



Carolina Power & Light Company

Brunswick Nuclear Project  
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Southport, N.C. 28461-0429

JAN 18 1992

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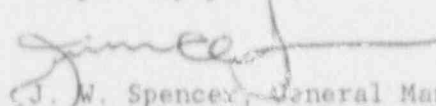
U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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BRUNSWICK STEAM ELECTRIC PLANT UNIT 1  
DOCKET NO. 50-325  
LICENSE NO. DRP-71  
LIC. EVENT REPORT 1-91-026 SUPPLEMENT 01

Gentlemen:

In accordance with Title 10 of the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. The original report fulfilled the requirement for a written report within thirty (30) days of a reportable occurrence and this supplement is submitted in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,

  
J. W. Spence, General Manager  
Brunswick Nuclear Project

GT/

Enclosure

cc: Mr. S. D. Ebner  
Mr. N. B. Le  
BSEP NRC Resident Office

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## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Brunswick Steam Electric Plant  
Unit 1DOCKET NUMBER (2)  
05000325PAGE (3)  
1

TITLE (4) UNIT 1 REACTOR SHUTDOWN REQUIRED WHEN EMERGENCY DIESEL GENERATOR MAINTENANCE WAS DETERMINED TO REQUIRE MORE TIME THAN THE TECHNICAL SPECIFICATION LIMITING CONDITION OF OPERATION WOULD ALLOW WITH A UNIT AT POWER

| EVENT DATE (5) |     |      | LER NUMBER (6) |          |          |   | REPORT DATE (7) |     |      | OTHER FACILITIES INVOLVED (8) |               |
|----------------|-----|------|----------------|----------|----------|---|-----------------|-----|------|-------------------------------|---------------|
| MONTH          | DAY | YEAR | YEAR           | SEQ. NO. | REV. NO. |   | MONTH           | DAY | YEAR | FACILITY NAME                 | DOCKET NUMBER |
| 10             | 13  | 91   | 91             | -        | 026      | - | 01              | 13  | 92   |                               |               |

|                    |  |   |  |                  |  |                     |  |                                      |  |  |  |
|--------------------|--|---|--|------------------|--|---------------------|--|--------------------------------------|--|--|--|
| OPERATING MODE (9) |  | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11) |  |                  |  |                     |  |                                      |  |  |  |
| 1                  |  | 20.402(b)   |  | 20.405(c)        |  | 50.73(a)(2)(iv)     |  | 73.71(b)                             |  |  |  |
| POWER LEVEL (10)   |  | 20.405(a)(1)(i)   |  | 50.36(c)(1)      |  | 50.73(a)(2)(v)      |  | 73.71(c)                             |  |  |  |
| 100                |  | 20.405(a)(1)(ii)  |  | 50.36(c)(2)      |  | 50.73(a)(2)(vi)     |  | OTHER (Specify in Abstract and Text) |  |  |  |
|                    |  | 20.405(a)(1)(iii)   |  | X 50.73(a)(2)(i) |  | 50.73(a)(2)(vii)(A) |  |                                      |  |  |  |
|                    |  | 20.405(a)(1)(iv)  |  | 50.73(a)(2)(ii)  |  | 50.73(a)(2)(vii)(B) |  |                                      |  |  |  |
|                    |  | 20.405(a)(1)(v)   |  | 50.73(a)(2)(iii) |  | 50.73(a)(2)(ix)     |  |                                      |  |  |  |

## LICENSEE CONTACT FOR THIS LER (12)

NAME Glen M. Thearling, Regulatory Compliance Specialist

TELEPHONE NUMBER

(919) 457-2038

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC |
|-------|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
|       |        |           |              |                   |       |        |           |              |                   |

## SUPPLEMENTAL REPORT EXPECTED (14)

| YES (If yes, complete EXPECTED SUBMISSION DATE) |  |  |  | X NO |  | EXPECTED SUBMISSION DATE (15) |  | MONTH | DAY | YEAR |
|---|--|--|--|------|--|-------------------------------|--|-------|-----|------|
|   |  |  |  |      |  |                               |  |       |     |      |

## ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single space typewritten lines) (16)

At 0700 on October 1, 1991, #3 Emergency Diesel Generator (EDG) was declared inoperable to allow for scheduled maintenance as part of the Unit 2 refueling outage. By 0600 on 10/15/91, it was apparent that the #3 EDG would not be returned to service in time to avoid the Reactor shutdown required by the Limiting Condition for Operation (LCO) action statement of the Electrical Power Systems, A. C. Sources, Technical Specification. The time required to complete the original work scope had increased due to emergent work items, scheduling and coordination issues, and a procedural compliance issue. This made it impossible to return the #3 EDG to service prior to the LCO expiring. On 10/15/91 at 0600, Unit 1 was at 100% reactor power with the Emergency Core Cooling Systems (ECCS) operable. Unit 2 was defueled in a refueling outage. The decision was made to commence Reactor shutdown beginning at 0630 on 10/15/91. Unit 1 entered Hot Shutdown at 1803 on 10/15/91, and Cold Shutdown at 1749 on 10/16/91. The #3 EDG was declared operable at 1850 on 10/20/91, upon completion of maintenance and testing. Unit 1 Reactor startup was commenced at 0048 on 10/21/91, and the Unit was synchronized to the system grid at 1724 on 10/21/91.

This event was of minimal safety significance as the Technical Specification LCO actions were successfully complied with by shutting down Unit 1.

A previous similar event is LER 1-91-009.

This supplement adds more detailed information to the body of the original LER.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

| FACILITY NAME (1)                        | DOCKET NUMBER (2) | LER NUMBER (6) |         |  |         | PAGE (3) |
|--|-------------------|----------------|---------|--|---------|----------|
|  |                   | YEAR           | SEQ NO. |  | REV NO. |          |
| Brunswick Steam Electric Plant<br>Unit 1 | 05000325          | 91             | 026     |  | 1       | 2        |
|  |                   |                |         |  |         |          |

TEXT (if more space is required, use additional NRC Form 366A's) (17)

INITIAL CONDITIONS

On October 1, 1991, at 0700 #3 EDG was declared inoperable to allow scheduled maintenance as part of the Unit 2 refueling outage. By 0600 on 10/15/91, it was apparent that #3 EDG would not be returned to service in time to avoid the Unit 1 shutdown requirements of the Limiting Condition for Operation (LCO) action statement of the Electrical Power Systems, A. C. Sources, Technical Specification. On 10/15/91 at 0600, Unit 1 was at 100% reactor power with the Emergency Core Cooling Systems (ECCS) operable. Unit 2 was defueled in a refueling outage.

EVENT NARRATIVE

At 0700 on October 1, 1991, #3 EDG was declared inoperable to allow scheduled maintenance as part of the Unit 2 refueling outage. During the full-load run of the #3 EDG on 10/01/91, sparks were observed coming from the collector ring brushes on the generator. The decision was made to secure the test until the causes and effects could be evaluated. The evaluation determined that the collector ring grinding that had originally been scheduled as optional and brush replacement would be required to correct the sparking. The #3 EDG outage mechanical inspection period followed the four day plan with only minor delays being encountered.

On Friday, 10/04/91, maintenance opened the non-surveillance maintenance work period which was planned to require three work days. This would be followed by collector ring grinding, governor replacement, and final EDG adjustments.

On Sunday, 10/06/91, problems were encountered with the installation of new air distributor parts which required relocation of dowel pins. Engineering activities were necessary to overcome installation and procurement issues. By Tuesday, 10/08/91, preventive maintenance on the 480 volt feeder breaker to the #3 EDG motor control center (DGC) identified that the breaker would require replacement. As this power supply was needed to complete the air distributor work, the final completion was extended. The scheduled non-surveillance maintenance period activities were completed on Wednesday, 10/10/91, - two days beyond the expected completion and 8 days into the 14 day LCO period.

After the non-surveillance maintenance items were completed, the #3 EDG was prepared for a run to support grinding of the collector rings. The collector ring grinding machinery was setup by Thursday, 10/10/91, but due to the need for the immediate return of the Unit 2 Nuclear Service Water (NSW) header, Operations personnel could not support the collector ring grinding project. The expiration of the NSW LCO represented a threat to continued Unit 1 operation and a significant portion of the Operations staff was needed to support the Unit 2 Nuclear Service Water header activity. Once started, the grinding process that had been expected to take 16 hours required 36 hours of actual grinding. This was the result of similar surface speeds for the collector ring and the grinding wheel. The collector ring grinding project was finally finished on Sunday, 10/13/91.

Immediately upon cessation of the collector ring grinding, the Woodward electro-hydraulic governor change-out was started. A vendor refurbished governor was staged in the EDG Building to allow removing the existing unit and installing the refurbished governor as soon as the clearance was in place for the change-out. At 2150 on 10/12/91, the #3 EDG was started to support governor tuning but the EDG repeatedly ramped up and finally tripped on overspeed. Troubleshooting revealed that the newly refurbished governor was not providing a ramp back signal to the fuel racks. The governor was removed and the original unit was placed back on the EDG. The #3 EDG was restarted and after about one hour of operation, as load was being increased, the #3 EDG underwent erratic load variations and made clattering noises. Troubleshooting focused on the link shaft actuator assembly which is used to advance valve

# **LICENSEE EVENT REPORT (LER)** **TEXT CONTINUATION**

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| Brunswick Steam Electric Plant<br>Unit 1 | 05000325          | YEAR           | SEQ<br>NO. | REV<br>NO. | 3 |          |
|  |                   | 91             | 026        | 1          |   |          |

TEXT (if more space is required, use additional NRC Form 366A's) (17)

timing in response to diesel load, the potential adverse effects that low load operation (during collector ring grinding) might have had on the EDG, and verbal reports that indicated the intake valve lash settings may have been incorrectly adjusted. The low load operation was later determined to have had no impact on the erratic engine performance.

A decision was made to commence a Unit 1 Reactor shutdown as #3 EDG would not be returned to service in time to avoid the Electrical Power Systems, A. C. Sources, Technical Specification LCO action statement. Unit 1 Reactor shutdown commenced at 0630 and the Unit reached Hot Shutdown at 1803 on 10/15/91, and Cold Shutdown at 1740 on 10/16/91.

Subsequent troubleshooting revealed that the intake valves had been adjusted without first centering the link shaft actuator. The procedure to center the link shaft actuator, as part of the intake valve adjustment, had been overlooked by an experienced and properly trained mechanic. When the intake valves were readjusted the diesel was successfully loaded to 3850 KW on 10/16/91 at 0850.

On 10/17/91 at 1537, the #3 EDG was removed from the associated emergency bus on completion of a 5 hour run for collector ring conditioning. It then experienced a phase differential lockout. With the assistance of General Electric (GE) technical representatives an extensive investigation was performed to determine the root cause of the phase differential lockout. No phase to ground or phase to phase fault conditions were identified during the investigation. Based on the results of the investigation, the GE technical representative indicated the differential trip was an isolated case. Since a definitive root cause was not identified, #3 EDG testing frequency was temporarily increased. By 12/09/91, six runs had been successfully completed and no recurrences were noted. The #3 EDG testing has been returned to its normal surveillance scheduling.

On completion of #3 EDG maintenance and testing the EDG was declared operable at 1850 on 10/20/91. Unit 1 Startup was commenced at 0048 on 10/21/91 and the Main Turbine synchronized to the grid at 1724 on 10/21/91.

## CAUSE OF EVENT

1. Unforeseen emergent items.
2. Scheduling and/or coordination issues related to the emergent changes in the #3 EDG outage.
3. The intake valves were mis-adjusted as the procedure that would have centered the link shaft actuator was not used.

## CORRECTIVE ACTIONS

1. Unit 1 was placed in Hot Shutdown, at 1803 on 10/15/91 and Cold Shutdown on 10/16/91 at 1740.
2. Procedure MST-DG500 was enhanced to prevent a recurrence of adjusting the EDG intake valves without using all associated procedures.
3. An expansion of Quality Control (QC) observation hold points was used for the #4 EDG outage.



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TEXT (If more space is required, use additional NRC Form 365A's) (1.)

4. Increased vendor representative presence was used for the #4 EDG outage.
5. The need for enhanced controls in procedures to assure quality is being assessed.
6. Improvements to the collector ring grinding process, by improving the grinding technique and resequencing the grinding evolution are being considered.
7. A reduction of the administrative burden on EDG supervision was implemented for the #4 EDG outage.
8. A review of the EDG governor calibration procedure has been performed. The root cause analysis of the rebuilt Woodward Governor failure is continuing.
9. Temporary increased frequency of testing was initiated to monitor #3 EDG operation as a result of the phase differential current relay lockout. Six #3 EDG test runs were completed without recurrence and scheduling was returned to normal.
10. Appropriate disciplinary action has been taken for the valve adjustment that was performed without a procedure.
11. A special review of the work packages associated with the #3 EDG outage was conducted prior to declaring the EDG operable.

**SAFETY ASSESSMENT**

This event was of minimal safety significance as the Technical Specification LCO actions were successfully complied with by shutting down Unit 1.

**PREVIOUS SIMILAR EVENTS**

A previous similar event is LER 1-91-009.

**EIIS COMPONENT IDENTIFICATION**

System/Component

EIIS Code

Emergency Diesel Generator

EK