Low Pressure Coolant Injection (LPCI) System (EIIS/BO), Core Spray System (EIIS/BG), Reactor Core Isolation Cooling (RCIC) System (EIIS/BN) and Automatic Depressurization System (ADS) (EIIS/**) were in standby readiness.

EVENT DESCRIPTION

On 9/9/89 at 1335, during startup of the HPCI turbine for overspeed testing, the HPCI turbine auxiliary oil pump (EIIS/BJ/TRB/P) developed approximately a one gallon per minute (gpm) leak. The Control Operator (CO) secured the auxiliary oil pump and terminated the testing to determine the origin of the leak. The reactor was placed in Hot Shutdown (Mode 3) at 1447.

EVENT CAUSE

Upon termination of the overspeed testing, investigation into the cause of the leakage was begun immediately. Inspection of the shaft seal for the Tuthill Pump Company Model # 5CEN Rotary HPCI turbine auxiliary oil pump (EIIS/BJ/TRB/P/SEAL) identified a failure of the shaft seal as the cause of the leakage. The pump seal was replaced and investigation to determine the root cause of the seal failure was initiated.

A review of historical data for the auxiliary oil pump seal noted no past catastrophic failures of this BUNA-N material type shaft seal (manufacturer part # 5CF94). A previous partial failure of the shaft seal on the Unit 1 HPCI auxiliary oil pump had occurred on 9/3/89. The Unit 1 shaft seal failure was attributed to leakage past a scored shaft, which was not present in the Unit 2 failure. Two additional minor seal leaks were identified during work order research.

The Unit 2 HPCI Auxiliary oil pump had an outstanding work request/job order (WR/JO# 89-AGCH1, initiated 3/6/89) written for seal leakage prior to this event. The HPCI System Engineer confirmed that the Unit 2 seal leakage had not increased on 9/6/89, following the failure of the Unit 1 seal. Based on the results of

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20556, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Brunswick Steam Electric Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 2 4 8 9	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
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TEXT (If more space is required, use additional NRC Form 306A's) (17)

the system engineer's inspection, the Unit 2 seal was not deemed to need replacing since:

1. Seal leakage had not increased in approximately six months.
2. Seal leakage typically increases gradually prior to failure.
3. Seal replacement was scheduled to be completed during the upcoming Unit 2 outage.
4. The HPCI auxiliary oil pump only runs briefly during turbine startup, turbine shutdown and when the turbine is run at low speeds.

The manufacturer of the HPCI auxiliary oil pump, Tuthill Pump Company, was contacted regarding potential seal failure modes. It was determined that the Unit 2 seal could have failed due to:

1. Overpressurization of the oil system during the overspeed testing.
2. Incompatibility of the seal material with the turbine lube oil.
3. Normal wear.

During recently completed HPCI turbine overspeed trip testing, which was completed during Unit 2 startup from the refuel outage, HPCI oil system pressures were monitored with no irregularities noted. Overpressurization of the lube oil system is therefore not believed to have contributed to the seal failure.

The failed seal was sent to the CP&L Harris Energy and Environmental Center (HE&EC) for a further compatibility/failure analysis. The HE&EC sent the failed seal to an external lab for analysis of the adhesive that bonds the seal elastomer to the seal cartridge. This analysis determined the failure to be the result of degradation of the adhesive that bonds the seal elastomer to the metal retaining ring. No compatibility problems were identified between the seal material and the Mobil Vaportec Light lube oil used in the HPCI lube oil system.

The HE&EC report further states that the seal adhesive could have potentially been degraded by temperatures higher than 150 degrees Fahrenheit; however, bulk lube oil temperatures for the HPCI system would not be expected to be this extreme. Oil temperatures data was collected on separate occasions from February to July, 1989. This data showed expected operating temperatures of less than 130 degrees Fahrenheit.

There is no conclusive evidence as to the root cause failure mechanism associated with this event. CP&L does not plan any further corrective actions as a result of this event.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F630) 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)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Brunswick Steam Electric Plant

0 5 0 0 0 3 2 4 8 9 - 0 1 3 - 0 2 0 4 OF 0 4

TEXT (If more space is required, use additional NRC Form 386A's) (17)

EVENT ASSESSMENT

The safety significance of this event was determined to be minimal. It is believed that the HPCI system was capable of starting and delivering design flow, since the Auxiliary oil pump runs only during system startup, shutdown and at low turbine speeds. A significant lube oil inventory loss would be expected only if the turbine were operated at low speeds for an extended period of time. It is also noted that during the 6/17/89 loss of off-site power event on Unit 2 at BSEP, the HPCI turbine operated during intermittent periods for the duration of the event for vessel level and vessel pressure control with no problems noted. Additionally, the RHR/LPCI system, Core Spray System, RCIC System and ADS system were operable and capable of bringing the unit to a safe condition under other reasonable and credible conditions.

EIIS CODESSystem/ComponentCode

HPCI

BJ

RCIC

BN

RHR/LPCI

BO

Core Spray

BG

ADS

No Code Available

HPCI Turbine

BJ/TRB

HPCI Aux. Oil Pump

BJ/TRB/P

HPCI Aux. Oil Pump Shaft Seal

BJ/TRB/P/SEAL