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SERIAL: BSEP 09-0118

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 Renewed Facility Operating License Nos. DPR-71 and DPR-62 Docket Nos. 50-325 and 50-324 Licensee Event Report 1-2009-004

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 (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,

ldwill

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

MAT/mat

Enclosure:

Licensee Event Report



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Document Control Desk

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cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II ATTN: Mr. Luis A. Reyes, Regional Administrator Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW, Suite 23T85 Atlanta, GA 30303-8931

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U. S. Nuclear Regulatory Commission ATTN: Mr. Philip B. O'Bryan, NRC Senior Resident Inspector 8470 River Road Southport, NC 28461-8869

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U. S. Nuclear Regulatory Commission (Electronic Copy Only) ATTN: Mrs. Farideh E. Saba (Mail Stop OWFN 8G9A) 11555 Rockville Pike Rockville, MD 20852-2738

Chair - North Carolina Utilities Commission P.O. Box 29510 Raleigh, NC 27626-0510 

U.S. NUCLEAR REGULATORY COMMISSION (9-2007) LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)							AI E: ccc in SC Ca in ar M to O pe	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. FACIL	.ITY N/		( <sup>1</sup> D)					, 2.	2. DOCKET NUMBER 3. PAGE					
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09	20	2009	20	09 – (	004 - 00	11	19	200	9 FACILITY N	FACILITY NAME			DOCKET NUMBER 05000	
9. OPERATING MODE 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)														
1 20.2201(b) [ 20.2201(d) [ 20.2203(a)(1) [ 20.2203(a)(2)(i) [				<ul> <li>20.2203(a)(3)(i)</li> <li>20.2203(a)(3)(ii)</li> <li>20.2203(a)(4)</li> <li>50.36(c)(1)(i)(A)</li> </ul>			☐ 50.73(a)(2)(i)(C) ☐ 50.73(a)(2)(ii)(A) ☐ 50.73(a)(2)(ii)(B) ☐ 50.73(a)(2)(iii)			☐ 50.73(a)(2)(vii) ☐ 50.73(a)(2)(viii)(A) ☐ 50.73(a)(2)(viii)(B) ☐ 50.73(a)(2)(ix)(A)				
10. POWER LEVEL 032			$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			□ 50.36(c)(1)(ii)(A) □ 50.36(c)(2) □ 50.46(a)(3)(ii) ⊠ 50.73(a)(2)(i)(A) □ 50.73(a)(2)(i)(B)			$ \begin{bmatrix} 50.73(a)(2)(V)(A) \\ 50.73(a)(2)(v)(A) \\ 50.73(a)(2)(v)(B) \\ 50.73(a)(2)(v)(C) \\ 50.73(a)(2)(v)(D) \\ \end{bmatrix} $			<ul> <li>50.73(a)(2)(X)</li> <li>73.71(a)(4)</li> <li>73.71(a)(5)</li> <li>OTHER</li> <li>Specify in Abstract below or in NRC Form 366A</li> </ul>		
					12. LIC	ENSEE CON	ITACT I	OR TH	HIS LER					
FACILITY NAMETELEPHONE NUMBER (Include Area Code)Mark Turkal, Lead Engineer - Licensing(910) 457-3066								ea Code)						
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT														
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14. SUPPLEMENTAL REPORT EXPECTED							15. EXPECTED MONTH DAY YEAF SUBMISSION DATE				YEAR			
ABSTRAC	CT (Limi	t to 1400 spa	ces, i.e., ap	proxim	ately 15 single-sp	aced typewritte	en lines)			·····				
On September 13, 2009, at 1950 hours Eastern Daylight Time (EDT), Emergency Diesel Generator														

(EDG) 4 was removed from service for routine maintenance and surveillance testing and both units entered Technical Specification (TS) 3.8.1, Required Action D.4, which required the inoperable EDG to be restored to operable status within 7 days (i.e., on September 20, 2009, at 1950 hours). On September 19, 2009 during post-maintenance testing of EDG 4, the diesel failed to start. As a result, it was evident that EDG 4 would not be restored to operable status within the Completion time of TS 3.8.1, Required Action D.4 and the decision was made to shutdown the units. Unit 1 entered Mode 3 at 2222 hours EDT on September 20, 2009, and Unit 2 entered Mode 3 at 0421 hours EDT on September 21, 2009.

Subsequent investigation and testing determined that failure of EDG 4 was due to binding of the mechanical governor control (i.e., EGB) due to presence of foreign material. The select cause of this event is the failure to prevent intrusion of foreign material into the mechanical governor control during vendor performed maintenance. A contributing cause was BSEP maintenance controls. Lack of specificity in procedures for EGB maintenance created the potential for undetected foreign material to be introduced. Corrective actions include the establishment of purchase order requirements for foreign material exclusion (FME) and revising site procedures associated with EGB maintenance and governor oil addition or removal to include FME control and cleanliness requirements.

NRC FORM 366 (9-2007)

NRC FORM 366A (9-2007)

#### U.S. NUCLEAR REGULATORY COMMISSION

# LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET		6. LER NUMB	3. PAGE		
Demonstrials Steam Electric Diant (DSED) Unit 1	05000225	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 . 6 5	
Brunswick Steam Electric Plant (BSEP), Unit I	05000325	2	2009 004	2 01 5		

#### NARRATIVE

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

## Introduction

## Initial Conditions

On September 13, 2009, at 1950 hours Eastern Daylight Time (EDT), Emergency Diesel Generator (EDG) [EK] 4 was removed from service for routine maintenance and surveillance testing and both units entered TS 3.8.1, Required Action D.4, which required the inoperable EDG to be restored to operable status within 7 days (i.e., on September 20, 2009, at 1950 hours). Both units entered TS 3.8.1, Condition H at 1950 hours on September 20, 2009. Per Required Action H.1, the units were required to be in Mode 3 within 12 hours (i.e., 0750 hours on September 21, 2009) followed by Mode 4 in 36 hours (i.e., 0750 hours on September 22, 2009) per Required Action H.2.

Unit 1 was in Mode 1, at approximately 32 percent of rated thermal power (RTP), when a preplanned manual scram was inserted at 2222 hours EDT on September 20, 2009. Unit 2 was in Mode 1, at approximately 30 percent of RTP, when a preplanned manual scram was inserted at 0421 hours EDT on September 21, 2009. The only safety-related equipment which was inoperable at the time the units were shutdown was EDG 4. Unit 1 and Unit 2 systems necessary to support plant shutdown were operable.

## Reportability Criteria

The TS required shutdown was due to inoperability of EDG 4. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A), due to the completion of a plant shutdown required by the plants' TSs. The NRC was notified of the initiation of a plant shutdown required by TSs at 1708 EDT on September 20, 2009 (i.e., Event Number 45368).

#### **Event Description**

On September 13, 2009, at 1950 hours EDT, EDG 4 was removed from service to perform scheduled six year preventive maintenance and surveillance testing. This maintenance included draining of the mechanical governor control (EGB) governor oil system and a complete refill.

On September 19, 2009, at 0942 hours EDT, EDG 4 was started for a maintenance run. The EDG started normally but then shut down after approximately 45 seconds. Troubleshooting identified a problem with the control air pressure regulating valve (i.e., 2-DSA-PRV-1251) and the valve was replaced. Following the valve replacement, at 2125 hours EDT, another EDG 4 start was attempted, but the diesel failed to start, reaching only 138 rpm. Potential causes of the failure were binding of the fuel racks, internal EGB fault and failure of the input drive to rotate the governor. Subsequent testing narrowed the apparent cause of the EDG failure to start to the EGB mechanical governor. The EGB was removed from the governor and shipped to Engine Systems Incorporated (ESI) for failure analysis.

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Brunswick Steam Electric Flant (BSEF), Onit 1			2009 004	5 01 5		

#### NARRATIVE

## Event Description (continued)

Bench testing of the EGB revealed that the electric pilot valve was stuck and required mechanical agitation to free it. The EGB was removed from the bench assembly and the sub-governor assembly was removed from the EGB. The electric portion of the pilot valve assembly was removed and inspected. Binding was observed along the shaft and small metal particles were observed in the affected area of the shaft. Particulate matter was found on the electrical pilot valve upper land region where the compensating bushing is located. After particle removal, the pilot valve stroked freely. The mechanical pilot assembly was disassembled and no binding was observed. No abnormal wear was observed. This confirmed that the cause of the diesel failure to start was due to the internal binding of the electric portion of the pilot assembly within the EGB.

To restore EDG 4 operability, a replacement governor was readied for installation on EDG 4. All components associated with replacement EGB were inspected for foreign material. The EGB, the new servo boost cylinder, and the new oil cooler as well as all connecting tubing were flushed with filtered oil prior to installation on EDG 4. On September 25, 2009, governor replacement was completed and successful post-installation tuning and post-maintenance testing, demonstrated that the EDG 4 is fully capable of performing its intended safety function. EDG 4 was declared operable at 1615 hours EDT on September 27, 2009.

#### Event Cause

The select cause of this event is failure to prevent intrusion of foreign material into the EGB during vendor performed maintenance. The most likely source of the foreign material is introduction during previous vendor performed EGB repairs prior to its installation on EDG 4. The purchase orders for these repairs were reviewed and they only contained standard requirements for assurance of quality. Specific requirements for preventing foreign material intrusion or flushing were not included. As a result, the vendor-performed maintenance activities did not provide adequate documentation that foreign material exclusion (FME) practices and cleanliness flush requirements were performed during maintenance on the EGB.

BSEP maintenance controls are considered a contributing cause to this event. Site maintenance activities could also have introduced the foreign material. Lack of specificity in procedures for EGB maintenance created the potential for undetected foreign material to be introduced.

#### Safety Assessment

The safety significance of this event is considered minimal. At the time of this event EDG 4 was inoperable for maintenance. Based on prior successful operation and the analysis of potential paths for foreign material to move to the pilot assembly, it is highly likely that the foreign material that impacted EDG 4 performance was dislodged from its previous location and moved to the pilot assembly during the governor

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Brunswick Steam Electric Flatt (BSEF), Ohn I	05000325		2009 004	4015		

#### NARRATIVE

## Safety Assessment (continued)

oil change performed with the other maintenance on the engine. Therefore, it is reasonable to conclude that EDG 4 would have performed as required, in response to an actual event, prior to being removed from service for routine maintenance and surveillance testing on September 13, 2009.

## Corrective Actions

The following corrective actions have been identified.

- Standard purchase order requirements for foreign material exclusion and establishing cleanliness were established in ESI purchase orders.
- BSEP procedures that address EGB maintenance and governor oil addition or removal will be revised to add adequate FME control and cleanliness requirements. These revisions are currently scheduled to be completed by January 8, 2010.

## Previous Similar Events

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

- LER 1-2007-002, dated May 30, 2007, "Technical Specification Required Shutdown Due To Emergency Diesel Generator 4 Inoperability," documents an event where Unit 1 was shutdown due to the inability to return EDG 4 to operable status within the 7-day completion time of Required Action D.4 of TS 3.8.1. The extended out-of-service time was due to multiple equipment issues, including two failed refurbished governors and latent design problems discovered during the Allen-Bradley relay replacements only after extensive post-maintenance testing. Each individual equipment issue was manageable within the allowed outage time, but the number and sequence of discovery was such that the cumulative effect of these issues precluded EDG 4 recovery within the allowed out-of-service time. The failure of the two refurbished governors in this event was attributed to the centering spring assembly. As such the corrective actions, applicable to the governors, associated with LER 1-2007-002, could not have reasonably been expected to prevent the condition reported in this LER.
- LER 1-2006-007, Supplement 1, dated January 26, 2007, "Operations Prohibited by Technical Specifications Due To Inoperable Emergency Diesel Generator 1," documents an event where EDG 1 was inoperable for 15 days, 20 hours and 17 minutes. This was caused by inadequate post-maintenance closeout inspections, which resulted in foreign material being left in the lube oil

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# LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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Bruiswick Steam Electric Flant (DSEF), Unit 1	03000525		2009 004	5015		

NARRATIVE

Previous Similar Events (continued)

system. The corrective actions to prevent recurrence associated with LER 1-2006-007, Supplement 1, focused on FME controls for the EDG lube oil sumps and could not have reasonably been expected to prevent the condition reported in this LER.

Commitments

No regulatory commitments are contained in this report.