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

Report No.: 50-400/89-01

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 Nuclear Power Plant

Inspection Conducted: January 9-13, 1989

Inspector: Charles A. Hughey 2/9/89
C. A. Hughey Date Signed

Approved by: John B. Kahle 2/9/89
J. B. Kahle, Chief Date Signed
Radiological Effluents and Chemistry Section
Emergency Preparedness and Radiological
Protection Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of liquid and gaseous radioactive effluents and plant chemistry.

Results: Although inoperability of several liquid radioactive effluent monitors and stack gaseous effluent flow measurement devices had continued to keep the licensee in ACTION statements of the Technical Specifications, there had been considerable progress toward permanent resolutions and fixes of these complicated problems. These issues had been identified during a previous inspection as Inspector Followup Items 88-24-01 and 88-24-02 and will remain open. No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

S. Buch, Technician, Environmental and Chemistry (E&C)
*C. Hinnant, Plant General Manager
S. Johnson, Foreman, E&C
J. Leonard, Project Specialist, Radwaste
*H. Lipa, Supervisor, E&C
*A. Poland, Project Specialist, Radiation Control
B. Sears, Foreman, E&C
*J. Sipp, Manager, Environmental and Radiation Control
E. Steudel, Principal Engineer, Special Projects
*D. Tibbits, Director, Regulatory Compliance
M. Wallace, Senior Specialist, Regulatory Compliance
E. Wills, Project Specialist

Other licensee employees contacted included construction craftsmen, engineers, and technicians.

Nuclear Regulatory Commission

*W. Bradford, SRI

*Attended exit interview

2. Licensee Action on Previously Identified Inspector Followup Items (92701)

a. (Open) Inspector Followup Item (IFI) 50-400/88-24-01: Review licensee resolution of contamination of liquid radwaste monitors.

As discussed in Inspection Report No. 88-24, contamination buildup within the sample chambers of the liquid radwaste monitors during discharges caused monitor setpoints to be exceeded during releases thereby prematurely terminating discharges. The monitors affected are listed as follows:

1) REM-01WL-3540, Treated Laundry and Hot Shower Tank Discharge

2) REM-21WL-3541, Waste Monitor Tank Discharge

3) REM-21WS-3542, Secondary Waste Sample Tank Discharge (continuous release path)

Although contamination buildup in the stainless steel sample chambers of the liquid radwaste monitors was indeed occuring during discharges, the licensee considered extremely low setpoints calculated prior to each release to be the root cause of their problem. Some buildup of contamination in the stainless steel sample

chambers cannot be avoided. The licensee indicated that forthcoming changes to the Offsite Dose Calculation Manual (ODCM) involving the addition of background counts into the setpoint calculation and increasing dilution flow to the cooling tower blow down line would permit an increase in the monitor setpoint during discharges sufficient to eliminate spurious discharge terminations.

During the inspection, all three of these Technical Specification required monitors were out of service for various reasons, placing the licensee in continuous ACTION statements of the Technical Specifications. The licensee indicated that these monitors would be back in service within several days after the inspection. This item remains open.

b. (Open) IFI 50-400/88-24-02: Review licensee resolution of flow measurement device operability in plant stacks.

As discussed in Inspection Report No. 88-25, turbulent flow problems in three out of four plant gaseous effluent stacks (Nos. 1,5 and 5a) caused by the relatively short and wide design of these stacks had prevented the licensee from accurately measuring the flow rates out of these stacks. This had placed the licensee in continuous ACTION statements of the Technical Specifications requiring periodic flow rate estimations. Previous flow modifications had been unsuccessful in restoring uniform flows to the plant stacks.

The licensee stated that, to resolve the issue, the total flow through a stack would be quantified by the summation of all individual influents into each stack. This would be applicable for stacks 1, 5 and 5a. To accomplish this, a microprocessor unit would summarize the influents for each stack by sensing the operation of the fan motors under various fan configurations. Microprocessor flow values will be determined from in situ flow measurements under various fan configurations. Plans are for the system to be installed, tested and operational by September 1989. This item remains open.

3. Temporary Radwaste Demineralizer (84750)

Plans were discussed to temporarily install a vendor supplied (Chem-Nuclear) liquid radwaste demineralization system as a one year demonstration project. This system was to be used instead of the permanently installed radwaste system to decontaminate liquid wastes prior to discharge and was very similar to a system installed at Carolina Power and Light's Robinson Nuclear Power Plant. The licensee anticipated the system to be operational by the end of January 1989.

Approximately six months into the demonstration period, the licensee planned to evaluate the system's performance and decide whether or not to continue using this system beyond the one year demonstration period.

During this period, the permanently installed radwaste system will be shutdown and placed into wet lay-up. During wet lay-up, calibrations would be maintained on essential in-line instrumentation and pumps/motors would be stroked and rotated periodically to maintain system operability. The membranes from the reverse osmosis units were to be removed and stored.

No violations or deviations were identified.

4. Steam Cycle Chemistry (79701)

The inspector reviewed chemistry data plots for October and November 1988. Steam Generator Owner's Group's Secondary Water Chemistry Guidelines were exceeded on several occasions for steam generator blowdown cation conductivity, sodium and sulfates. The major source of these impurities was most likely condensate polisher effluents. Most of these excursions occured during plant startup after the outage and subsequent to two reactor trips/restarts. These all occurred during October 1988. This highlighted the need for higher steam generator blowdown rates during plant startups.

To reduce cation conductivity and sodium levels in the blowdown during power operations, rinse times were increased after each regeneration of anion resins from the condensate polishers reducing the effluent conductivity from 300 uS/cm to less than 100 uS/cm. After depletion, mixed bed resins are transferred from each in-service condensate polisher vessel. The cation and anion resins are separated and regenerated. After regeneration and rinsing, the anion and cation resins are mixed back together and transferred to an empty condensate polisher vessel. Prior to placing back in service, the vessel is recirculated in a closed loop to less than 0.1 uS/cm to reduce contaminants thrown from the polishers. Preliminary testing indicated these techniques to be effective.

Contaminant concentration had also been occurring when steam generator blowdown lines were isolated daily for about one hour during plant calorimetric testing. To reduce this buildup, blowdown was being temporarily increased prior to blowdown isolation.

For the period reviewed in this inspection, steam generator blowdown cation conductivities ranged between 0.2 and 0.3 uS/cm, with chloride levels averaging just under 2 parts per billion (ppb). Feedwater cation conductivity averaged less than 0.07 uS/cm, with dissolved oxygen less than 0.5 ppb and sodium less than 0.1 ppb.

No violations or deviations were identified.

5. Staffing (84750)

Since the last inspection in this area, Foreman positions in the Environmental and Chemistry (E&C) group had increased from two to three.

There had been no major changes in the technician staff of 11 licensee and 11 contract employees. No turnover problems were noted.

No violations or deviations were identified.

6. Followup of Unusual Event (93702)

On December 16, 1988, during a treated laundry and hot shower tank release, a valid high radiation level trip occurred on the REM-01WL-3540 monitor. The high alarm setpoint was exceeded, automatically terminating the release. The licensee identified this incident as an Unusual Event and made the proper notifications to NRC.

The licensee stated that the cause of the alarm appeared to be settling in the tank during the discharge. Pre-release grab sample activity in the tank after pre-sampling recirculation was about 1.7 E-06 microcuries per milliliter (uCi/ml). The monitor high alarm setpoint was calculated and set at 1.55 E-05 uCi/ml with monitor background at the time normal at about 1.21 E-05 uCi/ml. The alarm and subsequent discharge isolation occurred at about 5% tank level. A post-release grab sample indicated the tank activity to be about 2.5 E-05 uCi/ml, verifying an increase in activity during the discharge. The tank had been properly recirculated prior to taking the pre-release grab sample.

To prevent reoccurrences, discharges from the treated laundary and hot shower tank were to be terminated at about 15% tank level and the tank periodically cleaned. Changes in monitor setpoint calculation methodology (see Paragraph 2.a) would also prevent unplanned discharge terminations.

No violations or deviations were identified.

7. Records Review (84750)

The inspector reviewed the following laboratory records:

a. Gross alpha composite sample analyses results for December 1988, from the plant vent stacks (1, 3a, 5, and 5a). All were found to be less than the lower limit of detection.

b. Intensity, gain, resolution, and background quality control charts for the gamma spectroscopy system for November and December 1988. System operability appeared stable for the period.

c. Quality control charts for the following laboratory instruments and analyses:

   1. Perkin - Elmer 3030B Atomic Absorption Spectrophotometer: Copper, Iron, Sodium, Lithium

   2. Perkin - Elmer Lambda 3B UV/VIS Spectrophotometer: Silica, Hydrazine

3. DIONEX 2020I Ion Chromatograph: Chlorides, Fluorides, Sulfates

The control charts were well organized and complete. Selected laboratory personnel appeared knowledgeable in their use and importance.

No violations or deviations were identified.

8. Semiannual Effluent Release Reports (84750)

The inspector reviewed the semiannual radioactive effluent release report for the period January 1 through June 30, 1988. This review included an examination of the liquid and gaseous effluent release data for this period as compared to 1987 data and to other Region II facilities. This data is summarized in the attachment to this report.

No abnormal gaseous or liquid releases were reported during the first half of 1988. No significant trends were noted in either liquid or gaseous effluents during the first half of 1988 as compared to 1987. Data values compared favorably to other Region II PWR plants.

No violations or deviations were identified.

9. Additional Dilution Water Flow (84750)

During the last inspection in this area (Inspection Report No. 88-24), the inspector and the licensee discussed the addition of piping that would supply increased dilution water flow to the circulating water blowdown line from the cooling tower make-up line, bypassing the cooling water basin and circulating water system. This additional flow was to enable the licensee to increase the setpoint points of the liquid radwaste monitors during discharges reducing the chances for inadvertent discharge terminations and to help conserve water treatment chemicals used in the circulating water system. During that inspection, construction and installation of this bypass line had not been completed.

During this inspection, the licensee indicated that the bypass line installation and initial testing had been completed. This additional line would enable the licensee to increase flow in the cooling tower blowdown line from 900 gallons per minute to almost 18,000 gallons per minute, at the maximum flow rate. Flow rates through the line had been verified during testing using a combination of make-up pump curves and various pressure/flow indicators in the system.

In order to claim this additional flow for the purpose of increasing the liquid radwaste effluent monitors setpoints and to verify system flow after it was placed into service, double flow verification was required. Two flow elements had been installed in an above-ground, u-bend section of the bypass line piping adjacent to the isolation valve for that purpose. During testing, however, the indicated flow rates of the two elements did not agree. The licensee determined that inconsistent water levels in the u-bend area caused the disagreement. Piping configuration changes would

be required to alleviate the problem. At the time of the inspection, these changes were in the design/approval process.

No violations or deviations were identified.

10. Radiation Monitoring System (84750).

The Radiation Monitoring System (RMS) was the plant-wide radiation information gathering and control system designed to provide plant personnel with current and historical measurements of radiological conditions in the plant during normal and design basis accident conditions. The system included the process and effluent radiation monitors and the airborne and area radiation monitors.

An excessive number of inputs to the system (160 total) resulted as the Harris project was reduced from a four unit to a single unit site, since the RMS was originally designed for a four unit plant. This also resulted in unnecessary personnel and resource requirements (calibrations, maintenance, spare parts, etc.) as the plant became operational.

Previous to this inspection, the licensee had formed a task force consisting of personnel from various plant disciplines to evaluate the RMS and recommend a plan to plant management to streamline the RMS by selecting certain unnecessary or redundant monitors for deletion from the system, redesignation, or other appropriate methods. This plan was formulated with various priorities taken into account such as Regulatory Guide 1.97 requirements, Techncial Specification/ODCM requirements, safety needs, and needs contributing to more efficient and safe plant operation but not necessarily required by regulations. Some examples of unnecessary monitors to be deleted were area radiation monitors in various locker rooms and a particulate and iodine monitor in the Health Physics instrument calibration room.

Previous to this inspection, the task force had formalized and recommended a plan of action to the Plant Nuclear Safety Committee and was in the initial steps of submitting change requests. Progress in this area will be followed closely during upcoming inspections.

No violations or deviations were identified.

11. Whole-body Counting

During a phone conversation subsequent to this inspection (January 30, 1989), the inspector discussed with the Manager of the Environmental and Radiation Control Group the benefits of informing visitors who require whole-body monitoring that whole-body counters calibrated for the detection of fission products will not necessarily provide accurate data for naturally occurring potassium-40.

11. Exit Interview

The inspection scope and findings were summarized on January 13, 1989, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed in detail 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.

ATTACHMENT

SHEARON HARRIS
RADIOACTIVE EFFLUENT SUMMARY

	1987	First half of 1988
No. of Abnormal Releases		
a. Liquid	0	0
b. Gaseous	0	0
Liquid Waste Released (gallons)	1.83 E+07	1.11 E+7
Activity Released (Curies)		
a. Liquid		
1. Fission and Activation Products	9.08 E-1	1.86 E-2
2. Tritium	2.48 E+2	2.40 E+2
3. Gross Alpha	2.73 E-4	2.55 E-6
b. Gaseous		
1. Fission and Activation Gases	1.71 E+3	1.44 E+3
2. Iodines	0.00 E+0	0.00 E+0
3. Tritium	0.00 E+0	0.00 E+0
4. Gross Alpha	3.15 E-6	6.55 E-8
5. Particulate (gross beta/gamma)	4.43 E-6	0.00 E+0