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

Report Nos.: 50-325/85-09 and 50-324/85-09

Licensee: Carolina Power and Light Company
411 Fayetteville Street
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: April 1 - 30, 1985

Inspectors: P K Hardin for 5/22/85
L. W. Garner, Resident Inspector Date Signed

P K Hardin for 5/22/85
T. E. Hicks, Resident Inspector Date Signed

Approved by: P K Hardin for 5/22/85
P. E. Fredrickson, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, unannounced inspection entailed 244 inspector-hours on site in the areas of surveillance, maintenance, operational safety verification, ESF System walkdown, in-office Licensee Event Reports review, independent inspection and plant transients.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*E. Bishop, Assistant to General Manager
*C. Blackmon, Superintendent - Operations
L. Boyer, Director - Administrative Support
J. Chase, Manager - Operations
*G. Cheatham, Manager - Environmental & Radiation Control
R. Creech, I&C/Electrical Maintenance Supervisor (Unit 2)
*C. Dietz, General Manager - Brunswick Nuclear Project
W. Dorman, QA - Supervisor
*F. Emerson, Project Engineer - Onsite Nuclear Safety - BSEP
*K. Enzor, Director - Regulatory Compliance
W. Hatcher, Security Specialist
R. Helme, Director - Onsite Nuclear Safety - BSEP
*B. Hinkley, Manager - Technical Support
W. Hogle, Engineering Supervisor
J. Holder, Manager - Outages
P. Hopkins, Director - Training
*P. Howe, Vice President - Brunswick Nuclear Project
*L. Jones, Director - QA/QC
R. Kitchen, Mechanical Maintenance Supervisor (Unit 2)
*W. Murray, Senior Engineer - Nuclear Licensing Unit
J. Moyer, I&C/Electrical Maintenance Supervisor (Unit 1)
D. Novotny, Senior Regulatory Specialist
G. Oliver, Manager - Site Planning & Control
*J. O'Sullivan, Manager - Maintenance
*R. Poulk, Senior NRC Regulatory Specialist
W. Tucker, Engineering Supervisor
V. Wagoner, Director - IPBS/Long Range Planning
J. Wilcox, Principle Engineer - Operations
B. Wilson, Engineering Supervisor

Other licensee employees contacted included technicians, operators, and engineering staff personnel.

*Attended exit interview.

2. Exit Interview

The inspection scope and findings were summarized on May 6, 1985, with those persons indicated in paragraph 1 above. Meetings were also held with senior facility management periodically during the course of this inspection to discuss the inspection scope and findings. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Maintenance Observations (62703)

Maintenance activities were observed and reviewed throughout the inspection period to verify that activities were accomplished using approved procedures or the activity was within the skill of the trade and that the work was done by qualified personnel. Where appropriate, limiting conditions for operation were examined to ensure that, while equipment was removed from service, the Technical Specification requirements were satisfied. Also, work activities, procedures and work requests were reviewed to ensure adequate fire, cleanliness and radiation protection precautions were observed, and that equipment was tested and properly returned to service. Acceptance criteria used for this review were maintenance procedures and technical specifications.

Outstanding work requests that were initiated by the operations group for Units 1 and 2 were reviewed to verify that the licensee is giving priority to safety-related maintenance and not allowing a backlog of work items to permit a degradation of system performance.

Selected portions of the following work activities were witnessed and/or reviewed:

- Plant Modification 82-287N, O and P; Replacement of air operated isolation valves and flow switches on instrument lines with excess flow check valves

- Plant Modification 82-219P; CUNI Replacement of RHR heat exchanger 1A outlet piping

- Work Request and Authorization (WR&A) #2-E-85-2061; Unit 2 Radwaste effluent radiation monitor D12-RR-R001A

- WR&A # 2-M-85-1435; Standby Liquid Control 2B accumulator flange leak

- WR&A # 2-E-85-2261; RCIC, E51-PDT-N017 operating erratic

- WR&A # 2-M-85-1389; Reactor cooling recirculating A pump discharge valve, B32-F031A, packing leak

No violations or deviations were identified.

4. Surveillance Testing (61726)

The surveillance tests were analyzed and/or witnessed by the inspector to ascertain procedural and performance adequacy. The completed test procedures examined were analyzed for embodiment of the necessary test prerequisites, preparations, instructions, acceptance criteria and sufficiency of technical content. The selected tests witnessed were examined to ascertain that current, written approved procedures were available and in use, that

test equipment in use was calibrated, that test prerequisites were met, system restoration was completed and test results were adequate. The selected procedures conformed to applicable Technical Specifications, received the required administrative review and were performed within the surveillance frequency prescribed.

Acceptance criteria for evaluating surveillance tests were 10 CFR, ANSI N18.7 and Technical Specifications.

The inspectors witnessed and/or reviewed portions of the following test activities:

- MI-03-3H1 Standby Gas Treatment Heat Detection System
- MI-03-15G1 Steam Jet Air Ejector Radiation Monitor
- MI-03-3E1 Containment Atmosphere Control System, Temp. Switch
- MI-03-3A21 HPCI Turbine Exhaust High Pressure Trip Pressure Switch
- MI-03-3A38 Noninterruptible Instrument Air Pressure Switch
- MI-03-3A59 HPCI Auxiliary Oil Pump Pressure Switch
- MI-03-3A12 HPCI Pump Suction Low Pressure Switch
- MI-03-3A15 RCIC Minimum Flow Bypass Valve Pressure Switch
- MI-03-3A18 RCIC Turbine Steam Exhaust Pressure Trip
- MI-03-9A2 ECCS High Level RCIC, HPCI Trip

One area of concern was identified relative to implementation of independent verification requirements.

A NRC order confirming implementation of operating activities as specified by NUREG 0737, Clarification of TMI Action Plan Requirements item I.C.6, discusses the proper method for returning to service safety related equipment. Specifically, it addressed the need for and documentation of independent verification during the conduct of routine or corrective maintenance on equipment important to safety.

The licensee conducts routine maintenance testing using Periodic Tests (PTs) and Maintenance Instructions (MIs). The PTs contain appropriate signature blocks in the body of the procedures for those areas requiring independent verification. Instrumentation listed in Technical Specifications are normally covered by PTs. However, the MIs do not generally contain these steps. Several instruments which are important to safety (could potentially render Technical Specification required equipment inoperable if not properly returned to service) are calibrated by MIs.

Administrative procedures are written to provide guidance for those procedures and evolutions which do not contain individual signature blocks. A concern arises because of an apparent contradiction between two administrative procedures involving the controls of wire removals and reterminations on important to safety instruments. One procedure, Administrative Pr edure Volume I, Book I, Section 11.7 requires independent verification f fety related systems (this procedure provides a list of those systems) eturning this equipment to service. The technician is required to ent all switch, valve and other manipulations of the equipment in accordance with this procedure. Administrative Instruction 59 is the other procedure which discusses the controls necessary for wire removal. When more than 2 wires are lifted, independent verification is required. This requirement is deleted however, when there are two or less wires lifted. The instrumentation being discussed falls into the two wire category.

The implementation of these two procedures has caused inconsistency in applying the controls that are necessary when returning these instruments to service. The use of AI-59 alone has allowed the equipment in the above mentioned category to be returned to service without the necessary independent verification. No examples have been identified which rendered equipment inoperable.

The other problem is the lack of documentation when operational tests of equipment are utilized in lieu of second verification. If a foreman is aware of a functional test which is to be performed, he sometimes fails to indicate on the work package that this is a substitute for second verification.

These areas of concern were addressed to plant management for evaluation. The resident office will track the progress of the licensee's corrective action under IFI 325, 324/85-09-01.

No violations or deviations were identified.

5. Operational Safety Verification (71707, 71710)

The inspector verified conformance with regulatory requirements throughout the reporting pericd by direct observations of activities, tours of facilities, discussions with personnel, reviewing of records and independent verification of safety system status. The following verifications were made:

- Control Room Observations - The inspector verified that control room manning requirements of 10 CFR 50.54, and the Technical Specifications were being met. Control room, shift supervisor, clearance and jumper/bypass logs were reviewed to obtain information concerning operating trends and out of service safety systems to insure that there were no conflicts with Technical Specifications Limiting Conditions for Operations. Direct observations were conducted of control room panels.

Instrumentation and recorder traces important to safety were verified operable. Safety parameters were verified to be within Technical Specification limits. In addition, the inspectors observed shift turnovers to verify continuity of system status was maintained and, also, questioned shift personnel relative to their awareness of plant conditions. The inspectors verified the status of selected control room annunciators and were assured that the control room operators understood the reasons why important annunciators were lit. In addition, periodic verifications were conducted to insure that corrective actions, if appropriate, were initiated and completed in a timely manner.

- ESF Train Operability - Operability of selected ESF trains was verified by insuring that; each accessible valve in the flow path is in its correct position; each power supply and breaker, including control room fuses, are aligned for components that must activate upon initiation signal; removal of power from those ESF motor-operated valves, so identified by Technical Specifications, is completed; there was no leakage of major components; there was proper lubrication and cooling water available; a condition did not exist which might prevent fulfillment of the train's functional requirements. In addition, instrumentation essential to system actuation or performance was verified operable by observing on-scale indication and proper instrument valve lineup, if accessible. The 2A Core Spray System for Unit 2 was verified operable.

- Radiation Protection Controls - The inspectors verified that the licensee's health physics policies/procedures are being followed, including area surveys, RWP's, posting and calibration of selected radiation protection instruments in use.

- Physical Security Plan - The inspectors verified that the security organization is properly manned and that security personnel are capable of performing their assigned functions, that persons and packages are checked prior to entry into the protected area (PA), vehicles are properly authorized, searched and escorted within the PA, persons within the PA display photo identification badges, personnel in vital areas are authorized, that effective compensatory measures are employed when required, and that security's response to threats or alarms appears adequate.

- Plant Housekeeping - Observations relative to plant housekeeping identified no unsatisfactory conditions.

- Containment Isolation - Selected containment isolation valves were verified to be in their correct positions.

- Radioactive Releases - The inspectors verified that selected liquid and gaseous releases were made in conformance with 10 CFR 20 Appendix B and technical specification requirements.

No violations or deviations were identified.

6. Followup of Plant Transients and Safety System Challenges (93702)

During the period of this report, a followup on plant transients and safety system challenges was conducted to verify the cause; ensure that safety systems and components functioned as required; corrective actions were adequate; and the plant was maintained in a safe condition.

One event occurred of significance. On April 16, 1985, at 2353 hours the E1 Emergency Bus tripped during the performance of battery 1A-2 equalizing charge. The No. 1 Diesel Generator auto-started and loaded on the bus. Unit 1 was in Condition 5 (Refueling with no core alterations in progress), Unit 2 was at 100% power. The loss of the bus caused, on Unit 1 a ½ Group 1 isolation signal, ½ RPS trip, RWCU isolation, auto start of the Standby Gas Treatment System, Group 6 and 8 isolations and an auto start of the No. 1 Diesel Generator. All safety systems functioned properly. The normal lineup was restored 23 minutes later.

The initial cause was thought to have been associated with the equalizing battery charge which was in progress. After reviewing the available data, this was determined not to be correct. The ensuing investigation reviewed many possible causes including the interlocks associated with E1 bus breakers, grid voltage transients, operator errors, any ongoing maintenance or testing, equipment failures, short circuits and grounds. Electrical tests were performed on April 23 and 24, 1985, which included visual inspections and meggering of various motor windings. No component/equipment failures were found and no human errors could be identified. The licensee has concluded that the cause is indeterminable and no further investigation is warranted.

No violations or deviations were identified.

7. Special Battery Inspection (61726, 62703)

The inspectors reviewed the operation and maintenance of various plant battery systems including:

a. 125/250 volt station batteries.

b. The fire pump diesel starting 24 volt batteries.

c. 24/48 volt batteries supplying standby power to neutron monitoring and process radiation monitoring.

d. High Pressure Coolant Injection System (HPCI) and Control Building CO2 fire extinguishing system standby batteries.

The inspector references included:

a. IEEE 450, 1980

b. Gould NCX-1200 Technical Manual

c. Gould NAX-600 Technical Manual

d. Technical Specifications

The following plant procedures were reviewed for technical accuracy, compliance with existing requirements and incorporation of industry standards and vendor recommendations:

- PT-12.6 Breaker Alignment Surveillance
- PT-17.1P Plant Batteries, Weekly Surveillance
- PT-17.2P Plant Batteries, Monthly Surveillance
- PT-17.3P Plant Batteries, Quarterly Surveillance
- PT-17.4 125 Volt Plant Batteries Load Discharge Test
- PT-17.5 Carbon Dioxide Fire Extinguishing System Standby Batteries
- PT-17.6 125 Volt Plant Batteries Capacity Test
- PT-17.7P Fire Pump Diesel Starting Batteries, Weekly Surveillance
- PT-17.8P Fire Pump Diesel Starting Batteries, Monthly Surveillance
- PT-17.9 Fire pump Diesel Starting Batteries, 18 Month Surveillance
- MI-10-6G Plant Batteries
- MI-10-6G1 Carbon Dioxide Fire Extinguishing Standby Batteries
- MI-16-004 Plant Electrical D.C. Battery Removal and Installation
- MI-10-2J Equalizing Plant Batteries
- MI-10-2J2 24/48 Volt Batteries

The following items were noted.

a. 125/250 Volt Plant Station Battery Equalizing Charge

(1) Reference (b) recommends charging the batteries at the specified voltage until the charging current has tapered and stabilized (no reduction for 3 hours), then charge for the minimum specified time

(74 hours) until the lowest cell voltage ceases to rise. The manual stated that monitoring of cell voltages should be started during the latter 10% of the time period to determine the lowest cell. MI-10-2J requires no data to be taken or criteria to be met other than a minimum time of 74 hours prior to securing the charge.

(2) The vendor manual recommends that an equalizer charge be conducted whenever the pilot cell's or any cell's corrected specific gravity is more than 10 points below its full charge value. Per the vendor manual the station batteries have a nominal specific gravity of 1.215 at 77 degrees F. The licensee's minimum criteria at which an equalizing charge is required is 1.195. This is 20 points below the full charge value and hence 10 points more than that recommended by the vendor. Technical Specifications allow the corrected specific gravity to decrease to less than 1.180 before the battery is considered inoperable.

(3) IEEE STD. 450-1980 and the vendor manual state that equalizer battery charges should be given when specific gravity of an individual cell drops more than .010 (10 points) from the average at the time of the inspection. The licensee has no similar practice, but a quarterly equalizing charge is conducted as part of the preventative maintenance program.

(4) The vendor manual also recommends conducting an equalizing charge if any cell voltage drops .04 volts below the average of all cells. The licensee has no similar requirement.

Conclusion: The licensee's method for conducting an equalizing charge varies from that recommended in the vendor manual with respect to the initiation of the charge and the acceptance criteria for securing the charge. The licensee is evaluating their procedures with respect to the conduct of equalizer charges. The inspectors will track the progress of this evaluation and the subsequent determinations by IFI 325, 324/85-09-02.

b. Diesel Generator Fire Pump Starting Battery Visual Inspection

Technical Specification 4.7.7.1.3.c(1) requires at least once per 18 months, the licensee visually verify that the cell plates show no indication of physical damage or abnormal deterioration. Considering the construction of the batteries (black cased 12 volt D.C. batteries similar to marine batteries), it is nearly impossible, based on normal inspection techniques (i.e., inspection mirror), to visually verify the integrity of the entire cell plate. The NRC is evaluating the adequacy of this surveillance requirement on a generic basis.

c. Carbon Dioxide Fire Extinguishing System Standby Batteries.

IEEE Std.-1980 Appendix A stated that specific gravities should be corrected for electrolyte level and temperature. Pt. 17.5, the weekly test of these standby batteries records specific gravity but does apply any corrections to the reading. The Fire Extinguishing system itself is required to be operable per Technical Specification 3.7.7.3 but there are no listed surveillance requirements associated with the batteries nor are the batteries listed anywhere in Technical Specifications or the FSAR. The batteries serve only as a standby power supply for the system.

The following batteries were visually inspected for proper installation, operation and physical condition:

a. 125/250 volt station batteries. No deficiencies were identified.

b. 24/48 volt batteries. A large amount of sediment is in the bottom of the cells. The 24B-1 battery cells appear to have more than normally expected amount of gassing. All the 24/48 volt batteries are 13 years into a vendor stated lifetime of 15 years. The licensee is currently evaluating a replacement strategy.

c. Diesel Generator Fire Pump starting batteries. No deficiencies were noted.

No violations or deviations were identified.

8. Onsite Review Committees

The inspectors attended various Plant Nuclear Safety Committee (PNSC) meetings conducted during the period. The following items were verified;

- Meetings were conducted in accordance with Technical Specification requirements regarding quorum membership, review process, frequency and personnel qualifications.

- Meetings minutes were reviewed to confirm that decisions/recommendations were reflected and follow-up of corrective actions were completed.

No violations or deviations were identified.