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

Report Nos.: 50-325/85-11 and 50-324/85-11

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: May 1-31, 1985

Inspectors: A K Hardin for 6/12/85
W. H. Ruland, Senior Resident Inspector Date Signed

A K Hardin for 6/12/85
L. W. Garner, Resident Inspector Date Signed

A K Hardin for 6/12/85
T. E. Hicks, Resident Inspector Date Signed

Approved by: P. E. Fredrickson 6/13/85
P. E. Fredrickson, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, unannounced inspection entailed 215 inspector-hours on site in the areas of maintenance observation, surveillance testing, operational safety verification, ESF System walkdown, onsite event followup, independent inspection, refueling activities, onsite review committee, and LER review.

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
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
M. Jones, Acting Director - Onsite Nuclear Safety - BSEP
R. Kitchen, Mechanical Maintenance Supervisor (Unit 2)
*W. Martin, Acting Director - ONS
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
*J. Parlier, Principle Engineer - BESU
*R. Poulk, Senior NRC Regulatory Specialist
W. Tucker, Engineering Supervisor
V. Wagoner, Director - IPBS/Long Range Planning
*J. Wilcox, Principal Engineer - Operations
B. Wilson, Engineering Supervisor
*T. Wyllie, Manager - Engineering and Construction

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 31, 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. 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 protection, cleanliness and radiation protection precautions were observed, and that equipment was tested and properly returned to service.

Outstanding work requests were reviewed to verify that the licensee was 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:

- Work Request and Authorization (WR&A) # 2-E-85-2297, Connection of strip chart recorders to 2-E51-PDT-N017 and 18 instruments to monitor performance

- WR&A #2-M-85-1200, Residual Heat Removal (RHR) system 2-E11-F015B stem leak

- WR&A #2-M-84-7819, RHR valve 2-E11-F025B flange leak

- WR&A #2-M-84-7514, RHR valve 2-E11-F015B clutch will not stay engaged

- WR&A #2-M-84-7244, RHR Pump 2D shaft seal leak

- Preventative Maintenance Routine 0-E-85-1280, Maintenance Instruction MI-03-1A4, RHR flow transmitter N013, 15A, 15B.

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 were reviewed for 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 was calibrated, that test prerequisites were met, system restoration was completed and test results were adequate; and that the selected procedures met the applicable Technical Specifications and that they received the required administrative review.

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

- Performance Test (PT) A21.2, Primary Containment Isolation System Main Steam Line Low Pressure Response Time Test
- PT 1.5.3.P, Neutron Monitoring Source Range Monitor Channel Function Test
- PT 2.1.2.PC, High Pressure Coolant Injection (HPCI) System Turbine Steamline Low Pressure Calibration and Channel Functional Test.
- PT A4.1, Reactor Core Isolation Cooling (RCIC) Steamline High Differential Pressure Channel Calibration
- 2MST-HPCI 21M, HPCI Steam Line Break High Differential Pressure Trip Unit Channel Calibration
- 2MST-RCIC 21M, RCIC Steam Line Break High Differential Pressure Trip Unit Channel Calibration
- 2MST-CS-21M, Core Spray (CS) Pump Discharge Pressure High Instrument Channel Calibration for Automatic Depressurization System
- PT 15.4, Secondary Containment Integrity Test
- PT 10.1.1, RCIC System Operability Test Flow Rates at 1000 psig.

No violations or deviations were identified.

5. Operational Safety Verification (71707)

The inspector verified conformance with regulatory requirements throughout the reporting period 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 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 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 to verify operability and conformance with Technical Specifications. The inspectors observed shift turnovers to verify that continuity of system status was maintained. The inspectors verified the status of selected control room annunciators.

- Radiation Protection Controls - The inspectors verified that the licensee's health physics policies/procedures were 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 was properly manned and that 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; effective compensatory measures were employed when required; and security's response to threats or alarms was 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. ESF System Walkdown (71710)

Operability of a selected ESF System 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. 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 Unit 2 Core Spray System 2A and the Unit 1 Standby Liquid Control System were verified operable.

7. Onsite Event Followup (93702)

Standby Gas Treatment System and Secondary Containment Design Deficiency:

On May 14, 1985, the licensee determined that the design of the standby gas treatment (SBGT) system logic was such that automatic SBGT initiation as described in section 7.3.2.1.1 of the updated Final Safety Analysis Report

would not occur after a temporary loss of power to the logic unless the operator took manual action to reset the logic. The need to reset the SBGT system after restoration of power is annunciated. Annunciator procedure UA-12 windows 2-6 and 3-6, STANDBY GAS SYS A(B) RB NOT RESET, directs the operator to reset the system. However, the fact that this condition is contrary to the Design Basis Accident (DBA) analysis which assumes the SBGT system will auto-start after a simultaneous recirculation loop break and loss of offsite power was not known until May 14.

The design of the system was such that high temperature in the prefilter compartments of the SBGT trains would trip the system fans. To prevent restart after a high temperature, a seal-in feature was provided. However, a loss of power to the temperature switch seal-in relay coil will also cause the seal-in to actuate. This seal-in is the feature which must be manually reset. Hence, under DBA assumptions, a loss of all offsite power would result in temporary interruption of power to the SBGT logic until the diesel generators start and load the emergency buses. This interruption of power would be of sufficient length to cause actuation of the above seal-in; i.e., lockout of any auto-start signal until manual reset is accomplished.

Until a permanent modification can be made, a jumper has been installed to bypass the seal-in. The permanent fix is expected to be installed on Unit 2 (which is at power) by early July and on Unit 1 prior to completion of the current refueling outage. The modification will install a time delay relay contact around the reset switch to allow automatic reset of the circuit upon restoration of power.

In addition to the effect on the SBGT system, the design error also prevented the anticipatory auto isolation of the reactor building supply and exhaust dampers on high drywell pressure or low vessel level until resetting was manually accomplished. These dampers receive auto isolation signals from the SBGT logic. The ability of these dampers to close on detection of high radiation in the reactor building vent was not affected.

The licensee attributed the problem to personnel error during original development of design specifications for the system. The licensee plans no further corrective action than the above described modification.

No violations or deviations were identified.

8. Independent Inspection Effort (92706)

Abnormal TLD readings due to hydrogen sulfide gas interference:

Background: As part of the Unit 1 outage which started March 30, 1985, a circulating water system piping cleanup was in progress. During power operation this system pumps cooling water from the intake canal through the main condenser and out into the discharge canal. Work was in progress to remove decaying marine life from the piping's inner surface. Because of the presence of methane and hydrogen sulfide gases, the use of forced ventilation and portable gas monitors was required for personnel safety.

Personnel wore TLD's since the work area was located inside the protected area. However, the area was not a radiation area as defined by 10 CFR 20.202(b)(2).

Event Description: On May 6, 1985, a contract employee working this job reported to the dosimetry office to check out of the protected area. As part of the normal checkout procedure, dosimetry personnel administered a whole body count and read the individual's TLD. The whole body count showed no uptake. However, two lithium borate elements of the TLD read abnormally high for the associated work site (i.e., one read 13.5 Rem), and the two calcium sulfate elements of the TLD read normal. Two co-workers were checked with similar results.

Beta-gamma and airborne surveys were then performed at the work site. No abnormal readings were obtained. In addition, no radiography had been performed in any area adjacent to the work site. An investigation was begun to determine the cause of the unusual readings. This included lab testing of the TLDs, exposing them to different gases in a controlled manner.

Results: TLD's exposed to hydrogen sulfide gas had abnormally high readings on the lithium borate elements and normal readings on the two calcium sulfate elements. This effect was temporary. After reading and annealing, the TLD's would respond normally to gamma radiation.

The TLD's were Panasonic Model UD-802. The exact reaction between the hydrogen sulfide and lithium borate which causes thermoluminescence is unknown.

Corrective actions:

a. The TLD's at this work site were placed in airtight plastic containers to prevent contact with the gas.

b. Panasonic has been asked to investigate the problem.

c. Notification to other utilities through the use of "Note Pad" was conducted.

d. Investigation results will be incorporated into dosimetry procedures.

No violations or deviations were identified.

9. Refueling Activities (60710)

During the licensee's preparation for core alterations, the inspectors verified that surveillance testing required by the Technical Specifications and the licensee's fuel handling procedures had been completed. Also, the following items were verified:

- Secondary containment integrity was established and a program was in place to maintain it operable.

- Good housekeeping was maintained in the refueling area.

- Staffing during refueling was in accordance with Technical Specifications and approved procedures.

- Refueling interlocks were properly tested and operable.

- Direct communications had been established between the refueling floor and the control room.

- Radiological controls in the refueling area, including precautions against foreign objects falling into the reactor vessel, were satisfactory.

- Current revisions to approved procedures were being used and followed.

No violations or deviations were identified.

10. Onsite Review Committee (40700)

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.

11. Review of Licensee Event Reports (92700)

The listed Licensee Event Reports (LERs) were 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. These reports are considered closed.

LER 2-83-03, Suppression pool level out of specification due to the operation of the HPCI system and the safety relief valves.

LER 2-83-04, Reactor Protection System relay had melted insulation around its coil. The problem was caused by overheating of the relay.

LER 2-83-07, HPCI isolated because HPCI steam line tunnel high temperature Primary Containment Isolation System (PCIS) instrument was mistakenly given a test signal due to instrument mislabeling.

LER 2-83-12, Control air pressure for D/G #3 was 35 psig versus normal 100 psig due to crud accumulation in the air moisture drain trap filter

LER 2-83-15, Reactor Recirculation Pump A tripped concurrent with the receipt of an ATWS High Pressure/Low Level trip alarm.

LER 2-83-16, Reactor Building Exhaust Ventilation High High alarm and Group Six isolation due to failure of relay K2 in D12-K609A.

No violations or deviations were identified.