



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

Report Nos.: 50-324/84-35 and 50-325/84-35

Licensee: Carolina Power and Light Company  
 411 Fayetteville Street  
 Raleigh, NC 27602

Docket Nos.: 50-324 and 50-325

License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection Conducted: December 31, 1984

|              |   |               |
|--------------|---|---------------|
| Inspectors:  | <u>A. K. Hardin for</u>   | <u>2/6/85</u> |
|              | D. O. Myers, Senior Resident Inspector                                  | Date Signed   |
|              | <u>A. K. Hardin for</u>   | <u>2/6/85</u> |
|              | L. W. Garner, Resident Inspector  | Date Signed   |
|              | <u>A. K. Hardin for</u>   | <u>2/6/85</u> |
|              | T. E. Hicks, Resident Inspector   | Date Signed   |
| Approved by: | <u>P. E. Fredrickson</u>  | <u>2/6/85</u> |
|              | P. E. Fredrickson, Acting Section Chief<br>Division of Reactor Projects | Date Signed   |

SUMMARY

Scope: This routine safety inspection involved 237 inspector-hours on site in the areas of surveillance, maintenance, operational safety verification, ESF system walkdown, in-office Licensee Event Reports review, independent inspection, plant transients, followup on previous inspection findings and review of onsite committee.

Results: Of the areas inspected, one violation was identified in one area (inadequate operations procedure, paragraph 6).

## REPORT DETAILS

## 1. Licensee Employees Contacted

- \*A. Bishop, Manager - Technical Support
- C. Blackmon, Superintendent - Operations
- J. Boone, Engineering Supervisor
- L. Boyer, Director - Administrative Support
- \*J. Chase, Manager - Operations
- \*G. Cheatham, Manager - Environmental & Radiation Control
- J. Cook, Senior Specialist - Environmental & Radiation Control
- R. Creech, I&C/Electrical Maintenance Supervisor (Unit 2)
- C. Dietz, General Manager - Brunswick Nuclear Project
- W. Dorman, QA - Supervisor
- \*K. Enzor, Director - Regulatory Compliance
- W. Hatcher, Security Specialist
- \*R. Helme, Director - Onsite Nuclear Safety - BSEP
- \*M. Hill, Manager - Administrative & Technical Support
- B. Hinkley, 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)
- 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
- C. Treubel, Mechanical Maintenance Supervisor (Unit 1)
- L. Tripp, Radiation Control 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 December 28, 1984, 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.

3. Licensee Action on Previous Enforcement Matters (92702)

(Open) Unresolved Item (URI) 325/84-31-02. Section 6.5.1 of the updated FSAR states that the standby gas treatment system (SGTS) operates automatically to maintain a negative pressure in the Reactor Building in response to the following signals.

- (1) High Radiation in the Reactor Building Ventilation Exhaust.
- (2) High Pressure in the Drywell.
- (3) Low Reactor Water Level.
- (4) Manually Initiated Signal from the Control Room.

Any of these signals initiates the following sequence of events:

- (1) Close the isolation valves and stop the fans in the Reactor Building ventilation system.
- (2) Start both SGTS blowers simultaneously.
- (3) Reposition the isolation valves in the SGTS, if necessary.

In addition, the FSAR states that the duct system connecting the Reactor Building area to the SGTS filter trains contain two low leakage dampers per train. The dampers open automatically upon a Reactor Building isolation signal from the radiation monitor.

Reviews by the inspector revealed that, apparently, the Unit 1 SGTS Trains A and B suction and discharge dampers (B, C, E and G-BFVRB), do not have any automatic open capability. These valves are controlled administratively by procedure in the open position. The Unit 2 dampers do have the automatic actuation capability. The inspectors are continuing to review this matter in that new information has raised a question concerning whether the FSAR described dampers, are in fact, the same as the inspector identified dampers.

4. Review of Licensee Event Report (92700)

- a. (Closed) LER 1-84-25 and 2 supplements - Unit 1 reactor scram and Unit 2 reactor protection system actuation resulting from lightning strike during inclement weather activity preceding Hurricane Diana.

An onsite inspection was performed and concluded that the necessary corrective actions had been taken and that regulatory responses made were in accordance with existing requirements, license conditions and commitments. This report is considered closed.

- b. (Closed) 1-SR-84-5 - Fourteen Day Special Report per Technical Specification 3.3.5.3 and Pursuant to Technical Specification 6.9.2.

The report discussed a missed surveillance (18 months channel calibration) for unit drywell radiation monitors due to personnel error involving data entry into the surveillance tracking/scheduling system.

Procedure RCI 2.4 was modified to include backup verification of data entry by regulatory compliance personnel. This report is considered closed.

5. Operational Safety Verification (71707, 71710)

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 determinations were made:

- Control Room Observation - The inspectors 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 to verify operability and that parameters were within Technical Specification limits. In addition, the inspectors observed shift turnovers to verify that 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 T.S. 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.
- Radiation Protection Controls - The inspectors verified that the licensee's health physics policies/procedures are being followed, including area surveys, RWPs, 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. Onsite Followup of Events at Operating Power Reactors (93702)

At 1736 hours on December 7, 1984 while conducting a reactor startup on Unit 1 following a six week outage for recirculation pipe weld inspections, the reactor scrambled from approximately 1% of full power. Operators took proper corrective actions and all safety systems functioned properly. The post trip investigation (OI-22) was conducted following the scram and the cause was determined to be due to an upscale trip on intermediate range monitors (IRM's), (120% scale). Apparently a water hammer event had caused oscillations in the various NSSS parameter instruments (reactor vessel level, main steam flow and main steam high radiation monitors), such that a neutron flux increase had occurred causing the IRM upscale trips. (Reviews conducted later determined that a neutron flux increase was not the cause).

The water hammer resulted because the main steam lines were not adequately drained after being placed in a condenser cooling line up, which was used during the previous shutdown. condenser cooling is used for reactor cooling during shutdown when the residual heat removal system (RHR) is undergoing maintenance. The evolution involves raising reactor vessel water level high enough to allow draining water down the main steam line through the bypass valves to the condenser. Due to the main steam line piping arrangement which bends upward several feet at one point and causes a water seal, the drain lines, which are specified to be opened in the startup procedure (GP-02), were not located to drain this portion of pipe. To fully drain the system, two additional valves had to be opened (MVD-F034, 35) allowing the 3,000 gallons of residual water to be drained to radwaste. Operating procedure (OP-32), which controls the condenser cooling evolution, did not address opening these valves. This procedure (OP-32) inadequacy constitutes a violation of Technical Specification 6.8.1.a, which requires the licensee

to establish implementing procedures recommended in Appendix "A" of Regulatory Guide 1.33 NOV. 1972. Item D.12 of the guide specifies that procedures are required for draining and starting up the main steam system. Contrary to this, OP-32 did not adequately drain the main steam line, resulting in a water hammer and reactor scram (Violation 325, 324/84-35-01).

A walkdown and inspection of the main steam line piping was conducted and no damage identified. The unit was restarted early on December 8, 1984. When the reactor reached approximately 4% power and 165 psi, the unit scrambled again due to an upscale trip on IRMs E and H. Operators took proper corrective actions and all safety systems functioned properly. The OI-22 post trip investigation conducted in this case identified an electrical problem with the IRMs and SRMs and the subsequent startup was delayed until corrective actions were taken.

During several days of trouble shooting, electrical noise was determined to be the cause of IRM and SRM spiking. Several power supply cable ends were repaired and one welding machine, which was turned on, was found to be grounded to a cable tray. It was subsequently disconnected. One pre-amplifier - instrument drawer cable for IRM E, was interchanged with one from another IRM (A) which was already inoperative (for a separate reason), because of high noise along the original IRM E cable. Several power supply filter capacitors were also replaced. After completing these corrective actions, noise levels were reduced substantially on IRM's and SRM's to a point where they could again be considered operable. A startup of the unit was conducted on December 10, 1984.

After a review of all the data available, it appears that several pieces of information may have alerted operators that the IRM's were unusually sensitive to electrical noise and that this caused the initial IRM spikes and scram (December 7, 1984) rather than an actual neutron flux increase.

- a. According to a computer printout of events, two IRMs (B and G) caused half scrams at approximately 1737 and 1739 hours respectively, one minute after all rods were fully inserted.
- b. Two IRMs (E and H) received the initial upscale trips, while the others did not.
- c. With the reactor at approximately 212°, with very little pressure (less than 5 psi) and only about four inches of level oscillation, a neutron flux spike (from approximately 30% to 120% of scale) due to the water hammer was unlikely.
- d. During the reactor restart (December 8, 1984), IRMs and SRMs were oscillating greater than usual.

These matters have been discussed with plant management who are examining ways in which to enhance the scram review process. This is an inspector followup item (IFI) 325, 324/84-35-02. In addition, onsite nuclear safety is conducting their own review of the event and the OI-22 reporting process.

This particular trip review process appeared to follow procedure (OI-22), since the initial report was completed before the unit was restarted and the involved operation's personnel completing the review felt assured that a reasonable cause had been identified.

7. Surveillance Testing (61726)

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 attested conformance with applicable Technical Specifications, they appeared to have received the required administrative review and they apparently were performed within the surveillance frequency prescribed.

The inspector employed one or more of the following acceptance criteria for evaluating surveillance tests.

10 CFR  
ANSI N18.7  
Technical Specifications

8. 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 as follows:

Maintenance Procedures  
Technical Specifications

Outstanding work requests that were initiated by the operations group for Unit 1 and 2 were reviewed to determine 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.

No violations or deviations were identified.

9. 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 determine the cause; ensure that safety systems and components functioned as required; corrective actions were adequate; and the plant was maintained in a safe condition.

On November 27, 1984, at 1023 hours, Unit 2 experienced a turbine stop valve closure scram from 98% of full power. Reactor pressure which peaked at 1032 psig was controlled by the turbine bypass valve control system. Water level was controlled by the condensate-feedwater system. Excluding the recirculation system, all systems responded as expected. Recirculation pump B had to be manually run back to minimum speed when the automatic feature failed to actuate. The B pump controller reset potentiometer was found to be defective and was replaced. This component failure in no way affected the ability of the B pump to trip if an ATWS (anticipated trip without scram) event had occurred.

Investigation into the stop valve closure scram revealed that the main turbine had tripped as a result of a malfunctioning moisture separator-reheater (MSR) high level actuation switch. Apparently, the switch had actuated due to a momentary fluctuation in level and had failed to reset within the allowable time because of crud buildup which caused binding of the float mechanism. The switch was repaired.

While attempting to place the unit into shutdown cooling at 2200 hours, a reactor scram was initiated by low vessel level and a water hammer event damaged a section of the steam condensing line of the RHR system. These items are being reviewed by Region II inspectors.

No violations or deviations were identified.

10. Onsite Review Committees (40700)

The inspectors attended the regular monthly Plant Nuclear Safety Committee (PNSC) Meeting and several special PNSC meetings conducted during the inspection period.

The inspectors verified the following items:

- Meetings were conducted in accordance with Technical Specification requirements regarding quorum membership, review process, frequency and personnel qualifications;
- Meeting minutes were reviewed to confirm that decisions/recommendations were reflected and follow-up of corrective actions were completed.

No violations or deviations were identified.