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

MAY 08 1987

Report No.: 50-400/87-18

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

Docket No.: 50-400 License No.: NPF-63

Facility Name: Shearon Harris

Inspection Conducted: April 20-23, 1987

Inspector: Susan S. Adamovitz for W. J. Ross 5-7-87 Date Signed

Approved by: Susan S. Adamovitz for J. B. Kahle, Section Chief 5-7-87 Date Signed
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine unannounced inspection was conducted in the area of plant chemistry.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. L. Willis, Plant General manager
*J. R. Sipp, Manager, Environmental and Radiological Control (E&RC)
J. Leonard, Radwaste Supervisor
H. Lipa, Chemistry Supervisor, E&RC
*E. Morgan, Principal Specialist, E&RC
J. Phillips, Materials Engineer
B. Sears, Laboratory Supervisor, E&RC

NRC Resident Inspectors

G. Maxwell
*S. Burris

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on April 23, 1987, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed the inspection findings. No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Plant Chemistry (79701)

This abbreviated inspection was performed to review and evaluate the licensee's capability to operate the balance of plant and to control water chemistry in a manner that will prevent degradation of the primary coolant pressure boundary. At the time of the inspector's site visit the licensee was performing final tests prior to going commercial and achieved 100% power for the first time.

a. Balance of Plant Operation

The inspector, through an audit of chemistry control data and discussions with cognizant plant personnel, reviewed the effectiveness of the major components of the secondary coolant system during the low power and startup tests.

(1) Main Condenser

The copper-nickel alloy condenser tubes had provided a dependable barrier against inleakage of condenser cooling water into the secondary coolant. However, the closed-cycle condenser cooling system was not providing the designed level of cooling and, consequently, was affecting the use of the unit's condensate polishers - as will be discussed later. The licensee was attempting to detect and correct all sources of air leaks in an effort to reduce leakage below 5 to 10 standard cubic feet per minute (SCFM); however, this goal had not been achieved on a routine basis.

(2) Water Treatment Plant

Before plant startup the licensee had corrected the major deficiency in the plant's capability to provide pure water for the primary and secondary coolant systems; i.e., the prevention of air inleakage into water storage tanks. The inspector was informed that nitrogen spargers had been installed in these tanks so that a nitrogen blanket could be maintained as a barrier to air inleakage. However, during plant startup the need for pure water to regenerate the condensate polishers had been greater than anticipated and the resulting draw-down of water in the condensate storage tank had increased the inflow of air into this tank. Consequently, the licensee was adding hydrazine to the CST to minimize the concentration of dissolved oxygen in the water used for plant startups (through the auxiliary feedwater system).

(3) Condensate Cleanup System

The licensee's capability to provide high quality feedwater to the steam generators had been diminished during the startup period by two problems associated with the deep-bed condensate polishers. First, as predicted by the licensee (see Inspection Report 85-50, January 27, 1986) the five resin beds required regeneration very frequently during the startup period while the secondary water system was being cleaned. In an effort to prevent transport of potentially corrosive species to the feedwater the licensee was using approximately 100,000 gallons of water to regenerate each bed. The use of such large volumes of water not only strained the capacity of the water treatment plant but it exceeded the capability of the plant's liquid radwaste system to dispose of the used water. As the result, continuous full-flow polishing had not been maintained, and the purity of the feedwater and steam generator water could not be maintained at the low levels recommended by the Steam Generator Owners' Group (SGOG), as reflected in operating and chemistry procedures.

In an effort to alleviate this restriction the licensee had taken two actions: spare tanks were being used for temporary storage of waste water, and the NRC had been petitioned to allow waste water to be returned to Lake Harris, via the waste neutralization basin, without treatment when the water was free of radioactivity. This request for a change in the plant Technical Specifications would eliminate the bottleneck in the liquid radwaste system, i.e., the 35 gpm waste evaporator.

The second restriction on the use of full-flow polishing during the startup period was caused by the inefficiency of the main condenser. Because of the excessively high temperature of the condensate water the condensate cleanup system frequently had to be bypassed to protect the integrity of the resins in the deep-bed demineralizers. The inspector was informed that efforts to keep the temperature of the condensate below 130°F were often prevented because the temperature of the closed-cycle condenser cooling water was too high. This problem is expected to worsen as the ambient temperature rises during summer months.

(4) Feedwater Heater

During the initial phases of plant startup water from the feedwater heater drains and the moisture separator reheater drains had been cycled back to the hotwell for cleanup. At power levels greater than 50% these drains were pumped forward as feedwater when the cation conductivity was less than 0.4 umho/cm and total solids were less than 50 ppb. However, there had been frequent power transients below 50% power during March and April 1987 which caused increases in both solids and conductivity. From audits of data taken during a two-week period in March and during the period of this inspection it appeared that the level of purity of feedwater that is recommended by the SGOG (cation conductivity less than 0.2 umho/cm) had been attained most of the time, especially when the condensate polishers were in operation.

The inspector also addressed the chemistry of the feedwater and of the extraction steam lines during a review of the actions being taken in response to IE Notice 86-106 (see Section 5 of this report).

(5) Steam Generator Blowdown Recovery System

The inspector was informed that the electromagnetic filter and other components of the blowdown recovery train had operated efficiently during startup. Effective operation of this system will reduce the requirement for condensate makeup water and, consequently, the demand on the water treatment plant.

No violations or deviations were identified.

b. Plant Chemistry Control

The inspector reviewed the effectiveness of the various elements of the licensee's water chemistry program during the startup period and found the principal deficiencies to be in the facilities used for sampling; e.g., inoperability of inline monitoring instrumentation in the secondary sampling room and various difficulties in the operation of the primary sampling sink. Otherwise, the chemistry staff was considered to have improved its capability to monitor and control the chemistry of primary, secondary, and auxiliary systems. The chemistry staff was being maintained at a level of 23 technicians and two foremen (one of whom has assumed his responsibilities during the startup period). A permanent support group of chemists had been established, under the direction of a principal specialist, to address specific problem areas (such as the condensate polishers) and to monitor a computerized data bank of control and diagnostic parameters.

Both licensee and contract personnel were being trained in the use of atomic absorption and ion chromatographic procedures for trace levels of key chemistry variables. Finally, the licensee's quality control program was considered to be functioning in an acceptable manner.

No violations or deviations were identified.

5. IE Notice 86-106, Feedwater Line Break

The inspector discussed with cognizant personnel the licensee's actions that were being taken in response to this Notice related to a feedwater line break at the Surry Nuclear Power Plant in December 1986. The inspector was informed that the licensee was remaining abreast of activities initiated by NRC, INPO, EPRI, and the nuclear power plant industry, and this Notice was being followed by the Operating Event Feedback Group. Recommendations were being prepared that would be consistent with INPO guidance (SOER 87-3) and would address such recommended subjects as pipe material and design, fluid dynamics, and water chemistry. As part of its inline monitoring capability the chemistry staff routinely analyses pH, dissolved oxygen, and cation conductivity in such carbon steel systems as feedwater lines and drains of extraction steam lines. The licensee also has an Inservice Inspection Program that will be used to monitor carbon steel pipe that carries high pressure steam and dual phase (steam/water) flow.