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NUCLEAR REGULATORY COMMISSION
REGION II
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March 24, 2000

EA-00-041

Carolina Power and Light Company
ATTN: Mr. J. S. Keenan
Vice President
Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461

SUBJECT: NRC INTEGRATED INSPECTION REPORT NOS. 50-325/00-01 AND 50-324/00-01

Dear Mr. Keenan:

This refers to the inspection conducted on January 16 through February 26, 2000, at the Brunswick reactor facility. The enclosed report presents the results of this inspection.

Based on the results of this inspection, the NRC has determined that one violation of NRC requirements occurred. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the Enforcement Policy. This NCV is described in the subject inspection report. If you contest the violation or severity level of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region II, and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Sincerely,

/RA/

Brian R. Bonser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: NRC Inspection Report

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-325, 50-324
License Nos:	DPR-71, DPR-62
Report No:	50-325/00-01, 50-324/00-01
Licensee:	Carolina Power & Light (CP&L)
Facility:	Brunswick Steam Electric Plant, Units 1 & 2
Location:	8470 River Road SE Southport, NC 28461
Dates:	January 16 - February 26, 2000
Inspectors:	T. Easlick, Senior Resident Inspector E. Brown, Resident Inspector E. Guthrie, Resident Inspector
Approved by:	B. Bonser, Branch Chief Reactor Projects Branch 4 Division of Reactor Projects

EXECUTIVE SUMMARY

Brunswick Steam Electric Plant, Units 1 & 2
NRC Inspection Report 50-325/00-01, 50-324/00-01

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection.

Operations

- Operator briefings, plant control, and work coordination during the Unit 1 shutdown for the refueling outage were efficient and effective with no deficiencies noted by the inspectors (Section O1.1).

- The licensee completed a safe shutdown risk management assessment that consisted of an independent review of the upcoming Unit 1 refueling outage schedule by a team of multi-disciplined personnel. The review and assessment was both comprehensive and thorough. The licensee took appropriate actions in response to the assessment to minimize outage risk (Section O2.2).

Maintenance

- A non-cited violation of the Maintenance Rule (MR) was identified for the failure to set goals and monitor the performance of the Unit 2 division I backup nitrogen subsystem as required by 10 CFR 50.65 (a)(1). The failure to identify the malfunction of the pressure control valve in the division I backup nitrogen subsystem resulted in long-term inoperability of this subsystem and a Technical Specification violation. The licensee's programmatic barriers to prevent the occurrence of long-term system inoperability failed during the sequence of events that led to the violation. (Section M2.1).

Engineering

- A review of an engineering service request package to redefine the requirements for an operable main turbine bypass system as specified in the Unit 2 cycle 14, Core Operating Limits Report concluded that the reduction in the number of main turbine bypass valves required for system operability from 10 to 8 was fully bounded by the current operating limits and did not reduce the margin of safety (Section E1.1).

Plant Support

- Radiation control practices were being conducted in accordance with procedures. The licensee provided good management oversight of chemistry results and regulatory limits were being met (Section R1.1).

- Protected area access activities were determined to be satisfactory. Challenges were made by members of the security force as appropriate in response to alarms from the access detection devices. Personnel searches were observed to be thorough and increased management oversight was observed during the high traffic times of the day (Section S1.1).

Report Details

Summary of Plant Status

Unit 1 began the report period operating at 100 percent rated thermal power (RTP). On January 21 power was reduced to 78 percent RTP for control rod position improvements in preparation for the upcoming refueling outage. The unit was returned to 100 percent RTP on January 22, where it remained until the last day of the inspection period when the unit was shut down for the refueling outage.

Unit 2 began the report period operating at 100 percent RTP. On February 19 RTP was reduced to 60 percent for the 2B reactor feed water pump control system repair, control rod position improvements, and valve testing. The unit was returned to 100 percent RTP on February 21, where it remained for the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Observations of Unit 1 Shutdown

a. Inspection Scope (71707)

The inspectors observed a portion of the Unit 1 plant shutdown on February 25. This shutdown was conducted for the purpose of a refueling outage.

b. Observations and Findings

The inspectors observed a portion of the Unit 1 plant shutdown from the main control room. The inspectors observed clear, thorough briefings for the appropriate evolutions. Good operator response and control was evident throughout the observed portion of the shutdown. The inspectors noted that the use of a third reactor operator provided for a dedicated operator for reactivity control while the other operators concerned themselves with the balance of plant equipment shutdowns. The three operators coordinated the shutdown activities in an efficient manner. The use of a shutdown procedure flow chart also assisted crew supervision in the control of the shutdown evolution. No deficiencies were noted by the inspectors.

c. Conclusions

Operator briefings, plant control, and work coordination during the Unit 1 shutdown for the refueling outage were efficient and effective with no deficiencies noted by the inspectors.

O2 Operational Status of Facilities and Equipment

O2.1 Core Spray System Walkdown (71707)

On February 24 the inspectors performed a general walkdown of the Unit 2 core spray (CS) system to verify its operability and configuration appropriate to the mode of plant operation. The inspectors used Inspection Procedure 71707 to walkdown the accessible portions of the loop A and loop B CS sub-systems. The inspectors also used Operating Procedure 2OP-18, Core Spray Operating Procedures, Revision (Rev.) 53, to review panel, electrical, and selected valve lineups during the walkdowns. All accessible valves as part of the main system flow path were in the correct position. Power supplies and breakers were correctly aligned and available for system initiation. Equipment material conditions and general housekeeping were acceptable. The inspectors identified no concerns as a result of the CS walkdown.

O2.2 Outage Risk Assessment

a. Inspection Scope (71707)

In preparation for the Unit 1 refueling outage, the inspectors attended an outage risk assessment team meeting debriefing and reviewed the licensee's Safe Shutdown Risk Management Assessment Report.

b. Observations and Findings

On January 17 through 20, the licensee conducted an independent review of the refueling outage schedule in accordance with Administrative Procedure AP-22, BNP Outage Risk Management, Rev. 6. This procedure communicated the plant management outage safety philosophy and provided guidance to be used in meeting the objectives and goals. The assessment team included a group of multi-disciplined personnel from operations, maintenance, engineering, and the outage and scheduling departments. Additionally, two individuals from other utilities participated on the team. The risk assessment team reviewed and verified that the outage plan maintained systems and components to provide backup of key safety functions, and planned and scheduled outage activities to optimize safety system availability. Some new challenges for the licensee this outage included a fuel shuffle instead of a full core offload and performing emergency electrical bus work earlier in the schedule than previous outages.

The assessment identified three higher risk evolutions that were planned for this outage. A high risk evolution was defined as outage activities, plant configuration or condition during shutdown where the plant was more susceptible to an event causing the loss of a key safety function. The first evolution identified was the vessel hydrostatic pressure test when all shutdown cooling will be secured to allow the reactor coolant system to heat up in preparation for the test. The team concluded that a contingency plan was already incorporated into the operating procedures and no further action was recommended. The second evolution was the reactor building closed cooling water outage concurrent with the residual heat removal system B loop outage. Supplemental spent fuel cooling (SSFPC) provided primary and backup fuel pool cooling during that

period. Contingency plans were in place for a postulated loss of the SSFPC system. The third evolution was the outage of the division I 4.16 KV Bus E1 and 480 V Bus E5 electrical buses. Continency plans have been developed for the switchgear, substation, and motor control center work. The final risk assessment report and contingency plans were reviewed and approved by the Plant Nuclear Safety Committee (PNSC).

c. Conclusions

The licensee completed a safe shutdown risk management assessment that consisted of an independent review of the upcoming Unit 1 refueling outage schedule by a team of multi-disciplined personnel. The review and assessment was both comprehensive and thorough. The licensee took appropriate actions in response to the assessment to minimize outage risk.

O4 Operator Knowledge and Performance

O4.1 Auxiliary Operator Evolution Observation (71707)

The inspectors observed several auxiliary operators perform a standby liquid control system operability test on February 24. The inspectors observed knowledgeable and professional skills exhibited throughout the evolution. The inspectors observed strict adherence to procedures and satisfactory communications. The inspectors noted no deficiencies with operator performance during the observed portion of the evolution.

O8.1 Miscellaneous Operations Issues (92700)

O8.1 (Closed) Licensee Event Report (LER) 50-324/2000-001: Operation Prohibited by Technical Specifications Due to Inoperable Vacuum Breaker. The inspectors reviewed the LER and found that the Unit 2 division I reactor building-to-suppression chamber vacuum breaker was inoperable, due to the inoperability of the division I backup nitrogen subsystem, in excess of the allowed limiting condition for operations (LCO) time of 31 days from August 28 to December 3, 1999. This was a violation of Technical Specification (TS) 3.6.1.5.c and 3.0.4, and is discussed in Section M2.1 of this inspection report.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance Activities (62707, 61726)

The inspectors reviewed all or portions of the following surveillance tests and/or maintenance activities:

- Work Request/Job Order 99-AAQC1, 1A Control Rod Drive (CRD) pump replacement.

- AI-117 Trouble Shooting Plan for the 2B Reactor Fuel Pump Turbine control system problems.
- Maintenance Surveillance Test 1MST-RPS 27Q, RPS Scram Discharge Volume High Water Level Channel Functional Test and Channel Calibration, Rev 13.
- Maintenance Surveillance Test 1MST-RHR 25Q, RHR Pump Discharge Pressure ADS Permissive Instrument Channel Calibration, Rev 2.
- Periodic Test 0PT-10.12.L, RCIC Steam Supply Inboard and Outboard Isolation Valve, and Turbine Trip and Throttle Valve, Local and ASSD Operability Test, Rev 4.
- Periodic Test 0PT-06.1, Standby Liquid Control System Operability Test, Rev 55.

The inspectors observed that good supervisory oversight was provided and the work performed under these activities was professional and thorough. Proper procedures were being used and followed at the job site as observed by the inspectors. The work performed was appropriately documented and the maintenance personnel were familiar and knowledgeable about the work activities. Test equipment was verified to be within the current calibration cycle. The inspectors noted that during the work associated with the 1A CRD pump, the work area was maintained free of debris, foreign material exclusion controls were in place, and tools and equipment were properly staged. The inspectors observed the complete implementation of clearance 1-99-01889, which was associated with a repair necessary on a scram discharge volume level switch found during the 1MST-RPS 27Q surveillance test. The inspectors observed no deficiencies with hanging the clearance and observed thorough peer checking during the process.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Backup Nitrogen Subsystem Maintenance Rule (MR) Functional Failures (FF)

a. Inspection Scope (62707)

On February 8 the inspectors reviewed the events involving the Unit 2 division I backup nitrogen subsystem in which the licensee had determined that the system was inoperable for an extended period of time in excess of TS allowed times. The inspectors reviewed the licensees MR program following a review of the root cause investigation, LER 50-324/2000-001, and observation of the PNSC review of this event.

b. Observations and Findings

The licensee determined on January 7, 2000, that a malfunction of the division I nitrogen backup subsystem pressure control valve had resulted in the inoperability of the subsystem from August 28 through December 3, 1999. The inoperability of this subsystem resulted in the inoperability of the division I reactor building-to-suppression chamber vacuum breaker. TS LCO 3.6.1.5.c, Reactor Building-To-Suppression Chamber Vacuum Breakers, required that each reactor building-to-suppression chamber vacuum breaker shall be operable during mode 1, 2, or 3 operation. With one inoperable reactor building-to-suppression chamber vacuum breaker, due to an inoperable backup nitrogen subsystem, the TS required restoration of the vacuum

breaker to an operable status in 31 days. Additionally, during the time the vacuum breaker was inoperable plant mode changes were made, contrary to the requirements of TS LCO 3.0.4.

On August 28 a quarterly periodic surveillance test was performed on the division I reactor building-to-suppression chamber vacuum breaker, which used the backup nitrogen subsystem as a pressure source to perform the test. The pressure of the backup nitrogen subsystem dropped abnormally during this evolution, but the final pressure was above the minimum allowed by TS. The operators initiated a condition report (CR) at the time based on the abnormal pressure drop. The systems operability status was not questioned when the CR was generated.

The division I reactor building-to-suppression chamber vacuum breaker quarterly test was conducted again on November 20, 1999. The division I backup nitrogen subsystem pressure dropped abnormally again and the final pressure was below the TS limit. The operators took the appropriate TS actions following the pressure drop. System operability was restored on December 3, 1999, following repair of the division I backup nitrogen subsystem pressure control valve.

On January 7, 2000, the licensee determined that the division I backup nitrogen subsystem was inoperable due to the malfunctioning pressure control valve and therefore the subsystem was determined to have been inoperable from August 28 through December 3, 1999. There were two divisions of backup nitrogen subsystems and two reactor building-to-suppression pool vacuum breakers. Each vacuum breaker was supplied by one division of backup nitrogen. Each vacuum breaker was designed for 100 percent capacity. With the inoperability of one vacuum breaker the other vacuum breaker provided the design safety function so that a loss of safety function did not occur.

The inspectors reviewed the licensee's MR database on February 8 and found that the August 28, 1999, division I backup nitrogen subsystem malfunction was not recorded in the database. The inspectors found that the November 20, 1999, subsystem malfunction was recorded as a MR FF. The inspectors questioned the licensee whether a MR FF determination was missed on August 28, 1999. Additionally, the inspectors questioned whether the MR FFs should have classified the system as an MR (a)(1) system in accordance with 10 CFR 50.65. The licensee determined that the system engineer failed to properly identify the event as a MR FF following a review of the August CR. The licensee generated action request (AR) 0016462, Missed Functional Failure on System 6135, which addressed the missed MR FF determination. The division I backup nitrogen subsystem was classified as an MR (a)(1) system pending MR expert panel review. The AR acknowledged that, had the MR program identified the FFs in a timely manner, the appropriate corrective actions would have been taken sooner and, therefore, the failure to promptly identify the FFs contributed to the inoperability of the subsystem. The division I backup nitrogen subsystem MR performance criteria was defined as no more than two FFs in 36 months. The subsystem had two previous FFs identified in October 1997, and May 1999. The FF definition for the back-up nitrogen subsystem was a failure to meet leakage criteria, blocked flow path, or a failure to provide system flow due to a pressure loss. The FF that occurred on August 28, 1999, was the inability to provide system flow, due to a

pressure loss that would have disabled the ability of the subsystem to perform its design function of supplying nitrogen pressure for approximately one day.

The inspectors determined, following a review of the event, that the programmatic barriers the licensee developed to prevent an occurrence of this type failed. Neither the corrective action program nor the MR program recognized the safety significance of the degraded system condition. For example, a CR was generated on August 28, 1999, but was extended twice. An explanation of an abnormal system pressure drop was never pursued; however, nitrogen bottles were changed to restore normal pressure on August 28, 1999. It was fortuitous that the same technicians performed the testing in August and November, and that they recognized abnormal system response similarities. The quarterly periodic surveillance test on the reactor building-to-suppression chamber vacuum breaker did not reveal the inoperability of the backup nitrogen subsystem. Additionally, an engineering past operability determination did not occur until January 7, 2000, which was over a month after the system malfunction was determined on November 21, 1999. After January 7, 2000, a root cause investigation was initiated to determine corrective actions to prevent recurrence.

10 CFR 50.65(a)(1) requires, in part, that holders of an operating licensee shall monitor the performance or condition of structures, systems, and components (SSCs) within the scope of the monitoring program as defined in 10 CFR 50.65(b) against licensee established goals, in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended functions.

10 CFR 50.65 (a)(2) states that monitoring as specified in (a)(1), of the rule, is not required where it has been demonstrated that the performance or condition of an SSC is being effectively controlled through the performance of appropriate preventive maintenance, such that the SSC remains capable of performing its intended function.

Contrary to 10 CFR 50.65 (a)(1), on August 28, 1999, the licensee failed to set goals and monitor the performance of the division I backup nitrogen subsystem when a third MR FF of the division I backup nitrogen subsystem occurred on August 28, 1999, which showed that the licensee had not demonstrated that the performance of the system was being effectively controlled through the performance of appropriate preventive maintenance (as required by 10 CFR 50.65 (a)(2)). The failure to identify the malfunction of the pressure control valve in the division I backup nitrogen subsystem resulted in long-term inoperability of the subsystem, which resulted in a violation of TS LCO 3.6.1.5.c and TS LCO 3.0.4. This Severity Level IV violation is being treated as a non-cited violation (NCV), consistent with section VII.B.1 of the NRC Enforcement Policy. This violation is identified in the licensee's corrective action program as AR 0016462 and is identified as NCV 50-324/00-01-01, Failure to Classify a MR System (a)(1).

The significance of this finding was that the barriers established by the licensee to prevent occurrences such as this failed. The licensee addressed the barrier failures in their root cause investigation and the LER. The licensee received a violation for a similar failure to identify a repetitive MR FF in June 1999; see NRC Inspection Report 50-325(324)/99-03. This MR violation was evaluated as not repetitive because the reasons for the violations were not similar, and the corrective actions for the June 1999 violation were determined to have been reasonably adequate and had not been completed when this violation occurred.

c. Conclusions

A non-cited violation of the Maintenance Rule was identified for the failure to set goals and monitor the performance of the Unit 2 division I backup nitrogen subsystem as required by 10 CFR 50.65 (a)(1). The failure to identify the malfunction of the pressure control valve in the division 1 backup nitrogen subsystem resulted in long-term inoperability of this subsystem and a TS violation. The licensee's programmatic barriers to prevent the occurrence of long-term system inoperability failed during the sequence of events that led to the violation.

III. Engineering

E1 Conduct of Engineering

E1.1 Unit 2 Main Turbine Bypass System Operability (37551)

The inspectors reviewed an engineering service request (ESR) package to redefine the requirements for an operable main turbine bypass system as specified in the Unit 2 cycle 14, Core Operating Limits Report (COLR). The COLR was revised to specify that three or more bypass valves inoperable would render the system inoperable. This was a change from the previous COLR, which stated that one inoperable bypass valve would cause the system to be inoperable. As a result of this change, the thermal limit restriction implemented on Unit 2 following the main turbine bypass system being declared inoperable due to the number two bypass valve being inoperable, was removed and the bypass system was declared operable. (See NRC Inspection Report 50/325(324)/99-09, dated February 4, 2000) The change in the COLR also necessitated the need for a TS bases and UFSAR revision to reflect the main turbine bypass system operability with 8 of 10 bypass valves in service.

The ESR package contained the requisite 10 CFR 50.59 safety evaluation and was prepared in accordance with plant procedures. The overall conclusion by the licensee was that the reduction in the number of main turbine bypass valves required for system operability from 10 to 8 was fully bounded by the current operating limits and did not reduce the margin of safety. The inspectors determined that this conclusion was adequately supported by the information contained in the ESR package. The inspectors identified no deficiencies.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 General Comments (71750)

The inspectors periodically toured the radiological control area (RCA) during the inspection period. The inspectors observed radiologically controlled areas to verify adequacy of access controls, locked areas, personnel monitoring, surveys, and postings. Radiological controls were adequate. Personnel were attentive and followed requirements. The inspectors concluded that radiation control practices were being conducted in accordance with procedures. The inspectors also routinely reviewed chemistry results. The licensee provided good management oversight of chemistry results and regulatory limits were being met.

S1 Conduct of Security and Safeguards Activities

S1.1 Protected Area Access Observations (71750)

The inspectors observed the conduct of security activities regarding personnel searches and protected area (PA) access during routine inspection activities. Access activities were determined to be satisfactory. Challenges were made by members of the security force as appropriate in response to alarms from the access detection devices. Personnel searches were observed to be thorough and the inspectors noted that increased management oversight was present during the high traffic times of the day. This was particularly important due to the increased number of personnel entering the PA for Unit 1 refueling outage related work.

V. Management Meetings

XI Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on March 8, 2000. The licensee acknowledged the findings presented.

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Licensee

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J. Gawron, Training Manager
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INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations Program
IP 71750:	Plant Support Activities
IP 92700:	Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-324/00-01-01	NCV	Failure to Classify a MR System (a)(1) (Section M2.1)

Closed

50-324/2000-001	LER	Operation Prohibited by Technical Specifications Due to Inoperable Vacuum Breaker (Section O8.1)
50-324/00-01-01	NCV	Failure to Classify a MR System (a)(1) (Section M2.1)

Discussed

50-325(324)/99-03-02	NCV	MR Implementation Failure (Section M2.1)