Progress Energy

JUN 0 2 2003

SERIAL: BSEP 03-0087

10 CFR 50.73

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-324/LICENSE NO. DPR-62
LICENSEE EVENT REPORT 2-03-003

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.73, Progress Energy Carolinas, Inc. submits the enclosed Licensee Event Report. 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. Edward T. O'Neil, Manager – Support Services, at (910) 457-3512.

Sincerely,

W. G. Noll
Plant General Manager
Brunswick Steam Electric Plant

GLM/glm

Enclosure: Licensee Event Report

**Progress Energy Carolinas, Inc.**
Brunswick Nuclear Plant
P.O. Box 10429
Southport, NC 28461

JE22

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Luis A. Reyes, Regional Administrator
Sam Nunn Atlanta Federal Center
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U. S. Nuclear Regulatory Commission
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NRC FORM 366 (7-2001)

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 7-31-2004
Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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 2 | 05000324 | 1 OF 4 |

4. TITLE
Unit 2 Scram During Startup Due to Electro Hydraulic Control System Malfunction

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---|---|---|---|---|---|---|---|---|---|---|
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER 05000 |
| 04 | 04 | 03 | 2003 | -- 03 -- | 00 | 06 | 02 | 2003 | FACILITY NAME | DOCKET NUMBER 05000 |

9. OPERATING MODE: 1

10. POWER LEVEL: 22%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more)

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

12. LICENSEE CONTACT FOR THIS LER

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Gary Miller – Lead Engineer | (910) 457-2110 |

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 | MO | DAY | YEAR |
|---|---|---|---|---|---|---|---|
| | YES (If yes, complete EXPECTED SUBMISSION DATE). | X | NO | | | | |

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

On April 4, 2003, at 1354 hours, during reactor startup following the Unit 2 refueling outage, a primary containment group one isolation occurred, which resulted in a reactor scram from 22 percent rated thermal power. All group one isolation valves closed as expected. The containment isolation signal was caused by low main steam line pressure after the main turbine bypass valves inadvertently opened. The main turbine bypass valves opened due to a malfunction in an Electro-Hydraulic Control (EHC) System pressure regulator. Following the scram, an expected reactor vessel coolant level shrink occurred, causing coolant level to decrease from approximately 187 (normal) to 150 inches above instrument zero. As a result of the low water level, primary containment groups 2, 6, and 8 isolation signals were received. All required isolations occurred as a result of the reactor low water level isolation signal. All control rods fully inserted on the scram and all systems responded as designed. Reactor Core Isolation Cooling was manually started to restore reactor water level to the normal band.

The cause of the event was determined to be an intermittent error signal from an EHC card that was improperly engaged in its hardware slot in the EHC pressure control circuitry. Following the event, all cards in the EHC control circuits were verified to be properly engaged. The process for checking card engagement will be enhanced to prevent recurrence of this event. The safety significance of the event is considered to be minimal.

# LICENSEE EVENT REPORT (LER)

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

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

## INTRODUCTION

On April 4, 2003, Unit 2 was in Mode 1 and in a reactor startup following a refueling outage. At the time of the event, reactor power was approximately 22% of Rated Thermal Power (RTP). All required systems were operable, and the Unit 2 generator [TB] was not synchronized to the transmission grid. At 1354 hours, a primary containment group one isolation [JM] occurred, which resulted in a reactor scram. All group one isolation valves closed as expected. An expected reactor vessel coolant level shrink occurred causing coolant level to decrease to approximately 150 inches above instrument zero (i.e., instrument zero is approximately 7.5 inches above the top of active fuel). The level transient resulted in the initiation of primary containment isolation [JM] signals for group 2, 6, and 8 isolation valves. The plant responded as designed to the event.

On April 4, 2003 at 1635 hours, notification was made to the NRC (Event Number 39733) in accordance with 10 CFR 50.72(b)(2)(iv)(B) for an event or condition that resulted in the actuation of the Reactor Protection System (RPS),[JD] when the reactor is critical, and in accordance with 10 CFR 50.72(b)(3)(iv)(A) as any event or condition that resulted in valid actuation of specified systems. 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 the RPS, and containment isolations signals affecting containment valves in more than one system, as well as manual actuation of the Reactor Core Isolation Cooling [BN] System.

## EVENT DESCRIPTION

On April 4, 2003, at 1354 hours, a Unit 2 primary containment group one isolation occurred, which resulted in a reactor scram. The containment isolation signal was caused by low main steam line pressure after the main turbine bypass valves inadvertently stroked open. This resulted in the main steam line pressure dropping below the group one isolation setpoint of 850 psig. The main turbine bypass valves [JI] opened due to a malfunction in an Electro-Hydraulic Control (EHC) System [JJ] pressure regulator card.

All control rods fully inserted and an expected reactor vessel coolant level shrink occurred causing coolant level to decrease from approximately 187 (normal) to 150 inches above instrument zero. The level transient resulted in the initiation of primary containment isolation signals for group 2 (i.e., Drywell Equipment and Floor Drain [WK], Traversing In-core Probe [IG], Residual Heat Removal (RHR),[BO] Discharge to Radwaste, and RHR Process Sample isolation valves), group 6 (i.e., Containment Atmosphere Control/Dilution, Containment Atmosphere Monitoring [BB], and Post Accident Sampling System [IP] isolation valves), and group 8 (i.e., RHR Shutdown Cooling Suction and RHR Inboard Injection isolation) valves. The required equipment responded as designed and the group 2, and 6 valves, that were open at the time of the event, closed upon receipt of the isolation signals. The group 8 valves were already closed at the time of the event. Operators performed the required actions in accordance Emergency Operating Procedure 2EOP-01-RSP, "Reactor Scram Procedure." Reactor Core Isolation Cooling was manually started to restore reactor water level to the normal band.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

## EVENT CAUSE

The cause of the event was an improperly seated card in the EHC pressure regulator circuitry that produced an intermittent error signal. The event began with a stable pressure regulator output signal that spuriously changed without a corresponding change in plant conditions. An EHC electrical signal is used to position the turbine control valves, bypass valves and turbine intercept valves, and is developed utilizing inputs from one of two redundant pressure regulators (i.e., "A" and "B"). During normal plant operation the "A" pressure regulator provides the controlling signal unless it is overridden by a greater output signal from the "B" pressure regulator. At the time of the event, the "A" pressure regulator responded normally, and the "B" pressure regulator produced an indicated low steam pressure which produced an open signal to the main turbine bypass valves.

Troubleshooting after the event determined that the Steam Line Resonance Compensator (SLRC) card for the "B" pressure regulator was not fully seated. When slight pressure was applied to the card, the "B" pressure regulator produced an output signal value similar to the value that caused the scram. The SLRC card was removed from its slot and further troubleshooting confirmed that the individual components on the card were not subject to movement or applied pressure. When the SLRC card was re-inserted, it required a firm push by the technician to engage fully in the slot.

Although the SLRC card was not removed for maintenance activities during the refueling outage, a large number of cards were removed and reinstalled in support of maintenance activities. Upon completion of maintenance activities in the EHC panel, all cards were checked for proper engagement. The normal practice for verifying proper card engagement is to apply manual pressure to cards that had been removed and perform a visual inspection of all other cards. However, the SLRC cards are wider, slightly longer than adjacent cards, and require more than typical seating force. The SLRC cards were upgraded as a plant modification, based on industry operating experience. These larger cards also have potentiometers on their front. Therefore, it is more difficult to apply an adequate manual seating pressure and to visually verify proper seating engagement by using normal seating and verification techniques.

## CORRECTIVE ACTIONS

All cards in the affected EHC cabinet were checked to ensure positive slot engagement. In addition, a procedure revision is planned that will add detail to the restoration steps for EHC cards to ensure proper slot engagement for all cards. The procedure revision will also include operating experience on this event.

## SAFETY ASSESSMENT

The safety significance of this event is considered to be minimal. All required systems responded to the transient as designed. The consequences of this low power transient on the fuel and vessel were minimal. The analyses in Chapter 15 of the Updated Final Safety Analysis Report fully bound this event.

## PREVIOUS SIMILAR EVENTS

A previous similar event at the Brunswick Steam Electric Plant Unit 2 was documented in LER 2-01-001. On February 23, 2001, a spurious high turbine speed signal from the EHC logic resulted in the main turbine bypass valves opening and a reactor scram. The cause of this event is attributed to a wire termination with a loose crimped ring lug that created the spurious signal in the EHC frequency-to-voltage converter card. The corrective actions in LER 2-01-001 could not be reasonably expected to prevent the event documented in LER 2-03-003.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* (17)

## COMMITMENTS

Those actions committed to by Progress Energy Carolinas, Inc. (PEC) in this document are identified below. Any other actions discussed in this submittal represent intended or planned actions by PEC. They are described for the NRC's information and are not regulatory commitments. Please notify the Manager-Support Services at BSEP of any questions regarding this document or any associated regulatory commitments.

- Maintenance procedure 0SPP-EHC001, " Electro Hydraulic Control Systems Alignment," will be revised to include new details for verifying proper EHC card engagement by February 27, 2004.