Progress Energy

JUL 02 2010

SERIAL: BSEP 10-0078 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 1-2010-003

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
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	1 of 4

4. TITLE
Automatic Reactor Scram due to 1B Reactor Feed Pump Trip.

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
05	05	2010	2010	– 003 –	00	07	02	2010	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)*
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	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

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

On May 5, 2010, at approximately 11:44 hours Eastern Daylight Time (EDT), an automatic reactor scram occurred on Unit 1 following a trip of the 1B Reactor Feed Pump (RFP). The Reactor Recirculation pumps did not run back as expected following the 1B RFP trip. The resulting water level shrink caused level in the Reactor Pressure Vessel (RPV) to drop to Low Level 1, causing the activation of the Reactor Protection System (RPS) and the Primary Containment Isolation System (PCIS). All control rods properly inserted.

PCIS Group 2, Group 6, and Group 8 isolation signals were received on Low Level 1. Actuations of the Primary Containment Isolation Valves (PCIVs) were completed and the affected equipment responded as designed. Water level in the RPV momentarily reached Low Level 2, which initiated the High Pressure Coolant Injection (HPCI) System, the Reactor Core Isolation Cooling (RCIC) System, and a partial Group 3 (i.e., Reactor Water Cleanup (RWCU)) PCIS isolation. The HPCI and RCIC systems did not inject to the RPV. The RWCU inboard isolation valve isolated and, in accordance with plant design, 1-G31-F004 (i.e., RWCU outboard isolation) did not automatically isolate. Unit 2 was not affected by this event.

The safety consequences of this event were minimal. All Emergency Core Cooling Systems (ECCS) were operable and available to provide adequate core cooling if needed. The investigation concluded that the adverse condition was a historical problem and no root cause could reasonably be determined.

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 1 (i.e., Power Operation), at approximately 100 percent of rated thermal power (RTP). The Emergency Core Cooling Systems (ECCS), along with the Reactor Core Isolation Cooling (RCIC) system [BN] and the Automatic Depressurization (ADS) system, were operable and available to provide adequate core cooling if needed.

Reportability Criteria

This event resulted in automatic actuation of the Reactor Protection System (RPS) [JC]. In addition, the Primary Containment Isolation System (PCIS) [JM], High Pressure Coolant Injection (HPCI) system [BJ], and RCIC system all actuated. 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 May 5, 2010 (i.e., Event Number 45902).

Event Description

On May 5, 2010, at 11:44 hours Eastern Daylight Time (EDT), with Unit 1 operating at approximately 100 percent of RTP, the 1B Reactor Feed Pump (RFP) tripped. When the resulting water level shrink dropped the Reactor Pressure Vessel (RPV) level to 182 inches (i.e., the setpoint for a Reactor Recirculation (RCR) [AD] pump runback to occur), the automatic runback of the RCR pumps did not occur as designed. The RPV water level continued to drop below the Low Level 1 setpoint (i.e., 166 inches), causing an automatic reactor scram on Unit 1 and activation of the RPS and the PCIS. All control rods fully inserted.

PCIS isolation signals to primary containment isolation valves (PCIVs) Group 2 (i.e., Drywell Equipment and Floor Drain, Traversing In-core Probe, 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 System), and Group 8 (i.e., RHR Shutdown Cooling Suction and RHR Inboard Injection) were received. The isolation signals closed all of the PCIVs that were open at the time of the actuation. In addition, reactor vessel level momentarily dropped below the Low Level 2 setpoint (i.e., 105 inches) which initiated the HPCI system, the RCIC system, and a partial Group 3 (i.e., Reactor Water Cleanup (RWCU)) PCIS isolation. In accordance with plant design and RPV water level response, the HPCI and RCIC systems did not inject to the RPV, and the RWCU outboard isolation valve (i.e., 1-G31-F004) did not automatically isolate. All other affected plant equipment and systems also responded as designed.

NARRATIVE

Event Description (continued)

The control logic to initiate a RCR pump runback consists of a RFP low suction flow signal from either RFP flow switch 1-FW-FS-175 or 1-FW-FS-176, combined with a low reactor vessel water level (i.e., less than or equal to 182 inches) signal. A runback of the RCR pumps reduces reactor power to a level where flow from one RFP is sufficient to avoid a scram on low reactor vessel level. The event investigation determined that the 1B RFP indicated suction flow, as measured at the flow switch, remained above the RCR pump runback setpoint for an extended period of time following the RFP trip. This delay prevented a runback signal from being generated in time to prevent the automatic reactor scram on RPV low level.

Failure of the RCR pump to runback upon loss of the 1B RFP was caused by implementation of an inappropriate design change in 1977. A plant modification installed pulsation dampeners (i.e., snubbers) in each Unit 1 RFP suction flow element sensing line in order to reduce excessive gauge fluctuations and prolong the life of the instruments connected to the sensing lines. The RCR pumps did not runback as expected because the signal for RFP low suction flow did not occur until after reactor vessel level dropped to the scram setpoint. The plant modification was intended to correct a gauge fluctuation problem, but was implemented in such a way that resulted in delayed actuation of the RFP low suction flow signal to the runback logic.

The installed snubbers are adjustable pin stainless steel pulsation dampeners. As a result of the extent of condition investigation, the as-found configuration of the adjustable pin snubbers in both the Unit 1 and Unit 2 RFP sensing lines found that each snubber contained either one or two pins installed. Troubleshooting determined that the required RCR pump runback signal could only be achieved with all pins removed from the snubbers. With all pins removed from the snubbers, the RCR pump runback function within the required timeframe was restored.

Event Cause

The cause of the event was pulsation dampeners (i.e., with pins installed) in the reactor feed pump suction flow element sensing lines, installed in a 1977 plant modification, delayed the actuation of the low suction flow signal to the pump runback logic. This delay allowed the RPV water level to drop below the Low Level 1 setpoint, causing an automatic reactor scram on Unit 1 and activation of the RPS and the PCIS. The investigation concluded that the adverse condition was a historical problem, which has existed for such a long time that a plausible root cause could not be reasonably determined.

Safety Assessment

The safety significance of this event is considered minimal. In addition to RCIC, the Emergency Core Cooling systems and the Automatic Depressurization system were operable and available to provide adequate core cooling if needed. Operators maintained RPV level within the normal band following the automatic reactor scram. All systems functioned as designed, and there was no nuclear or industrial safety consequence from this event.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	2010 --	003 --	00	4 of 4

NARRATIVE

Corrective Actions

The following corrective actions will be taken.

- Remove all snubber pins in the Unit 1 and Unit 2 reactor feed pump suction flow element sensing lines. This action is complete.
- Revise Unit 1 and Unit 2 instrument rack piping detail drawings D-70042 and D-07042, respectively, to identify adjustment no. 1 configuration (i.e., no pins) for the instrument snubbers in the RFP suction flow sensing lines. This action is scheduled to be completed by September 9, 2010.
- Revise design basis document DBD-02, "Reactor Coolant Recirculation System," to identify that the RFP low suction flow signal is required to actuate in sufficient time to allow the runback to prevent a scram. This action is scheduled to be completed by September 9, 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.