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

Report Nos. 50-325/86-12 and 50-324/86-13

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

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

Facility Name: Brunswick 1 and 2

Inspection Conducted: April 1-30, 1986

Inspectors: P S Mellen 5/16/86
W. H. Ruland Date Signed

FOR P. S. Mellen 5/16/86
L. W. Garner Date Signed

Approved by: P C Fredrickson 5/20/86
P. E. Fredrickson, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine safety inspection involved 158 inspector-hours on site in the areas of maintenance observation, surveillance observation, operational safety verification, service water leak in Unit 2 reactor building, diesel generator fuel oil leaks, and onsite review of licensee event report (LER).

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted - Licensee Employees

P. Howe, Vice President - Brunswick Nuclear Project
C. Dietz, General Manager - Brunswick Nuclear Project
T. Wyllie, Manager - Engineering and Construction
J. Holder, Manager - Outages
E. Bishop, Manager - Operations
L. Jones, Director - Quality Assurance (QA)/Quality Control (QC)
R. Helme, Director - Onsite Nuclear Safety - BSEP
J. Chase, Assistant to General Manager
J. O'Sullivan, Manager - Maintenance
G. Cheatham, Manager - Environmental & Radiation Control
K. Enzor, Director - Regulatory Compliance
B. Hinkley, Manager - Technical Support
A. Hegler, Superintendent - Operations
W. Hogle, Engineering Supervisor
W. Tucker, Engineering Supervisor
B. Wilson, Engineering Supervisor
R. Creech, I&C/Electrical Maintenance Supervisor (Unit 2)
R. Warden, I&C/Electrical Maintenance Supervisor (Unit 1)
W. Hatcher, Supervisor - Security
R. Kitchen, Mechanical Maintenance Supervisor (Unit 2)
R. Poulk, Senior NRC Regulatory Specialist
D. Novotny, Senior Regulatory Specialist

Other licensee employees contacted included construction craftsmen, engineers, technicians, operators, office personnel, and security force members.

Other Organizations

General Electric

E. Scott, Operations Engineer

2. Exit Interview (30703)

The inspection scope and findings were summarized on May 7, 1986, with the general manager and the vice-president. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during the inspection.

3. Followup on Previous Enforcement Matters (92702)

Not inspected.

4. Maintenance Observation (62703)

The inspectors observed maintenance activities and reviewed records to verify that work was conducted in accordance with approved procedures, Technical Specifications, and applicable industry codes and standards. The inspectors also verified that: redundant components were operable; administrative controls were followed; tagouts were adequate; personnel were qualified; correct replacement parts were used; radiological controls were proper; fire protection was adequate; quality control hold points were adequate and observed; adequate post-maintenance testing was performed; and independent verification requirements were implemented. The inspectors independently verified that selected equipment was properly returned to service.

Outstanding work requests and authorizations (WR&A) were reviewed to ensure that the licensee gave priority to safety-related maintenance.

The inspectors observed/reviewed portions of the following maintenance activities:

86-ADWY2	Testing of Recirculation Discharge Valve Bypass Valve, 2B32-F032B
86-AGYU1	Battery 2A2 Preventive Maintenance
86-AKAX1	Reinstallation of Service Water Snubber 2SW-106SS211
86-AKNY1	Containment Atmospheric Control Suppression Pool Purge Bypass Valve, 2CAC-V22, Breaker Repair
86-AMXU1	Cable Replacement for Main Steam Line Drain Primary Containment Isolation Valve, 2B21-F019
86-APGR1	Steam Jet Air Ejector Monitor Chamber Draining
MI-10-6G	Plant Batteries
MI-10-32	Steam Jet Air Ejector Sample Chamber Drain Procedure
MI-10-500	Lubrication Schedule for Daily, Weekly, Biweekly and Monthly
MI-10-525H	Operational Inspection of Rotating Equipment
MI-16-21	Motor Operated Valve Stroking Procedure

While performing a walkdown of the diesel generators on April 25, 1986, the inspector observed that 3 out of the 4 diesel generators had governor oil levels at or above the top of the sight glass. Because the level could not be determined and a caution sticker on the outside of the governors indicated that they should not be filled above a gasket level which appeared

to correspond to the top of the sight glasses, the condition was reported to the operations superintendent. Maintenance personnel examined the levels and determined that they were not above the gasket level. Subsequent discussions between the licensee and the vendor indicated that the oil level should be adjusted within the sight glass band while the diesel is operating. The licensee successfully started each diesel and adjusted the oil levels in accordance with the vendor's recommendations. After the diesels were shut down, oil drained into the reservoirs such that the sight glass was completely filled. The licensee is considering discontinuing their daily check of the governor oil level and substituting verification of proper oil level just prior to shutting down the diesel either after the normal monthly required start or anytime the diesel is started. This is an Inspector Followup Item, (325/86-12-01 and 324/86-13-01), Licensee To Modify Procedures To Adjust Diesel Generator Governor Oil Level While Engine Is Running.

No violations or deviations were identified.

5. Surveillance Observation (61726)

The inspectors observed surveillance testing required by Technical Specifications. Through observation and record review, the inspectors verified that: tests conformed to Technical Specification requirements; administrative controls were followed; personnel were qualified; instrumentation was calibrated; and data was accurate and complete. The inspectors independently verified selected test results and proper return to service of equipment.

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

E&RC-1130	Monthly Determination of Sodium Pentaborate Solution In Standby Liquid Control Tank
2MST-BATT11R	18 Month Surveillance on Battery Bank 2A-1
MST-CAC25Q	Containment Atmospheric Control - Remote Shutdown Panel Drywell Pressure Channel Calibration
MST-LKDET12M	Leak Detection System - Primary Containment Atmosphere Radiation Monitor Channel Functional
MST-RGE15Q	Radioactive Gaseous Effluent - Reactor Building Vent Monitoring Channel Functional
MST-RPS26M	Reactor Protection System - High Drywell Pressure Trip Unit Channel Calibration
PT-1.1.12P	Main Steam Line Radiation Channel Alignment and Functional Test
PT-1.14B	Equipment and Instrument Channel Checks

PT-14.2.1	Single Rod Scram Insertion Times Test
PT-15.6	Standby Gas Treatment System Operability
PT-80.1	Reactor Pressure Vessel Hydrostatic Test

The inspector witnessed sampling and analysis of the Unit 1 Standby Liquid Control (SLC) Tank on April 24, 1986. Visual inspection of the tank revealed that the clarity was good, though the bottom of the tank showed some deposition, the sparger lines were readily visible and the tank outlet was free of debris. These observations were made after the tank had been air sparged for approximately 1 1/2 hours. Reinspection on May 1, 1986, with no air sparging for 7 days, yielded the same observations. However, the inspector found a small piece of opaque plastic wrap (about hand size) floating in the tank. The licensee removed it from the tank. The source of the foreign material or when it got into the tank could not be determined. The licensee will determine permanent corrective action to preclude recurrence after they complete their evaluation of the source of the foreign material. Licensee inspection of the Unit 2 SLC tank showed no signs of foreign material.

Analysis of the sample was performed in accordance with procedure E&RC-1130, Revision 6. During the procedure the technician misinterpreted step 8.9 which states, "Titrate the solution to pH 7.0 within 0.05 ml with 1.15N NaOH (or equivalent)." The technician interpreted the step to mean within 0.05 of pH 7.0, whereas, the step had intended to determine the amount of NaOH to within 0.05 ml. The technician's approach was conservative. However, five attempts had to be made before the higher tolerance could be obtained. In addition, two equations were provided by which the boron percent could be determined. One equation contained the separate factors and conversion constants. The other equation was derived from the former by combining all the constants and known variables into a single multiplier. The more simple form of the equation is normally utilized. However, while attempting to use the more complicated form, the decimal place repeatedly came out in the wrong place. On closer examination of the derivation of the equation, it was found that a factor of 100 appeared to be in the denominator where it should have been in the numerator. The sample results were verified to be within technical specification limits. The licensee is considering clarifying the above steps to avoid possible future misunderstandings.

During PT-14.2.1, control rod 34-31 was found to require approximately 5 seconds to bleed the air off the solenoid valves prior to the scram valve actuation and beginning of rod movement. The solenoid valves were replaced with rebuilt valves and the rod successfully tested. The inspector witnessed disassembly of the malfunctioning solenoid pair. The air passages were clear. The gaskets and diaphragms were in good condition. There was no evidence of foreign material inside the valves. Cause of the problem could not be determined. The inspector has no further questions.

No violations or deviations were identified.

6. Operational Safety Verification (71707)

The inspectors verified conformance with regulatory requirements by direct observations of activities, facility tours, discussions with personnel, reviewing of records and independent verification of safety system status.

The inspectors verified that control room manning requirements of 10 CFR 50.54 and the technical specifications were 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 ensure 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 to verify operability and that parameters were within Technical Specification limits. The inspectors observed shift turnovers to verify that continuity of system status was maintained. The inspectors verified the status of selected control room annunciators.

Operability of a selected Engineered Safety Feature (ESF) train was verified by insuring that: each accessible valve in the flow path was in its correct position; each power supply and breaker, including control room fuses, were aligned for components that must activate upon initiation signal; removal of power from those ESF motor-operated valves, so identified by Technical Specifications, was completed; there was no leakage of major components; there was proper lubrication and cooling water available; and a condition did not exist which might prevent fulfillment of the system's functional requirements. However, leakage was discovered on the diesel generator fuel oil system as discussed in paragraph 8 below. Instrumentation essential to system actuation or performance was verified operable by observing on-scale indication and proper instrument valve lineup, if accessible.

The inspectors verified that the licensee's health physics policies/ procedures were followed. This included a review of area surveys, radiation work permits, posting, and instrument calibration.

The inspectors verified that: the security organization was properly manned and security personnel were capable of performing their assigned functions; persons and packages were checked prior to entry into the protected area (PA); vehicles were properly authorized, searched and escorted within the PA; persons within the PA displayed photo identification badges; personnel in vital areas were authorized; and effective compensatory measures were employed when required.

The inspectors also observed plant housekeeping controls, verified position of certain containment isolation valves, checked selected clearances, and verified the operability of onsite and offsite emergency power sources.

No violations or deviations were identified.

7. Service Water Leak in Unit 2 Reactor Building (93702)

On April 30, 1986, with Unit 2 in day 151 of a scheduled 196 day modification and refueling outage, a salt water leak from the service water system flooded portions of the reactor building. At approximately 2:30 a.m., a number of reports were received from personnel in the building that water was running on the floor and down stairwells. Operations and fire brigade members responded. The licensee found a blown gasket on a 4 inch flange downstream of the "D" Residual Heat Removal (RHR) Service Water (SW) pump. This loop of the service water system was secured to stop the leakage. The 350 psig pump discharge pressure had been sufficient to spray water into the overhead, onto surrounding equipment and into pipe chases. The leak and resultant runoff into lower elevations resulted in portions of the southern and eastern sections of the 50 ft., 20 ft. and -17 ft. elevations becoming contaminated. The -17 ft. elevation Division II RHR and the Division II core spray rooms had between 1 and 2 inches of water on the floor. The Division II motor control center (MCC) 2XB tripped due to salt water forming a current path between breaker stabs in the E41-F079 (High Pressure Coolant Injection (HPCI) System vacuum breaker) valve breaker compartment. The 2XB MCC is located on the 20 ft. elevation below the RHR SW pumps. The 2XF MCC had to be de-energized due to arcing in the G31-F031 (Reactor Water Cleanup (RWCU) System orifice bypass valve) valve breaker compartment. The 2XF MCC is located across from the RHR SW pumps. Some lighting was lost in the building when the disconnect from the 2R6 lighting distribution panel blew apart when water seeped into it.

Prior to and after the event, the reactor was in cold shutdown. The Division II RHR system was in the shutdown cooling mode at the time of the event. Prior to tripping of the 2XB MCC, preparations were made and some valves were repositioned to support switchover of shutdown cooling to Division I of RHR. The loss of 2XB MCC resulted in lost position indication of the Division II RHR valves. The Division II RHR pump was unaffected and remained in service until the loop swap was completed approximately 2 hours after the start of the flooding. Because core decay heat was small, reactor heatup was of little concern during the event. Both divisions of core spray were available and unaffected.

Cleanup commenced that morning and building activities were returned to normal by the next day. The inspector observed drying out and inspection activities of safety related panels and MCC's. The licensee is preparing a report on the event. The inspectors will review the report when it is issued and update next month's report as appropriate.

No violations or deviations were identified.

8. Diesel Generator Fuel Oil Leaks (71707)

On April 8, 1986, the inspector observed that fuel oil was dripping from the Diesel Generator No. 2 fuel oil pump suction line at the rate of 12 to 15 drops per minute. The licensee determined that a small vent on top of a strainer was partially open. The vent was closed and the leak stopped. The

reason for the condition could not be determined. The inspector had looked at this line approximately a month earlier. There was no sign of leakage at that time. On April 9, 1986, the operations manager identified another small leak, approximately 1 drop per 5 minutes, on a fuel oil suction line fitting. This was tightened and the leak stopped. The licensee started the motor driven fuel oil pump for post maintenance testing. From the time the vent was closed until the motor driven fuel oil pump was started, the fuel oil system was partially drained. Because it could not be determined when the leak began, it is not possible to determine how much was drained. Approximately 6 feet of pipe is between the strainer and check valves in the fuel oil lines. At the observed rate, it would take about 50 hours to drain that section. Review of the auxiliary operator, control operator and shift foreman logbooks contain no entry that the diesel was started during this time period. For the leak to drain more of the fuel oil system would require one or more check valves to weep by. The inspector believes that under design basis conditions the diesel would start since the shaft driven positive displacement fuel oil pump, even with the fuel oil lines completed drained, is capable of delivering fuel to the injectors. Technical Specification 4.8.1.1.2.a.4 requires that at least every 31 days on a staggered basis each diesel generator start from ambient condition and accelerate to at least 514 rpm in less than or equal to 10 seconds. The diesel normally starts and comes to full speed between 9 and 10 seconds. The starting time of a diesel can be increased by starting it with a partially drained fuel oil system. Because the amount of drainage was not and can not now be determined and no action was taken to determine the effect on the diesel starting time, it is now not possible to say whether or not the starting time was affected. The inspector discussed with plant management the need for the plant staff to be more aggressive in questioning the operability of degraded plant equipment.

On April 28, 1986, while Diesel Generator No. 2 was operating, the inspector observed a 2 to 3 drop per minute leak on the fuel oil return line. The leakage was originating from under an abrasion pad on the rubber reinforced hose connecting the injector fuel suction header to the piping returning unused fuel oil to the day tank. Near the pad was a trouble tag dated June 7, 1983, which read, "Fuel oil line shows extreme wear." After the report period, on May 7, 1986, the licensee replaced the hose. Inspection revealed that three grooves had been worn in the hose such that the metal inner liner was visible. Apparently, flexing of the hose during diesel operation had resulted in further weakening of the hose such that fuel oil weeped out.

These items, and the need for increased sensitivity of station personnel toward maintaining equipment in the best possible condition, was discussed with plant management.

No violations or deviations were identified.

9. Onsite Review of Licensee Event Report (92700)

The listed Licensee Event Report (LER) was reviewed to verify that the information provided met NRC reporting requirements. The verification included adequacy of event description and corrective action taken or planned, existence of potential generic problems and the relative safety significance of the event. Onsite inspections were performed and concluded that necessary corrective actions have been taken in accordance with existing requirements, licensee conditions and commitments.

(OPEN) LER 1-86-09: On March 26, 1986, at 8:19 a.m., Unit 1 automatically scrammed while at 100% power. The licensee determined that the scram was caused by a momentary high level signal from transmitters C32-LT-N004A and C, which tripped the main turbine and feedpump turbines. The licensee could not determine the exact cause of the momentary high level signal until after the start-up on April 2, 1986. The licensee had attached strip chart recorders to several level instruments, including LT-N004A and C, which share a common variable leg, and LT-N004B. The licensee noticed during start-up that control rod motion caused level perturbations on LT-N004A and C strip charts. These perturbations existed only during rod motion. Apparently the pressure changes seen at the Control Rod Drive (CRD) system pump discharge were coupled across the CRD system differential pressure (d/p) transmitters for drive water and cooling water d/p, then through the core plate d/p transmitter N032, which is connected to the standby liquid control system penetration to measure core d/p. The pressure fluctuations were then further transmitted from N032 to N035, the jet pump d/p transmitter, since N032 and N035 share the below core plate pressure tap. The fluctuations were transmitted across N035 to the common variable leg of the GEMAC level transmitters N004A and N004C. Thus, the pressure fluctuations were transmitted from the CRD pumps, through 3 transmitters in series along with the associated piping in and out of the drywell, to the common variable leg of the GEMAC transmitters.

The licensee discovered that a freeze seal had been relaxed on CRD pump 1A about two hours prior to the scram. The licensee believes that the scram most likely occurred when the freeze seal relaxed, causing a large pressure spike to travel the path described above, causing a momentary high level for N004A and C, scramming the reactor.

Three safety related level instruments were attached to the same variable leg as N004A and C: N017B-1, N017B-2, and N042. These instruments provide signals to: scram reactor on low level 1 (166 inches), trip High Pressure Coolant Injection turbine, and Automatic Depressurization System permissive at 166 inches, respectively. No evidence exists to indicate that these instruments reached their trip setpoint as a result of the pressure spike. The licensee has isolated N035 to prevent any further hydraulic coupling. The licensee states that they are evaluating the problem to find a permanent fix.

The inspector reviewed the post-scram review package, walked down the applicable instrument lines, reviewed strip chart records and interviewed personnel regarding the event. This LER will remain open pending the inspector's review of the licensees permanent fix.

No violations or deviations were identified.