UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

February 4, 2000

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. 50-325/99-09 AND 50-324/99-09

Dear Mr. Keenan:

This refers to the inspections conducted on December 5, 1999, through January 15, 2000, at the Brunswick reactor facility. The enclosed report presents the results of this inspection.

During the inspection period, your conduct of activities at the Brunswick facility was generally characterized by safety-conscious operation, sound engineering and maintenance practices, and careful radiological work controls.

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.

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

cc w/encl: (See page 2)

cc w/encl:
J. J. Lyash, Director
Site Operations
Brunswick Steam Electric Plant
Carolina Power & Light
Electronic Mail Distribution

Terry C. Morton, Manager
Performance Evaluation and
Regulatory Affairs CPB 7
Carolina Power & Light Company
Electronic Mail Distribution

Warren Dorman, Acting Manager
Regulatory Affairs
Carolina Power & Light Company
Brunswick Steam Electric Plant
Electronic Mail Distribution

William D. Johnson
Vice President & Corporate Secretary
Carolina Power and Light Company
Electronic Mail Distribution

John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, NW
Washington, DC 20037-1128

Mel Fry, Director
Division of Radiation Protection
N. C. Department of Environment
and Natural Resources
Electronic Mail Distribution

Peggy Force
Assistant Attorney General
State of North Carolina
Electronic Mail Distribution

Robert P. Gruber
Executive Director
Public Staff NCUC
P. O. Box 29520
Raleigh, NC 27626-0520

Public Service Commission
State of South Carolina
P. O. Box 11649
Columbia, SC 29211

Jo Ann Simmons, Chairman
Brunswick County Board of
Commissioners
P. O. Box 249
Bolivia, NC 28422

Dan E. Summers
Emergency Management Coordinator
New Hanover County Department of
Emergency Management
P. O. Box 1525
Wilmington, NC 28402

Distribution w/encl: (See page 3)

Distribution w/encl:

A. Hansen, NRR
PUBLIC

OFFICE	DRP/RII	DRP/RII	DRP/RII	DRP/RII	DRS/RII		
SIGNATURE	GWest:vyg	TEaslick	EBrown	GGuthrie	DForbes		
NAME							
DATE	3/ /2000	2/ /2000	2/ /2000	2/ /2000	3/ /2000	3/ /2000	3/ /2000
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: C:\9909 drp.wpd

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-325, 50-324
License Nos:	DPR-71, DPR-62
Report No:	50-325/99-09, 50-324/99-09
Licensee:	Carolina Power & Light (CP&L)
Facility:	Brunswick Steam Electric Plant, Units 1 & 2
Location:	8470 River Road SE Southport, NC 28461
Dates:	December 5, 1999 - January 15, 2000
Inspectors:	T. Easlick, Senior Resident Inspector E. Brown, Resident Inspector E. Guthrie, Resident Inspector D. Forbes, Reactor Inspector (Sections R1.1, R1.2, R2.1)
Approved by:	B. Bonser, Chief Reactor Projects Branch 4 Division of Reactor Projects

EXECUTIVE SUMMARY

Brunswick Steam Electric Plant, Units 1 & 2
NRC Inspection Report 50-325/99-09, 50-324/99-09

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection; in addition, it includes the results of a radiation protection inspection by a regional inspector.

Operations

- Recovery of an idle Unit 1 reactor recirculation (RR) pump following single-loop operation was successfully performed utilizing lessons-learned from previous evolutions. Clear, direct communications and good supervisory control resulted in an event-free restoration of the idle RR pump (Section O1.1).

Maintenance

- Maintenance work was professionally performed and thoroughly completed. Proper procedures were being used at the job sites. The work performed was appropriately documented and the maintenance personnel were familiar with and knowledgeable of the work. Appropriate radiation control measures were in place (Section M1.1).

Engineering

- On Unit 2, the licensee determined that the number two main turbine bypass valve would not function as designed and was therefore inoperable. The inspectors found that the licensee's technical evaluation of this condition as well as their planned corrective actions were accurate and thorough (Section E1.1).

Plant Support

- The licensee was effectively labeling, controlling, and storing radioactive material as required by 10 CFR 20.1904. All radioactive material storage areas observed were appropriately posted to specify the radiological conditions (Section R1.1).

- The licensee had effectively implemented a program for shipping radioactive materials in accordance with Nuclear Regulatory Commission and Department of Transportation regulations (Section R1.2).

- The amounts of radioactivity released from the plant in liquid effluents has remained stable over the last several years and the radiation doses resulting from those releases were a small percentage of regulatory limits (Section R2.1).

Report Details

Summary of Plant Status

Unit 1 began the report period operating at 100 percent rated thermal power (RTP). On January 7, power was reduced to 30 percent following the trip of a reactor recirculation (RR) pump due to the inadvertent closure of its suction valve. The unit was returned to 100 percent power on January 8, where it remained for the remainder of the inspection period.

Unit 2 began the report period operating at 100 percent RTP. On December 18, power was reduced to 35 percent and the unit was placed in single-loop operation for the replacement of the 2B RR pump motor generator set tachometer. The unit was returned to 100 percent power on December 19. On January 14, power was reduced to 59 percent for control rod position improvements, valve testing, and scram time testing. The unit was returned to 100 percent on January 15, the last day of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Restoration of an Idle Unit 1 Reactor Recirculation Pump

a. Inspection Scope (71707, 93702)

The inspectors observed the restoration activities associated with the 1B RR pump that tripped as a result of an inadvertent suction valve closure.

b. Observations and Findings

On January 7, with the reactor at 100 percent RTP, the 1B RR pump tripped following an attempt to electrically backseat the pump's suction valve, 1-B32-F023B. The valve backseating was performed to assist in identifying the source of a small amount of leakage into the drywell which was necessitating excessive filter changeouts in the drywell atmospheric monitors. The backseating evolution was performed in accordance with Special Procedure, 0SPP-MO001, Electrically Backseating of AC Motor Operated Valves Using the Motor Operator, Revision (Rev.) 7. The procedure required manually actuating the opening contactor in the motor-operated valve starter while monitoring motor current to determine when the valve achieved a backseat condition. During the evolution on the F023B valve, the technicians inadvertently actuated the closed contactor, causing the valve to close. The breaker for the valve was immediately opened to stop valve motion, but the trip logic for the RR pump sensed that the suction valve was not full open and initiated a trip signal to the 1B RR pump.

The suction valve was fully opened and electrically backseated, and preparations were made to re-start the 1B RR pump. The inspectors observed activities from the main control room. The pre-evolution briefing was comprehensive with appropriate management oversight. The operators utilized lessons-learned from a previous single-loop restoration on Unit 1, which included increasing feedwater flow via a flow path back to the main condenser. This action minimized the potential for feedwater flow oscillations at the low power level. The recirculation drive flow on the operating loop was reduced to meet the procedural requirements for starting the idle pump. The operators were able to successfully start the idle pump on the first attempt. Clear, direct communications and good supervisory control resulted in an event-free recovery from single-loop operations.

c. Conclusions

Recovery of an idle Unit 1 RR pump following single-loop operation was successfully performed utilizing lessons-learned from previous evolutions. Clear, direct communications and good supervisory control resulted in an event-free restoration of the idle RR pump.

O2 Operations Status of Facilities and Equipment

O2.1 Clearance Walkdown (71707)

The inspectors verified proper installation and removal of clearance 99-01029 on January 13. The clearance was to isolate the standby gas treatment system in order to install test equipment for preventive maintenance testing. The inspectors verified that the clearance was properly prepared and authorized, and that the tagged components were in the required positions with the appropriate tags in place. No discrepancies were identified during the review of this clearance, as well as the observation of its implementation.

O2.2 Containment Atmosphere Dilution (CAD) Safety System Walkdown (71707)

On January 13 and 14, the inspectors conducted a walkdown of the CAD system. The inspectors found that the system was aligned in accordance with operating procedures. The inspectors found that the system was in a standby status with the required system parameters established. No discrepancies were found.

O4 Operator Knowledge and Performance

O4.1 Unit 1 Reactor Building Auxiliary Operator (RBAO) Daily Rounds (71707)

On January 13, the inspectors observed the Unit 1 RBAO during the performance of Operating Instruction 1OI-3.4.2, Unit 1 Reactor Building Auxiliary Operator Daily Check Sheets, Rev. 16. An auxiliary operator-in-training accompanied the RBAO on his rounds for on-the-job training and performed the daily checks under the supervision of the RBAO. The inspectors observed that the RBAO provided thorough instruction and direction to his trainee, asking numerous questions to test the trainee's knowledge of

the plant and system operations. The inspectors observed that the proper procedure was in use and of the proper revision. The inspectors noted that the RBAO demonstrated a questioning attitude concerning the installation of pre-outage scaffolding around the Unit 1 high pressure coolant injection system. The operator contacted engineering about the proximity of the scaffolding to safety-related piping and learned that the appropriate engineering reviews and evaluations had been completed.

O8 Miscellaneous Operations Issues (92700)

O8.1 (Closed) Licensee Event Report (LER) 50-325(324)/1998-006-00: Engineered Safety Feature Actuation Due to Main Stack Wide Range Gas Monitor Failure. The two events addressed in this LER occurred in August 1998 and concerned invalid trip signals from the main stack wide range gas monitor that resulted in isolations of the Units 1 and 2 primary containment isolation systems. During these events, the affected systems operated as designed. The licensee determined that the causes of the events were the end-of-life failures of the low range detectors and water intrusion within the signal microprocessor and electrical junction boxes. The licensee's corrective actions included: replacement of the failed components; sealing the conduit entering the instrument; and the replacement of coaxial cables from the plant to the detectors. The inspectors reviewed the LER package and verified that the corrective actions had been completed.

O8.2 (Closed) LER 50-324/1998-003-00: Main Steam Isolation Valve Closure Due to Procedure Deficiency. This LER addressed an event that occurred on August 29, 1998. During a reactor startup, an automatic closure of the main steam isolation valves was initiated as a result of excessive steam flow through the turbine bypass valves. The plant, systems, and affected components responded as designed. The bypass valves were manually opened in support of the plant cooldown during the unit shutdown activities on August 25. The licensee determined that the plant procedures did not contain the necessary instructions to ensure that the bypass valves were in the closed position prior to initiation of unit startup activities. The inspectors verified that the appropriate plant procedures were enhanced to provide guidance to the operators to verify bypass valve position where appropriate.

O8.3 (Closed) LER 50-325(324)/1999-006-00: Missed Surveillance Requirements Result in Operation Prohibited by Technical Specifications. The inspectors reviewed the LER, the associated root cause investigation, and the licensee's corrective actions. On April 23, 1999, the licensee determined that Technical Specification (TS) Surveillance Requirement (SR) 3.3.3.1.1, channel check requirements had not been met for suppression chamber pressure and drywell area radiation post accident monitoring instrumentation. The surveillance requirements had not been met since the Improved Standard Technical Specifications (ITS) were implemented on July 25, 1998. The licensee entered TS SR 3.0.3 for the missed surveillances on Unit 1 (Unit 2 was in a shutdown condition) and remained there until the channel check surveillance requirements were completed for the missed surveillances. The TS-required channel checks were performed on April 24, 1999, on Unit 1, within the TS SR 3.0.3 allowed time of 24 hours, and on April 29, 1999, on Unit 2. Both surveillances were completed satisfactorily for all of the instruments. SR 3.3.3.1.1 was required to be performed every

31 days. Because the instruments passed the channel checks, they were considered to have been operable during the period of the missed surveillance. Based on continued operability of the instruments, the missed surveillances were of minimal safety significance. The missed surveillances were a minor violation of TS and are not subject to formal enforcement action. The licensee's root cause investigation determined that the cause of the missed surveillances was inadequate tracking of restrictive changes created by ITS implementation to ensure that the TS changes were implemented and completed. In this case, the required surveillances were not incorporated into the appropriate procedure.

O8.4 (Closed) LER 50-325(324)/1998-005-00: Chlorine Leak Results in Control Room Emergency Ventilation System Isolation and Suspended Fire Watches. The inspectors reviewed the LER and found no new information presented. The inspectors also found that all corrective actions assigned by the root cause investigation and LER were completed.

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:

- Maintenance Surveillance Test 1MST-RGE31R, Main Stack Radiation Monitor High Radiation Isolation Response Time, Rev. 9
- Maintenance Surveillance Test 0MST-RBM21R, RBM Channel Calibration and Functional Test, Rev. 2
- Periodic Test 1PT-15.1.2A, Standby Gas Treatment Train 1A Filter Test, Rev. 7
- Maintenance activities associated with the replacement of an elbow in the fire main, WR/JO 97-AMB1
- Maintenance activities associated with the replacement of defective fuel pins in the new fuel on Unit 1

The inspectors found the work performed under these activities to be professional and thorough. Proper procedures were being used at the job site. The work performed was appropriately documented and the maintenance personnel were familiar with and knowledgeable of the work. Appropriate radiation control measures were in place, in particular with the work associated with the replacement of fuel pins in the new fuel bundles on Unit 1. The pre-job briefing for the fuel pin replacement was comprehensive, covering the vendor's procedures, radiation protection, operational experience, and foreign material control on the refuel floor.

III. Engineering

E1 Conduct of Engineering

E1.1 Unit 2 Main Turbine Bypass Valve Indication Failure (37551)

On December 25, the operators noted that the number two main turbine bypass valve position indication had failed, with the indicator pegged low. The licensee determined that the valve would not function as designed and was therefore inoperable. The inspectors verified that the licensee took the appropriate actions in accordance with TS. A temporary modification was installed to have the number eight main turbine bypass valve actuate in place of the number two bypass valve. The TS require that with one bypass valve inoperable, the main turbine bypass system must be declared inoperable and thermal limit restrictions implemented. Normal operation of the plant would not be affected by the thermal limit restrictions; however, operation in a single-loop condition would not be permitted. The inspectors reviewed the licensee's planned actions to change the main turbine bypass valve TS Bases and the Core Operating Limits Report (COLR) to allow for the failure of two main turbine bypass valves and still maintain the operability of the system. Engineering and vendor reviews determined that the system could remain operable with two valves not functioning. The inspectors reviewed the licensee's planned corrective actions and changes to the TS Bases and COLR and found them to be accurate, thorough, and comprehensive.

E8 Miscellaneous Engineering Issues (92903) (92700)

E8.1 (Closed) Inspection Follow-up Item (IFI) 50-325(324)/98-08-02: Review Licensee Actions to Resolve DC Ground Problems. Direct current (DC) grounds have been experienced on both units' battery buses during several hurricanes that have passed over the Brunswick site since 1996. The grounding problems were found on balance of plant (BOP) components; specifically, switchyard components that affected the safety-related systems. The BOP DC systems were integral with the safety-related DC systems. The licensee determined that they would not physically separate the BOP and safety-related systems.

The inspectors reviewed the licensee's actions during five hurricanes when the site ground hunting procedure was implemented. The inspectors found that the actions taken to identify grounds and correct them were adequate. The licensee determined that a portion of the site's grounding problem was being generated from the condition of the site's manhole system. The DC cables were routed through the site's manhole tunnels. The licensee's Maintenance Rule (MR) baseline inspections of the site's manhole system found that the condition of the manhole system was degraded such that acceptance requirements were not met. Significant groundwater in-leakage was occurring due to deteriorated seals in the electrical cable duct banks located on the walls of the manholes. During significant periods of rain, the tunnels would fill up with water. This condition caused water infiltration in the buildings, which led to equipment grounds and malfunctions in 1998 (see LER 50-325(324)/1998-006-00, Section O8.1). Additionally, Engineering Service Request (ESR) 99-00313, Manhole Functional Failure, identified that the cabling was not rated for submersion, but only a wet environment.

The ESR stated that cabling supplying DC circuitry was susceptible to producing ground faults when the cabling was submerged. The licensee's inspection findings identified a MR functional failure, which led the licensee to classify the system as MR a(1). The MR a(1) classification required the licensee to generate corrective actions, which included a walkdown inspection of all manholes in the system (approximately 75), and repair of the electrical cable duct bank seals to stop in-leakage. This item was tracked in the licensee's corrective action program as Action Request 00005664, Manhole Functional Failure.

The inspectors determined that the licensee's ground hunting procedures and corrective actions for the manhole system in-leakage problems were adequate to eventually resolve the grounding concerns.

E8.2 (Closed) LER 50-324/1998-002-01: Excessive Feedwater Temperature Reduction as a Result of Loss of Stator Cooling Water with Main Turbine Runback. On July 8, 1998, the licensee determined that a loss of stator cooling water and subsequent main turbine runback on the unit could result in a feedwater temperature reduction greater than the 100 degrees Fahrenheit reduction assumed in the Updated Final Safety Analysis Report (UFSAR) for Brunswick Unit 2. The worst-case loss of feedwater heating transient had not been analyzed at the time of plant design and construction. In July 1998, the immediate corrective actions for this event included setting thermal limit restrictions such that limits would not be exceeded in the event of a loss of stator cooling water. Subsequently, a temporary modification was installed to disable the loss of stator cooling water main turbine runback, which removed the thermal limit restrictions. The final resolution of the issue was a permanent modification to disable the stator cooling water runback, which was completed in May 1999. The inspectors reviewed the licensee's root cause investigation for this event and verified that all corrective actions were appropriate and completed.

E8.3 (Closed) LER 50-324/1999-003-00: Inadequate Augmented Inservice Weld Inspections. The inspectors reviewed the LER and found no new information presented. Non-Cited Violation (NCV) 50-325(324)/99-01-04, Failure to Perform Volumetric Examinations In Accordance With Generic Letter 88-01 was issued in NRC Inspection Report 50-325(324)/99-01 regarding this issue. The inspectors noted that all corrective actions assigned by the LER and the root cause investigation were completed.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Tour of Radiological Protected Areas (86750)

During tours, the inspectors reviewed survey data and observed activities in progress. Radiological surveys reviewed were well-documented. The inspectors performed independent surveys of selected storage areas and verified that the licensee was effectively controlling and storing solid radioactive material as required by regulations.

All radioactive material storage areas observed were appropriately posted and labeled as required by 10 CFR 20.1904 and 10 CFR 20.1902.

R1.2 Transportation of Radioactive Materials (86750)

The inspectors evaluated the licensee's programs for implementing radioactive material transportation regulations. The inspectors reviewed the preparation of a shipment of radioactive spent resin, reviewed procedures, and determined that the procedures adequately addressed the shipping requirements. The licensee had effectively implemented a program for shipping radioactive material as required by NRC and Department of Transportation regulations.

R2 Status of Radiation Protection and Chemistry Facilities and Equipment

R2.1 Radioactive Effluent Monitoring Instrumentation (84750)

During a plant tour, the inspectors reviewed the performance of several licensee radiation monitors and the quantification of selected liquid effluent samples from release pathways described in the licensee's Offsite Dose Calculation Manual (ODCM) and in the UFSAR. The inspectors toured the Unit 1 and Unit 2 control rooms and reviewed radiation monitor results, inspected three environmental air sampling stations and two environmental liquid sampling stations, observed technicians taking samples, and reviewed system operating procedures to ensure that the licensee met the chemistry release permit procedure and the ODCM requirements for releases of radioactive materials. The inspectors reviewed calibration records for three radwaste monitors and determined that the licensee was effectively maintaining these monitors. Based on the Annual Effluent Release Report data, the amounts of radioactivity released from the plant in liquid effluents has remained stable over the last several years and the radiation doses resulting from those releases were a small percent of regulatory limits.

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 January 21, 2000. An interim exit meeting was held on January 14, to discuss the findings of the regional inspector. The licensee acknowledged the findings presented. No proprietary information was identified to the inspectors.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Brittain, Security Manager
D. Dicello, Environmental and Radiation Control Manager
W. Dorman, Regulatory Affairs Manager (Acting)
N. Gannon, Plant General Manager
J. Gawron, Training Manager
J. Franke, Brunswick Engineering Support Section Manager
J. Lyash, Director of Site Operations
W. Noll, Operations Manager
E. Quidley, Maintenance Manager
S. Rogers, Outage and Scheduling Manager

Other licensee employees contacted during the inspection included technicians, maintenance personnel and administrative personnel.

NRC

T. Easlick, Senior Resident Inspector
E. Guthrie, Resident Inspector
E. Brown, Resident Inspector

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 84750:	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750:	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92700:	Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92903:	Followup - Engineering
IP 93702:	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

50-325(324)/1998-006-00	LER	Engineered Safety Feature Actuation Due to Main Stack Wide Range Gas Monitor Failure (Section O8.1).
50-324/1998-003-00	LER	Main Steam Isolation Valve Closure Due to Procedure Deficiency (Section O8.2).
50-325(324)/1999-006-00	LER	Missed Surveillance Requirements Result in Operation Prohibited by Technical Specifications (Section O8.3).
50-325(324)/1998-005-00	LER	Chlorine Leak Results in Control Room Emergency Ventilation System Isolation and Suspended Fire Watches (Section O8.4).
50-325(324)/98-08-02	IFI	Review Licensee Actions to Resolve DC Ground Problems (Section E8.1).
50-324/1998-002-01	LER	Excessive Feedwater Temperature Reduction as a Result of Loss of Stator Cooling Water with Main Turbine Runback (Section E8.2).
50-324/1999-003-00	LER	Inadequate Augmented Inservice Weld Inspections (Section E8.3).