Progress Energy

MAR 2 9 2009

SERIAL: BSEP 09-0033 10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit No. 2
Docket No. 50-324/License No. DPR-62
Licensee Event Report 2-2009-001

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.73, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., submits the enclosed Licensee Event Report (LER). This report fulfills the requirement for a written report within sixty (60) days of a reportable occurrence.

Please refer any questions regarding this submittal to Mr. Gene Atkinson, Supervisor - Licensing/Regulatory Programs, at (910) 457-2056.

Sincerely,

Edward L. Wills, Jr.
Plant General Manager
Brunswick Steam Electric Plant

MAT/mat

Enclosure:

Licensee Event Report

Progress Energy Carolinas, Inc.
Brunswick Nuclear Plant
PO Box 10429
Southport, NC 28461

IE22
NRR

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II
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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

High Pressure Coolant Injection (HPCI) System Inoperable Due to Water in the HPCI Turbine Casing

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
01	27	2009	2009	– 001	– 00	03	29	2009	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Mark Turkal, Lead Engineer - Licensing	(910) 457-3066

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On January 27, 2009, at 2007 hours Eastern Standard Time (EST), the Unit 2 High Pressure Coolant Injection (HPCI) system was declared inoperable due to a sustained high water level in the HPCI exhaust line drain pot. The inability to reduce level in the exhaust line drain pot resulted in backup of water into the HPCI turbine casing which rendered the system unavailable to perform its safety function. This sustained high level was caused by a failure of the HPCI barometric condenser condensate pump and difficulties in establishing an alternate drain path from the barometric condenser. The HPCI system was declared operable, following repair of the HPCI barometric condenser condensate pump, on January 28, 2009, at 2050 hours EST.

There are two root causes associated with this event. The HPCI barometric condenser condensate pump failed because no Preventive Maintenance (PM) activities had been established for the pump and motor. The difficulties in establishing an alternate drain path were a result of an incorrect annunciator response procedure. Corrective actions to prevent recurrence include establishment of PM activities for the HPCI barometric condenser condensate pump and motor and correction of the annunciator response procedure.

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NARRATIVE

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

Introduction

Initial Conditions

At the time of the event, Unit 2 was in Mode 1, operating at approximately 100 percent of Rated Thermal Power (RTP). The Reactor Core Isolation Cooling (RCIC) system [BN], the Automatic Depressurization system (ADS), the Core Spray (CS) system [BM] and the Low Pressure Coolant Injection (LPCI) system [BO] were all operable.

Reportability Criteria

On January 27, 2009, at 2007 hours Eastern Standard Time (EST), the Unit 2 High Pressure Coolant Injection (HPCI) system [BJ] was declared inoperable due to a sustained high water level in the HPCI exhaust line drain pot. This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(D), as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. The NRC was initially notified of this event on January 27, 2009 (i.e., Event Number 44810).

Event Description

The HPCI Turbine Gland Exhauster system provides a means of minimizing steam leakage to the HPCI room atmosphere. The system consists of a barometric condenser, vacuum tank, condensate pump, and vacuum pump. The steam, condensate, and noncondensable gases from the HPCI turbine seals, and the governor and stop valve stem leakoff, plus drainage from the turbine exhaust line drain pot, are routed to the barometric condenser. The barometric condenser condensate pump automatically starts on a high level in the vacuum tank, and discharges the condensate to the suction of the HPCI booster pump when HPCI is operating or to the Reactor Building equipment drain tank when HPCI is in standby. Additionally, high level in the HPCI exhaust line drain pot will cause the exhaust drain pot drain bypass valve (i.e., 1(2)-E41-F053) to automatically open. This drains condensate to the barometric condenser. Once operating, a failure of either the condensate or vacuum pump will not prevent the HPCI system from performing its design function. However, if HPCI is shutdown, a failure of the condensate pump could lead to water backing up into the exhaust line drain pot, and eventually enter the turbine casing and exhaust line. If HPCI is started with water in the casing, water hammer damage could result.

On January 27, 2009, HPCI Turbine Exhaust Line Drain Pot Level High alarms were being experienced and, per design, the exhaust drain pot was automatically draining the condensate to the HPCI barometric condenser. At 1745 hours EST and again at 1839 hours, the HPCI Vacuum Tank Level High alarm was received. After the alarm at 1839 hours, an auxiliary operator (AO) was sent to investigate the condensate pump because its operation time had exceeded the expected one to two minutes. The AO reported that the condensate pump was not running, contrary to the control room indication. Upon recognition that the

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Event Description (continued)

condensate pump had failed, Operations personnel pursued establishment of the preferred alternate drain path from the barometric condenser (i.e., via a test connection downstream of the condensate pump) in accordance with section 5-3, "HPCI Vacuum Lvl Hi," of procedure 2APP-A-01, "Annunciator Procedure for Panel A-01." This alternate path was established at 1901 hours; however, the HPCI Vacuum Tank Level Hi alarm did not clear. At 2007 hours, the HPCI Turbine Exhaust Line Drain Pot Level High alarm returned. At this point, the HPCI system was declared inoperable due to the high exhaust line drain pot level and the threat of system damage due to a potential turbine start with water inside the turbine casing. The high drain pot level alarm cleared within one to two minutes, but returned at 2018 hours and would not clear.

Subsequently, at approximately 2140 hours, a second alternate drain path from the barometric condenser vacuum tank was established through the barometric condenser drain collecting valve (i.e., 2-E41-V5003). This path was successful in reducing condenser level and, at 2204 hours, the HPCI Turbine Exhaust Line Drain Pot Level High annunciator cleared.

Troubleshooting activities determined that the failure of the HPCI barometric condenser condensate pump was due to worn motor brushes. The brushes were replaced and, following post-maintenance testing, the HPCI system was returned to service at 2050 hours on January 28, 2009.

Event Cause

There are two root causes associated with this event. The HPCI barometric condenser condensate pump failed because no Preventive Maintenance (PM) activities had been established for the pump and motor. The difficulties in establishing an alternate drain path from the barometric condenser were a result of an incorrect annunciator response procedure.

The HPCI system was declared inoperable when the ability to control water level at or below the exhaust line drain pot level alarm was lost. Level control was originally challenged due to failure of the HPCI barometric condenser condensate pump, which resulted in the condenser and the vacuum tank filling with water. The pump failure was caused by wear of the motor brushes, which resulted in a loss of contact between the brushes and the collector ring. There were no PM activities to inspect or refurbish the condensate pump and motor.

Initial attempts to establish the primary alternate drain path from the barometric condenser were unsuccessful because procedure 2APP-A-01 was technically incorrect. The primary alternate drain path was through a test connection downstream of the HPCI barometric condenser condensate pump. The test connection consists of two globe-type isolation valves in series (i.e., 2-E41-V13 and 2-E41-V14). However, between the condensate pump and the test connection is valve 2-E41-F058, which is a stop check valve with a spring-loaded disc requiring a differential pressure of approximately 5 psig to lift. System pressure was inadequate to actuate the disc in the spring-loaded stop check valve.

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CONTINUATION SHEET

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Safety Assessment

The safety significance of this event is considered minimal. The RCIC system, the ADS, the CS system, and the LPCI system were all operable during the time that HPCI was inoperable. Adequate core cooling was ensured by the operability of the redundant and diverse low pressure injection systems in conjunction with ADS. Additionally, the RCIC system would have automatically provided makeup at high reactor operating pressures.

Corrective Actions

The following corrective actions to prevent recurrence have been identified.

- PM activities will be established for the Unit 1and 2 HPCI system barometric condenser condensate pumps and motors and the Unit 1 and 2 RCIC system barometric condenser condensate pumps and motors. These PMs are currently scheduled to be established by May 15, 2009.
- Procedures 1(2)APP-A-01 were revised to ensure proper alternate drain paths can be established in the event of failure of the HPCI system barometric condenser condensate pumps. These procedure revisions were completed on February 2, 2009.
- Procedures 1(2)APP-A-01 were revised to minimize sources of condensate to the HPCI system barometric condenser when the HPCI system is not running and a HPCI vacuum tank high level condition exists. These procedure revisions were completed on March 9, 2009, for Unit 1 and March 12, 2009, for Unit 2.

Additional corrective actions include the following.

- The HPCI system was declared operable, following repair of the HPCI barometric condenser condensate pump, on January 28, 2009, at 2050 hours EST.
- The Unit 1 HPCI system barometric condenser condensate pump motor brushes will be inspected and any necessary repairs completed. This action is currently scheduled to be completed by June 30, 2009.
- The Unit 1 and Unit 2 RCIC system barometric condenser condensate pump motor brushes will be inspected and any necessary repairs completed. This action is currently scheduled to be completed by July 30, 2009.
- The PM requirements for other components needed to ensure HPCI condensate removal will be reviewed and any necessary changes implemented. This action is currently scheduled to be completed by June 15, 2009.

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Previous Similar Events

A review of LERs and corrective action program condition reports for the past three years identified the following similar event.

- Nuclear Condition Report (NCR) 223820, "HPCI Overspeed Test Halted Due to Unexpected Annunciation," generated on February 27, 2007, documented a high vacuum tank alarm that occurred while performing procedure 0PT-09.8, "HPCI System Coupled Overspeed Trip Test," on Unit 2. One of the apparent causes of this event was identified as minor degradation of the HPCI system barometric condenser condensate pump. The pump had been in service for many years and the potential for age-related degradation was identified. However, a subsequent review found that performance of the pump had been acceptable. As such, the PM activities for the pump were not questioned.

  Additionally, during investigation of this event, it was discovered that valve 2-E41-F058 was a stop check valve versus a globe valve as shown on the Piping and Instrument Drawing and described in the Equipment Database. Activities to correct the condition were informal and failed to evaluate how the finding could impact operability of the system or to update applicable plant drawings. These errors were individual human performance errors.

  Based on the factors discussed above, the actions taken in response to NCR 223820 did not prevent the HPCI system inoperability discussed in LER 2-2009-001.

Commitments

No regulatory commitments are contained in this report.