U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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Report Nos:	50-325/98-11, 50-324/98-11
Licensee:	Carolina Power & Light (CP&L)
Facility:	Brunswick Steam Electric Plant, Units 1 & 2
Location:	8470 River Road SE Southport, NC 28461
Dates:	November 22, 1998 - January 2, 1999
Inspectors:	B. Holbrook, Acting Senior Resident Inspector E. Brown, Resident Inspector E. Guthrie, Resident Inspector
Approved by:	B. Bonser, Chief Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

EXECUTIVE SUMMARY

Brunswick Steam Electric Plant, Units 1 & 2
NRC Inspection Report 50-325/98-11, 50-324/98-11

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

Operations

- Licensee actions in response to a chlorine leak which was declared a notification of unusual event were performed in accordance with procedures. The inspectors noted some confusion by the Site Emergency Commander as to which procedure to implement for site evacuation. The licensee's event investigation, system failure analysis, and corrective actions were thorough and prompt (Section O1.1).

- The licensee's cold weather program was being effectively implemented and no deficiencies were noted with the heat trace system (Section O1.2).

- Operator response to transient plant conditions that had the potential for a decreasing condenser vacuum was timely and correct. Procedures were implemented, and system indications and performance were correctly monitored. Actions to respond to high differential pressure across the traveling screens were proceduralized and the necessary equipment was prestaged (Section O4.1).

Maintenance

- Maintenance activities observed were performed in accordance with licensee procedures. Appropriate instrumentation and communications between technicians and the control room were used (Section M1.1).

Engineering

- The Updated Final Safety Analysis Report (UFSAR) revision for the control room emergency ventilation system (CREVS) re-classification was deficient in that the revision did not identify that the UFSAR classification conflicted with Technical Specifications. The licensee responded promptly to inspectors' concerns regarding the CREVS classification. The licensee initiated Condition Reports with corrective actions to evaluate the cause of the condition and correct the licensing basis (Section E7.1).

Plant Support

- Radiological areas observed were properly labeled and controlled. Personnel access and egress activities from the radiological control area were determined to be appropriate (Section R1.1).

- Despite ongoing configuration changes for the vehicle search area, search activities observed were conducted satisfactorily (Section S1.1).

Report Details

Summary of Plant Status

Unit 1 began the report period at 100 percent rated thermal power (RTP). Power was reduced to about 60 percent on December 12, in preparation for maintenance activities on the 1A reactor feed pump turbine (RFPT). Power was returned to 100 percent RTP on December 15, following completion of the maintenance activities on the 1A RFPT. At the end of the report period Unit 1 had been on-line continuously for 124 days.

Unit 2 operated at or near 100 percent RTP during the report period except for planned testing activities. At the end of the report period, the unit had been on-line continuously for 125 days. Unit 2 operated with three control rods inserted to suppress power around a leaking fuel assembly.

I. Operations

O1 Conduct of Operations

O1.1 Chlorine Leak Unusual Event

a. Inspection Scope (71707)

The inspectors observed the licensee's response to a chlorine leak on November 23. The inspectors reviewed the licensee's activities following the event including event review and investigation, root cause determination, and corrective actions.

b. Observations and Findings

The licensee entered an abnormal operating procedure for a chlorine gas leak based on a report by an auxiliary operator (AO) of a strong odor of chlorine and a leaking component in the chlorine system. Chlorine detection alarms were received in the control room which activated the control building emergency air filtration system. The licensee reported this system actuation in accordance with 10 CFR 50.72(b)(2)(ii). The system was verified to have actuated correctly by operations personnel. The inspectors verified that the report was accurate and prompt. Shortly after the engineered safety feature (ESF) actuation, a report of a chlorine odor in the Radwaste Building was reported to the control room. The shift superintendent then declared a notification of unusual event (NOUE) for hazards to plant operations due to toxic gas that could endanger personnel.

The Site Emergency Commander (SEC) decided to evacuate the site based on the reports of chlorine odors and the potential danger to personnel. The inspectors observed some confusion by the SEC as to which procedure to implement for site evacuation. The SEC had two procedural options for site evacuation. One procedure was a precautionary relocation and the other was a site evacuation. The SEC chose to

implement a precautionary relocation. The inspectors noted that the SEC was concerned that if he used the site evacuation procedure he would have to declare a site area emergency (SAE), which he did not need to do because conditions did not warrant it. However, the precautionary relocation procedure was typically used for slower evacuations, such as hurricanes. The SEC was not aware that the site evacuation procedure could have been used "when directed by" the SEC without declaring an SAE. The licensee identified this as an item for improvement with actions to provide emergency response training and to make procedure enhancements to clarify the difference in the site evacuation procedure. All actions observed by the inspectors during the event were performed in accordance with procedures. Procedures were present and in use during the event.

During the event, the licensee determined that required fire watches would be missed in buildings which were inaccessible due to the chlorine leak. The licensee reported this condition in accordance with 10 CFR 50.72 (b)(1)(i)(B). The report was a one hour non-emergency event report based on deviation from the Technical Specification (TS), authorized by 10 CFR 50.54(x). This requirement states that a licensee may take reasonable action that departs from a license condition or a TS in an emergency when this action was immediately needed to protect the public health and safety. The required fire watches in this case were not performed for about an hour. The licensee had invoked 10 CFR 50.54(x) on two other recent occasions for suspending fire watches; those were during Hurricanes Bertha and Fran in 1996.

The licensee promptly formed an event review team in response to the event that convened the following day. The team evaluated site emergency response and identified several items which needed improvement in operations, the emergency response organization, and equipment problems. Items for improvement constituted communications, coordination of response personnel, the use and function of emergency equipment, and the material condition of the chlorine system.

The licensee determined that the chlorine system developed a leak on a spool piece tee connection. The licensee removed the leaking spool piece and performed a failure analysis on the component. The analysis determined that the neoprene coating, internal to the pipe, failed. Once the seawater-chlorine mixture was in contact with the pipe, graphitic corrosion occurred which lead to pipe failure and a leak. The licensee conducted a complete inspection of the remaining service water chlorination neoprene lined pipe and found no other indications of lining failure or corrosion to the base metal. Based on length of service and a different lining type, the licensee chose not to inspect the circulating water portion of the chlorination system. The chlorination system was returned to service following analysis, evaluation, inspections, and repairs on December 10.

c. Conclusions

Licensee actions in response to a chlorine leak which was declared a notification of unusual event were performed in accordance with procedures. The inspectors noted some confusion by the Site Emergency Commander as to which procedure to implement for site evacuation. The licensee's event investigation, system failure analysis, and corrective actions were thorough and prompt.

O1.2 Cold Weather Preparations (71714)

The inspectors reviewed the licensee's preparation and implementation of their cold weather program. The inspectors reviewed cold weather procedures and completed periodic tests, assessed operator knowledge, and conducted a walkdown of the heat trace systems. The inspectors determined that the cold weather program was being implemented effectively and found no deficiencies with the heat trace system. Two minor deficiencies identified by inspectors and discussed in NRC Inspection Report (IR) 50-325(324)/97-13, Section O1.1 were found to have been corrected.

O2 Operational Status of Facilities and Equipment

O2.1 Core Spray (CS) System Walkdown (71707)

On December 23, the inspectors verified system alignment for the Unit 1, "A" CS system. All accessible valves were found aligned consistent with the controlled system piping diagram and applicable operating procedure. Minor housekeeping issues were identified by the inspectors and promptly corrected by the licensee. Selected operational parameters were verified to be within design and/or TS requirements.

O4 Operator Knowledge and Performance

O4.1 Circulating Water Pump Trip

a. Inspection Scope (71707)

The inspectors observed operator performance in the control room during the trip of a circulating water intake pump (CWIP) on Unit 2. The pump trip was a result of clogged pump traveling screens.

b. Observations and Findings

On November 24, with both units operating at 100 percent rated thermal power, the inspectors observed the Unit 2 control operator (CO) report that the circulating water (CW) traveling screen high differential pressure (dP) alarm was received and that the 2B CWIP had tripped. The AO was dispatched to the intake structure to investigate reports of marine life clogging the traveling screens. The inspectors observed the AOs cleaning the traveling screens. The licensee entered Abnormal Operating Procedure 0AOP-37, "Low Condenser Vacuum," Revision (Rev.) 1, based on the high dP and the CWIP trip. The licensee had anticipated a period of vulnerability for debris fouling and had staged fire hoses at the CW traveling screens in the event the screens needed to be manually cleaned in accordance with the guidance in Operating Procedure 2OP-29.1 "Screen Water System Operating Procedure," Rev. 18. To increase system reliability following the CWIP trip, the licensee restored the 2A CWIP and the 2A CW traveling screen, which was under clearance for preventive maintenance. The inspectors observed good communications in the Control Room throughout the event. The COs were observed to be actively monitoring reactor turbine gauge board (RTGB) indications, specifically condenser vacuum and the status of the other three CWIPs, for degrading conditions.

The potential existed for a reduction in condenser vacuum and a reactor trip. The inspectors noted similar system and parameter monitoring on Unit 1. Condenser vacuum was observed by the inspectors to remain stable throughout the event due to the prompt response by operations personnel.

c. Conclusion

Operator response to transient plant conditions that had the potential for a decreasing condenser vacuum was timely and correct. Procedures were implemented, and system indications and performance were correctly monitored. Actions to respond to high differential pressure across the traveling screens were proceduralized and the necessary equipment was prestaged.

O4.2 Auxiliary Operator Performance (71707)

The inspectors observed an AO conduct a tour of the Unit 2 reactor building, perform daily checks as required by plant procedures, and perform required daily TS surveillances. The inspectors found that the AO's building tour and overall knowledge of the plant was satisfactory. The inspectors observed no discrepancies with log keeping or the performance of surveillance requirements.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) Violation (VIO) 50-325(324)/97-13-01: Failure to Retain TS Required QA Record. The inspectors had identified the licensee's failure to maintain clearances as required by TS. The licensee indicated that administrative controls were established to properly classify and maintain clearances as QA documents with a lifetime retention. A site task force was formed to identify and correct any other records not properly maintained. This issue was identified to be applicable to Shearon Harris and H. B. Robinson nuclear plants. The licensee entered this finding in the corrective action program for both the Harris and Robinson plants.

O8.2 (Closed) Inspection Follow-up Item (IFI) 50-325(324)/98-05-02: Adequacy of RSDP Procedure and Training. The inspectors reviewed the applicable control room annunciator procedures associated with Unit 1 and Unit 2 Remote Shutdown Panels (RSDPs) and observed that the procedures were the current revision. The procedures provided adequate instructions for operator actions to verify the validity of alarmed conditions. The inspectors observed that the local procedures for the RSDP were maintained in a locked cabinet near the RSDPs. The inspectors accompanied an AO and viewed the procedures inside one cabinet and verified that the procedures were the current revision. The inspectors questioned the AO and concluded he demonstrated satisfactory knowledge about the RSDP and actions to take for RSDP annunciators.

The inspectors reviewed Auxiliary Operator Lesson Plan, AOI-CLS-LP-119-A, "Remote Shutdown Panel," dated June 30, 1997, and observed that operator actions to be taken for the RSDP annunciators were discussed. The lesson plan identified specific knowledge items and objectives concerning the RSDP and operator actions. The lesson plan identified that Student Study Material, OPS-CLS-SM-119-A, "Remote

Shutdown Panel," Rev. 3, be used as a companion document and reference for the RSDP. The companion document contained figures of the RSDP and annunciator windows and described operator actions to be taken.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments (61726)

The inspectors observed portions of the following maintenance surveillance tests (MSTs):

- 0MST-CLDET11M "Chlorine Detection System Channel Functional Test," Rev. 13
- 1MST-ADS21Q "ADS RX Water LL1 Trip Unit Chan Cal," Rev. 2
- 2MST-RHR25Q "RHR Pump Disch Press ADS Permissive Inst Chan Cal," Rev. 3
- 2MST-APRM29Q "APRM Flow Bios Flow Units C & D Chan Cal," Rev. 27

The inspectors found that the surveillance testing procedures were present, in active use, and satisfactorily followed during the observed portions of the tests. The inspectors observed that all equipment was in calibration. The inspectors observed good three-way communications during the tests. Maintenance activities observed were performed in accordance with licensee procedures. Appropriate instrumentation and communications between technicians and the control room were used.

III. Engineering

E7 Quality Assurance in Engineering Activities

E7.1 Control Room Emergency Ventilation System (CREVS) Classification

a. Inspection Scope (37551)

The inspectors reviewed the validity of the licensee's reclassification of the CREVS from an engineered safety feature (ESF) to an essential auxiliary system (EAS).

b. Observations and Findings

The inspectors determined that the licensee reclassified the CREVS from an ESF system to an EAS in an amendment to the Updated Final Safety Analysis Report

(UFSAR) in 1994. The UFSAR defined ESF systems as those designed features to mitigate the consequences of postulated accidents to minimize potential offsite dose and to protect the fuel barrier.

The inspectors determined that all supporting UFSAR documentation, including the safety evaluation for the UFSAR change, showed that the CREVS did not meet the criteria for an ESF system. However, the inspectors found that 10 CFR 50.72 listed the CREVS as an ESF system; NUREG 1022 refers to CREVS as an ESF system and the licensee's TS 5.5.7, "Ventilation Filter Testing Program" considered the CREVS as an ESF.

The UFSAR revision for the CREVS re-classification was deficient in that the revision did not identify that the UFSAR classification conflicted with TS. The inspectors questioned the licensee concerning this conflicting information. The licensee conducted a review of the information discussed above and generated two adverse condition Condition Reports (CRs). The CRs identified the classification discrepancy between the UFSAR and TS. Engineering was assigned to evaluate the cause of the condition and correct the licensing basis appropriately. The inspectors verified that the licensee had maintained the system as an ESF regarding material condition and preventive maintenance. Discussions with the licensee indicated that the licensee intended to continue maintaining the system per the same standard as an ESF. The licensee indicated that the intent of reclassification was to avoid reportability. The licensee did not identify other facilities in the industry that did not consider CREVS as an ESF.

c. Conclusions

The UFSAR revision for the CREVS re-classification was deficient in that the revision did not identify that the UFSAR classification conflicted with TS. The licensee responded promptly to inspectors' concerns regarding the CREVS classification. The licensee initiated CRs with corrective actions to evaluate the cause of the condition and correct the licensing basis appropriately.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) IFI 50-325(324)/98-10-04: TSV/TCV Scram Function Operability. The inspectors reviewed the licensee's design calculation which discussed the effects on the minimum critical power ratio (MCPR) during abnormal operating occurrences (AOO) as defined in the UFSAR. The inspectors reviewed this calculation to determine if disabling the turbine stop valve (TSV) and turbine control valve (TCV) automatic scram functions, above the TS required limit of 30 percent rated thermal power (RTP), was considered in the plant design basis and what effect that would have on the MCPR limit.

The design calculation showed that the TSV/TCV scram functions were credited, during normal operations, as an initial condition to the transient event to limit MCPR values. The inspectors found that the evolutions which potentially could have bypassed the TSV/TCV scram function, although not specifically identified as an initial condition for the analysis, were bounded by the AOO's specified in Chapter 15 of the UFSAR. The design basis transient analysis was not required to consider the specific evolutions

identified which would bypass the scram function because these plant configurations were considered infrequent occurrences. Chapter 15 of the UFSAR specified that these types of occurrences do not have to be analyzed unless shown to be limiting.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Radiological Observations (71750)

The inspectors during routine tours of the plant site verified radiological controls. Observed radioactive material storage areas were appropriately labeled. Access to selected high radiation areas was verified to be under positive control or locked as required. Personnel wore appropriate dosimetry and protective clothing for several activities observed by the inspectors. Access and egress activities from the radiological controlled area were observed with no deficiencies observed. The inspectors noted that egress activities continued to be time consuming as a result of noble gas and the associated daughter products created by fuel pin leaks.

S1 Conduct of Security and Safeguards Activities

S1.1 Security Performance (71750)

On December 24, the inspectors observed the release of a contract vehicle from the protected area (PA) to the owner controlled area (OCA). The PA fence was in the process of being moved to incorporate several structures previously in the OCA into the PA. The transition included modification of the vehicle site access (VSA). Despite the ongoing configuration changes in the VSA, search activities and escort activities were conducted satisfactorily. Adequate security force coverage was observed and control of the vehicle by security was maintained at all times.

F8 Miscellaneous Fire Protection Issues (92904)

F8.1 (Closed) VIO 50-325(324)/98-05-04: Fire Protection Procedure. The inspectors verified completion of the proposed corrective actions. These actions included reinforcement of procedural requirements and management expectations. The deficient procedure was revised. The licensee performed an assessment of the fire protection program. From this review the licensee identified deficiencies in the technical adequacy and implementation of fire protection program procedures. These deficiencies and those actions proposed to correct these items were presented to the NRC by the licensee in a meeting on September 17, 1998. These program deficiencies are scheduled to be completed in 1999.

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 11. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Brittain, Manager Security
E. Quidley, Manager Maintenance
J. Gawron, Manager Nuclear Assessment
M. Herrell, Training Manager
K. Jury, Manager Regulatory Affairs
J. Keenan, Site Vice President
B. Lindgren, Manager Site Support Services
J. Lyash, Plant General Manager
N. Gannon, Manager Maintenance
G. Miller, Manager Brunswick Engineering Support Section
R. Mullis, Manager Operation

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations Program
IP 71714:	Freeze Protection
IP 71750:	Plant Support Activities
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering
IP 92904:	Followup - Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Closed

50-325(324)/97-13-01	VIO	Failure to retain TS Required QA Record (Section O8.1)
50-325(324)/98-05-02	IFI	Adequacy of RSDP Procedure and Training (Section O8.2)
50-325(324)/98-10-04	IFI	TSV/TCV Scram Function Operability (Section E8.1)
50-325(324)/98-05-04	VIO	Fire Protection Procedure (Section F8.1)