



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
191 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

FEB -2 1993

Report Nos.: 50-325/93-03 and 50-324/93-03

Licensee: Carolina Power and Light Company  
P. O. Box 1551  
Raleigh, NC 27602

Docket Nos.: 50-325 and 50-324 License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection Conducted: January 11-15, 1993

Inspector: R. Moore  
R. Moore

1/28/93  
Date Signed

Approved by: Candle J. Iuliano for  
M. Shymlock, Chief  
Plant Systems Section  
Engineering Branch  
Division of Reactor Safety

2/1/93  
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of observation of electrical maintenance, review of licensee actions on restart item B7, and review of the prioritization and scheduling of the maintenance backlog for the emergency diesel generators.

Results:

In the areas inspected, violations or deviations were not identified. Ongoing maintenance activities on the EDGs were appropriately controlled. Licensee actions on restart item B7, which involved EDG-3 cylinder liner inspections, were adequate for closure of this issue. The licensee's process for prioritization and scheduling of the EDG maintenance backlog was adequate. All significant maintenance work was scheduled to be completed during this outage.

One poor maintenance practice was noted during this inspection related to the indefinite extension of "temporary repairs". A "temporary repair" installed in the EDG-1 motor operated voltage adjuster in 1988 was still installed in 1993.

## REPORT DETAILS

### 1. Persons contacted

#### Licensee Employees

- \*J. Bates, Technical Support Engineer
- \*H. Beane, QC Manager
- S. Bostic, Maintenance Engineering Supervisor
- \*M. Bradley, NAD Manager
- \*S. Callis, On-site Licensing Representative
- J. Franke, Technical Support Supervisor
- \*R. Johnson, OM&M Manager
- \*W. Leininger, NED Manager
- \*D. McCarthy, Licensing Engineer

#### NRC Personnel

- \*R. Prevatte, Senior Resident Inspector
- \*D. Nelson, Resident Inspector
- \*H. Christensen, Region II Projects Section Chief
- \*P. Milano, NRR Project Manager

#### \*Attended Exit Interview

### 2. Electrical Maintenance (Components & Systems) Observation of Work, Work Activities, and Review of Quality Records (IP 62705)

This inspection included the observation and review of maintenance activities on the emergency diesel generators. Additionally, the inspector reviewed the licensee's action to resolve restart item B7 related to a cylinder inspection of EDG-3, and the licensee's process for prioritization and scheduling of the EDG maintenance backlog.

#### a. Observation of EDG Maintenance

During this inspection, EDG-4 was inoperable while undergoing an 18 month routine maintenance and surveillance inspection. Additionally, the licensee was inspecting EDG-4 for potentially generic problems identified on EDG-1. EDGs-1, -2, and 3 were functional and aligned for emergency operation. Maintenance on EDG-4 began on January 2, 1993. In addition to the 18 month inspection of engine and generator internals, the number nine journal/thrust bearing was inspected, the flex coupling was inspected, the collision blocks' clearances were measured, and the auxiliary motor driven pumps' alignments were measured.

Non-destructive examination of 4 cylinder liners provided preliminary indications of cracking. The licensee performed destructive testing to further evaluate this condition and determined that there was no cylinder liner cracking. New cylinders were installed for the cylinders destroyed. The licensee's decision to test all 4 cylinder liners demonstrated their commitment to resolve potential hardware problems on the EDGs.

No significant problems were identified by the licensee during this maintenance activity on EDG-4. Post maintenance break-in runs were scheduled for the week following this inspection. Work controls were equivalent to those of EDG-1 maintenance which were discussed in NRC Report No. 50-325,324/92-41. Work controls continued to be adequate with respect to technical support and QC involvement, supervisory oversight, and procedure guidance.

b. Restart Item B7: EDG-3 Cylinder Inspection

Restart item B7 addressed licensee actions, recommended by the NRC, to evaluate the result of high exhaust temperatures experienced on EDG-3. Exhaust temperatures had exceeded the vendor manual recommended values of 775 °F. In particular, the licensee was requested to perform a boroscopic inspection of the cylinder which had experienced the highest exhaust temperature. Also the vendor was to be consulted regarding the acceptability of operation above 775 °F.

The inspector reviewed WR/JO 92-AJED1 which documented completion of the requested boroscopic examination on May 16, 1992. The inspection identified no damage to the cylinder. The licensee provided documentation from the vendor, Hatch and Kirk Inc., dated April 22, 1992, which stated that the exhaust temperatures experienced by the EDG did not exceed design limits and that exhaust temperatures up to 940°F were acceptable. The high temperatures experienced by EDG-3 were within this range. The inspector concluded that the licensee had appropriately resolved this restart issue.

c. EDG Maintenance Backlog

The inspector reviewed the licensee's process for prioritization and scheduling of the EDG maintenance backlog. The procedure, PN-30, Integrated Recovery Methodology, revision 1, provided guidance for this process. Generally, this procedure provided a methodology for screening, categorizing, and scheduling of maintenance work. Specifically, the process identified work to be accomplished prior to plant restart.

An IBIR was generated which identified the outstanding work for each plant system. Work items in the IBIR were divided into 7 categories based on criteria such as operability, reliability, availability, regulatory requirements, design basis restoration, and material improvements. Categories 1 through 6 were scheduled for performance prior to restart. Individual exceptions to this scheduling required approval by two separate management committees and the site vice president. This level of review demonstrated management's direct involvement in the maintenance backlog issue.

The inspector reviewed the IBIRs for the EDGs and EDG support systems and concluded that the work had been appropriately

prioritized. These reports included approximately 300 work items. Only 3 schedule exceptions or deferrals had been proposed and these had received a rigorous management review; two were approved. The inspector noted that nearly all identified work, even category 7 items, were scheduled for performance prior to restart. The licensee has maintained two shifts of maintenance crews with supporting technical and support staff dedicated specifically to EDG maintenance. This resource commitment and the EDG work accomplished thus far demonstrated management commitment to eliminate the EDG maintenance backlog and upgrade the material condition of the EDGs.

d. Poor Maintenance Practice - Temporary Repair Extensions

During review of the EDG backlog the inspector noted an example of a poor maintenance practice related to the extension of "temporary repairs". On EDG-1, non-q list parts were installed in a q-list component, the motor operated voltage adjuster, as a temporary repair in August, 1988. This temporary repair was still installed in 1993. The engineering evaluation which authorized this repair included an action item to replace these parts by September, 1990. Extensions were approved in 1991 and 1992 which indicated that the item was being tracked. A replacement MOVA unit was received in 1991 but was not acceptable for replacement. The licensee pursued replacement of the entire component rather than the non-q parts specifically.

The engineering evaluation and accompanying safety evaluation demonstrated this particular example was not safety significant. The MOVA circuit had no active safety function during emergency EDG operations. The circuit was used in the manual EDG mode for load testing. This example was a poor maintenance practice in that it demonstrated a weakness in following up temporary repairs in a timely manner to return a component to its design condition. Temporary conditions generally receive less rigorous evaluations than direct replacements or modifications. For the length of time this repair was installed, the item should have been directed to one of the more rigorous programs or the procurement problems related to this component should have been resolved.

3. Exit Meeting

The inspection scope and results were summarized on January 15, 1993, with those persons indicated in paragraph 1. Proprietary information is not contained in this report. The inspector described the areas inspected and discussed in detail the inspection results. There were not dissenting comments received from the licensee.



## 4. Acronyms and Abbreviations

EDG	Emergency Diesel Generator
IBIR	Integrated Backlog Item Report
MOVA	Motor Operated Voltage Adjuster
NAD	Nuclear Assurance Department
NED	Nuclear Engineering Department
OM&M	Outage Management and Modifications
QC	Quality Control
WR/JO	Work Request/Job Order