Progress Energy

November 19, 2009

SERIAL: BSEP 09-0120 10 CFR 50.73

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

Subject: Brunswick Steam Electric Plant, Unit No. 1
Renewed Facility Operating License No. DPR-71
Docket No. 50-325
Licensee Event Report 1-2009-005

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 Ms. Annette Pope, Supervisor - Licensing/Regulatory Programs, at (910) 457-2184.

Sincerely,

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

LJG/ljg

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

LICENSEE EVENT REPORT (LER)

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

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.

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE
Reactor Protection System (RPS) Actuation When Placing HPCI in Pressure Control.

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
09	21	2009	2009	– 005 –	00	11	19	2009	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE: 3

10. POWER LEVEL: 000

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)*
Lee Grzeck, Senior Engineer - Licensing	(910) 457-2487

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 September 21, 2009, at approximately 14:46 Eastern Daylight Time (EDT), Unit 1 received valid actuations of the Reactor Protection System (RPS) and the Primary Containment Isolation System (PCIS). Unit 1 was non-critical, operating in Mode 3 (i.e., Hot Shutdown) with all control rods inserted, when the RPS actuation occurred. Operators were placing the High Pressure Coolant Injection (HPCI) system in service for reactor pressure control, when a resulting water level shrink caused level in the reactor pressure vessel to drop to Low Level 1, causing the actuations of RPS and PCIS. The HPCI system was secured, and level stabilized in the normal band.

PCIS Group 2, Group 6, and Group 8 isolation signals were received. Actuations of the Primary Containment Isolation Valves (PCIVs) were completed and the affected equipment responded as designed. Two Group 2 valves and two Group 6 valves did not automatically isolate, since the reactor water level did not get low enough to actuate all PCIS channels, and were manually isolated from the control panel.

The safety consequences of this event were minimal. The Emergency Core Cooling Systems (ECCS), along with the Reactor Core Isolation Cooling (RCIC) system and Automatic Depressurization (ADS) system were operable and available to provide adequate core cooling if needed. The root cause of this event was determined to be an inadequate procedure. The corrective action for this event is to revise the plant operating procedure(s).

NARRATIVE

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

Introduction

Initial Conditions

At the time of the event, Unit 1 was in Mode 3 (i.e., Hot Shutdown), with all rods inserted. The Emergency Core Cooling Systems (ECCS), along with the RCIC system and the Automatic Depressurization (ADS) system were operable and available to provide adequate core cooling if needed.

Reportability Criteria

This event resulted in valid actuations of the Reactor Protection System (RPS) [JC] and the Primary Containment Isolation System (PCIS) [JM]. As such, this event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A), as an event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B). The NRC was initially notified of this event on September 21, 2009 (i.e., Event Number 45375).

Event Description

On September 21, 2009, at approximately 14:46 EDT, Unit 1 received valid actuations of the Reactor Protection System (RPS) and the Primary Containment Isolation System (PCIS). Unit 1 was non-critical, operating in Mode 3 with all control rods inserted, when the RPS actuation occurred. Operators were placing the High Pressure Coolant Injection (HPCI) system [BJ] in service for reactor pressure control, when a resulting water level shrink caused level in the reactor pressure vessel to drop to Low Level 1, causing the actuation of RPS and PCIS. The HPCI system was secured, and level stabilized in the normal band.

PCIS Group 2 (i.e., Drywell Equipment and Floor Drain, Residual Heat Removal (RHR) Discharge to Radwaste, and RHR Process Sample), Group 6 (i.e., Containment Atmosphere Control/Dilution, Containment Atmosphere Monitoring, and Post Accident Sampling Systems), and Group 8 (i.e., RHR Shutdown Cooling) isolation signals were received. RHR was not in shutdown cooling at the time of the isolation signal. Actuations of the Primary Containment Isolation Valves (PCIVs) were completed and the affected equipment responded as designed. Two Group 2 valves (i.e., 1-G16-F003 and 1-G16-F019) and two Group 6 valves (i.e., 1-CAC-V6 and 1-CAC-V9) did not automatically isolate and were manually isolated from the control panel. It was determined that the Reactor Pressure Vessel (RPV) water level did not get low enough to actuate all PCIS channels (i.e., channel B1 did not trip). As such, the plant responded as expected to the event, and these valves operated properly when manually isolated.

Prior to this event, Unit 1 and Unit 2 had been shutdown to comply with Technical Specifications (TSs) Required Action. A manual reactor scram was inserted on Unit 1 on September 20, 2009, at 22:22 hours, when the required action to return Emergency Diesel Generator (EDG) [EK] No. 4 to operable could not be completed within the associated completion time. Following the scram, there were a series of equipment

NARRATIVE

Event Description (continued)

issues that resulted in plant conditions that are normally not expected during plant shutdown. The Main Steam Isolation Valves (MSIVs) [SB] were closed approximately 1 hour and 45 minutes after the scram to maintain pressure in the RPV to assist in locating leaks in the Drywell. The MSIVs remained closed following completion of the leak hunt when operators were unable to establish the proper pressure differential required to open the MSIVs. Reactor Core Isolation Cooling (RCIC) [BN] was placed into service for RPV level control using normal operating procedures. Approximately 16 hours after the scram, HPCI was placed into service for pressure control. Normal operating procedure 1OP-19, "High Pressure Coolant Injection System Operating Procedure," was used. At the time of the event, RPV level was being maintained at 177 inches. When HPCI was started, RPV level began to swell, but the swell was greater than anticipated. Adjustments were made to HPCI to reduce flow and minimize any further swell. The RPV level reached 188 inches and then began to lower, and subsequently the water level decrease was larger than expected. RCIC and Control Rod Drive (CRD) [AA] flow rates were adjusted to stop the level decrease. The RPV level drop reached 167 inches, and resulted in an inadvertent RPS trip at Low Level 1 of 168 inches. PCIS Group 2, 6, and 8 isolation signals were also received. Two Group 2 valves and two Group 6 valves did not automatically isolate, since the reactor water level did not get low enough to actuate all PCIS channels (i.e., nominal trip setpoint of 166 inches), and were manually isolated from the control panel. Based on narrow range indications, the low level condition actuated channels A1, A2, and B2, but channel B1 did not get low enough to require actuation. The HPCI system was secured, and RPV level stabilized in the normal operating band.

RPV level shrink and swell were anticipated by the Operators, but the magnitude of the shrink and swell was larger than expected. Operators had briefed the evolution, and initial RPV level was established in the middle of the level band to help avoid trips on high and low level. Contingency actions to compensate for shrink and swell, such as increasing injection flow with RCIC to increase level, and reducing flow on HPCI to reduce steam demand, were developed. Starting HPCI per the procedure in pressure control mode results in a near maximum steam demand for HPCI, which results in a very large amount of swell and subsequent shrink. The existing procedure does not allow starting the HPCI system at a slower steam demand. Being unable to bring the HPCI system into service in a slower, more controlled, manner complicated this evolution. The Operators did not anticipate the effects of HPCI operation for the existing reactor conditions (i.e., low decay heat and low RPV pressure) which existed at the time of the event.

Event Cause

The root cause of this event was determined to be an inadequate procedure. The existing procedure for the use of the HPCI system in pressure control mode was inadequate in relation to the conditions of the plant that existed at the time of this event.

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NARRATIVE

Safety Assessment

The safety significance of this event is considered minimal. The Emergency Core Cooling Systems (ECCS), along with the RCIC system and the Automatic Depressurization (ADS) system were operable and available to provide adequate core cooling if needed. All systems functioned as designed.

Corrective Actions

The following corrective action to prevent recurrence will be taken.

- Revise procedures 1(2)OP-19, "High Pressure Coolant Injection System Operating Procedure," to include plant conditions with low decay heat and low RPV pressure when using HPCI in pressure control mode. This action is scheduled to be completed by February 17, 2010.

Previous Similar Events

A review of LERs and corrective action program condition reports for the past three years did not identify any similar previous occurrences.

Commitments

No regulatory commitments are contained in this report.