Progress Energy

AUG 1 8 2008

SERIAL: BSEP 08-0102 10 CFR 50.73

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

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62
Licensee Event Report 1-2008-004

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. 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. Philip A. Leich, Manager-Support Services, at (910) 457-2271.

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
ATTN: Mr. Luis A. Reyes, Regional Administrator
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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)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	1 OF 5

4. TITLE

Control Room Emergency Ventilation (CREV) Subsystems Inoperable Due to Failure to Isolate

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
06	19	2008	2008	-- 004 --	00	08		2008	BSEP, Unit 2	05000324
									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 one or more)

☐ 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 Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Lee J. 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	MO	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

On June 19, 2008, at 1641 hours Eastern Daylight Time (EDT), the Control Room authorized post-maintenance testing following replacement of solenoid valves affecting the Control Room Emergency Ventilation (CREV) subsystem. This test inputs a simulated high radiation signal into the logic for the Control Building ventilation system to ensure that the CREV subsystem automatically aligns to the radiation/smoke protection mode. At 1735 hours, during performance of this test, the 2D Control Building exhaust fan damper failed to close and the associated Control Building exhaust fan failed to trip as expected. The affected functions of the CREV system are to provide isolation, positive pressurization, and emergency filtration of the Control Room in the event of high radiation or smoke intrusion into the Control Building. Because BSEP has a shared Control Room, both Unit 1 and Unit 2 immediately entered TS Limiting Condition of Operation (LCO) 3.7.3, "Control Room Emergency Ventilation (CREV) System," Required Action B.1 for two CREV subsystems inoperable (i.e., be in Mode 3 within 12 hours). At 1910 hours, the 2A CREV subsystem was manually placed in the radiation/smoke protection mode restoring the subsystem to operable status, and LCO 3.7.3, Required Action B.1, was exited. No reactor power reduction took place on either unit as a result of the LCO entry.

An exact root cause for this event has not been determined. The select cause of this event was determined to be failure to identify appropriate Preventive Maintenance (PM) routes for the CREV system components. The corrective action to prevent recurrence is to develop PM tasks for the Control Building ventilation system dampers, actuators, limit switches, and relays.

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NARRATIVE

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

INTRODUCTION

On June 19, 2008, at 1641 hours Eastern Daylight Time (EDT), the Control Room authorized post-maintenance testing following replacement of solenoid valves affecting the Control Room Emergency Ventilation (CREV) [VI] subsystem. This test inputs a simulated high radiation signal into the logic for the Control Building Ventilation system to ensure that the CREV subsystem automatically aligns to the radiation/smoke protection mode. At 1735 hours, during performance of this test, the 2D Control Building exhaust fan damper failed to close and the associated Control Building exhaust fan failed to trip as expected. These functions are provided to maintain a positive pressure in the Control Building in the event of high radiation or smoke intrusion into the Control Building. Because BSEP has a shared Control Room, both Unit 1 and Unit 2 immediately entered TS Limiting Condition of Operation (LCO) 3.7.3, "Control Room Emergency Ventilation (CREV) System," Required Action B.1 for two CREV subsystems inoperable (i.e., be in Mode 3 within 12 hours). At 1910 hours, the 2A CREV subsystem was manually placed in the radiation/smoke protection mode restoring the subsystem to operable status, and LCO 3.7.3, Required Action B.1 was exited. No reactor power reduction took place on either unit as a result of the LCO entry.

On June 20, 2008, at 0015 hours, the NRC was notified of this event (i.e., Event Number 44309) in accordance with 10 CFR 50.72(b)(3)(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.

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.

EVENT DESCRIPTION

Initial Conditions

Prior to the event, both Units 1 and 2 were in Mode 1 operating at approximately 100 percent rated thermal power.

Discussion

On June 3, 2008, a series of solenoid valves associated with the CREV dampers were being replaced as part of Preventive Maintenance (PM) activities. It was intended that a total of seven CREV solenoid valves be replaced, but due to an unanticipated isolation of two Control Room Air Conditioning subsystems (i.e., LER 1-2008-002), this activity was stopped after replacement of only three. One of the three solenoid valves replaced was 2-VA-SV-917, Control Building Exhaust Fan 2D Damper Solenoid, also referred to as the

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NARRATIVE

EVENT DESCRIPTION (continued)

Control Room washroom exhaust damper. Following replacement on June 3, 2008, the solenoid valve was tested satisfactorily by using its manual control switch to open and then close the damper. Following replacement of additional solenoid valves and a damper shaft repair, a post-maintenance test was performed to ensure proper response of the CREV components and verify that the radiation monitor was restored.

On June 19, 2008, at 1641 hours EDT, the Control Room authorized post-maintenance testing following replacement of solenoid valves affecting the 2B CREV subsystem. The post-maintenance test, 0PT-23.1, "Control Room Emergency Filtration System Operability Test," was required to restore the subsystem to operable status following the planned maintenance. The test inputs a simulated high radiation signal into the logic for the Control Building ventilation system to ensure that the CREV subsystem automatically aligns to the radiation/smoke protection mode. At 1735 hours, during performance of the post-maintenance test, the 2D Control Building exhaust fan damper failed to close and the associated Control Building exhaust fan failed to trip as expected. These functions are provided to maintain a positive pressure in the Control Building in the event of high radiation or smoke intrusion into the Control Building. Because Brunswick has a shared Control Room, the following action statement was entered for both Units 1 and 2:

- TS 3.7.3, Required Action B.1, be in Mode 3 within 12 hours, for two CREV subsystems inoperable.

At 1910 hours, on June 19, 2008, the 2A CREV subsystem was manually placed in the radiation/smoke protection mode restoring the subsystem to operable status, and LCO 3.7.3, Required Action B.1 was exited. No reactor power reduction took place on either unit as a result of the LCO entry.

The failure of the Control Room washroom exhaust fan and damper to isolate was indicated by the Unit 2 control board's (i.e., the RTGB) damper and flow indicating lights remaining red. The expected green indication would have signaled that the exhaust fan damper is closed and the exhaust fan is off. All other equipment monitored in the 0PT-23.1 test responded satisfactorily. Once the post-maintenance test was completed, the fan and damper were isolated using the control switch on the Unit 2 RTGB. Each Unit has a separate control switch which can be used to operate this fan and damper combination.

Further evaluation determined five scenarios that could have contributed to intermittent sticking or binding and possibly account for the observed indications. These scenarios included sticking of the solenoid valve, sticking of the limit switch, sticking of the damper actuator, sticking of the damper, and a combination of two failures within parallel control circuits associated with the simulated high radiation signal.

Subsequent troubleshooting was unable to recreate the failure and no obvious faults were observed. The troubleshooting activities involved cycling the actuator, control switch, and limit switch's actuation arm. All appeared to move freely and appropriately, and actuated the control board lights per design. The damper and its actuator were observed to operate without any indication of binding or resistance immediately after

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NARRATIVE

EVENT DESCRIPTION (continued)

the event. The solenoid valve and limit switch were removed and examined without any observable causes for sticking. The last scenario involves a duel failure of components which have been functionally checked each quarter and are channel checked every cycle. Since the failure cleared prior to the beginning of troubleshooting and has not been able to be recreated, the actual failure mechanism has not been identified.

EVENT CAUSE

An exact root cause of this event has not been determined. The select cause of this event was determined to be failure to identify appropriate Preventive Maintenance (PM) routes for the CREV system components. The most probable cause of this event was age related degradation causing intermittent operation of one or more of the components in the Control Building exhaust damper's control scheme. PM's will be generated to ensure limit switches, dampers, damper actuators, and relays relied upon to satisfy the Control Room envelope Technical Specification requirements, or provide verifying indications, have suitable PM routes.

SAFETY ASSESSMENT

The safety significance of this condition is considered minimal. The affected functions of the CREV system are to provide isolation, positive pressurization, and emergency filtration of the Control Room in the event of high radiation or smoke intrusion into the Control Building. For the brief time that the CREV subsystems were inoperable, performance of plant personnel and equipment in the Control Room was not adversely affected. The plant staff took immediate and proper actions to return the equipment to service. There were no nuclear or industrial safety consequences from this event.

CORRECTIVE ACTIONS

The following corrective action to prevent recurrence will be taken.

- Develop Preventive Maintenance tasks for the Control Building ventilation system dampers, actuators, limit switches, and relays.

Additional corrective actions include the following.

- The 2D Control Building exhaust damper solenoid valve 2-VA-SV-917 and limit switch 2-VA-ZS-917 were replaced.

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NARRATIVE

PREVIOUS SIMILAR EVENTS

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

- LER 1-2006-001, dated March 9, 2006, "Control Room Emergency Ventilation (CREV) and Air Conditioning (AC) Inoperable Due to Loss of Control Air," documents an event where the CREV and AC systems were declared inoperable for Unit 1 and 2 due to the Control Building Instrument Air compressor failing to maintain pressure. The root cause of the event was determined to be ineffective condition monitoring of compressor oil pressure to detect hydraulic unloader degradation. The corrective actions associated with LER 1-2006-001 addressed the oil pressure trending and monitoring, and could not have reasonably been expected to prevent the condition reported in this LER.

- LER 1-2008-002, dated August 4, 2008, "Loss of Two Control Room Air Conditioning (AC) Subsystems," documents an event where the two operating Control Room AC subsystems tripped while replacing solenoid valves for the Control Building supply/exhaust fan dampers. The root cause of this event was determined to be a reliance on an Engineering Change calculation which did not adequately consider the impact of system material condition and resulted in an inadequate assessment of risk. The corrective actions revised the Preventive Maintenance tasks to use a Temporary Modification whenever the Control Room AC system solenoid valves are being replaced, which will allow the Control Room AC system to run on total loss Control Room instrument air. The corrective actions associated with LER 1-2008-002 could not have reasonably been expected to prevent the condition reported in this LER.

COMMITMENTS

No regulatory commitments are contained in this report.