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

JUL 27 1992

Report No: 50-400/92-12

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: June 22 - 26, 1992

Inspector: Thomas R Decker for 7/23/92
R. P. Carrion Date Signed

Approved by: Thomas R Decker 7/23/92
T. R. Decker, Chief Date Signed
Radiological Effluents and
Chemistry Section
Radiological Protection and Emergency
Preparedness Branch
Division of Radiation Safety and
Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of organization of the Environmental and Radiation Control (E&RC) Department, the Radwaste Shipping Unit, and the Radiochemistry Section; audits; plant water chemistry; radiological effluents; information transfer between radiation monitors; unmonitored release paths; the post accident sampling systems (PASS); the Spent Fuel Pool (SFP) clean up status; Information Notice (IN) 92-34; the radiological environmental monitoring program (REMP); shipping of radwaste and spent fuel; contingencies for low level radwaste (LLW) storage facilities; and records for decommissioning planning.

Results:

The licensee's organization in the areas of Chemistry and Radioactive Waste was stable and staffed with competent personnel. (Paragraph 2)

Recent audits had improved significantly and were effective in assessing licensee programs. (Paragraph 3)

Plant water chemistry was maintained well within TS limits. (Paragraph 4)

The licensee had made good progress in efforts to put the TS radiation monitors back into service. (Paragraph 5.b)

The licensee had addressed a potential communication problem between radiation monitors. (Paragraph 6)

The licensee had taken steps to correct an installation deficiency which had allowed contaminated water to enter the ventilation system. (Paragraph 7)

The licensee had made great progress in resolving problems with the PASS. (Paragraph 8)

The clean up of SFPs C and D continues. (Paragraph 9)

Information Notice 92-34, "New Exposure Limits For Airborne Uranium and Thorium," was discussed with the licensee. (Paragraph 10)

The licensee had a good program in place to detect the effects of radiological effluents, direct radiation, etc., due to plant operations. Those operations had caused minimum impact to the environment and virtually no dose to the general public. Its results compared favorably with those of the State of North Carolina. (Paragraph 11)

The Radiation Control (RC) staff involved with the radwaste and spent fuel shipments is competent and carries out its duties in a professional manner. However, Non-Cited Violation (NCV) 91-25-01 was identified. (Paragraph 12).

The licensee continued to prepare contingencies for long-term storage of low level radioactive waste even though the operating license of the current disposal facility had been extended. (Paragraph 13)

The licensee had a good program in place for identifying, maintaining, and retrieving records required for decommissioning planning. (Paragraph 14)

REPORT DETAILS

1. Persons Contacted

Licensee Employees

N. R. Bach, Senior Specialist
A. M. Boone, Radiation Control (RC) Supervisor
D. F. Cahill, Radiochemistry Laboratory Supervisor
A. G. Cheatham, Lead Assessor, Nuclear Assessment Department
*J. M. Collins, Operations Manager
P. L. Doss, Technical Specialist
*D. Hawley, Nuclear Assessment Department (NAD)
*C. S. Hinnant, General Manager - Harris Plant
*J. L. Kiser, Radiation Control Manager
*D. P. Knepper, Nuclear Engineering Department (NED) Site Supervisor
*L. I. Loflin, NAD
*S. Mabe, NAD
*J. W. McKay, Engineering/Technical Support Manager
*T. C. Morton, Maintenance Manager
B. A. Meyer, Environmental and Radiation Control (E&RC) Manager
*C. S. Olexik, Regulatory Compliance Manager
*M. Pease, Nuclear Records Manager
*A. D. Poland, E&RC Support Manager
*A. Taylor, Project Services Manager
*D. P. Terry, Senior Specialist - Radwaste Operations
*G. E. Vaughn, Vice President - Harris Nuclear Project
*M. G. Wallace, Senior Specialist, Regulatory Compliance
*W. R. Wilson, Spent Nuclear Fuel Manager
*L. J. Woods, Systems Engineering Manager

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

Nuclear Regulatory Commission

*M. Shannon, Resident Inspector
J. Tedrow, Senior Resident Inspector

*Attended exit interview

Acronyms and Initialisms used throughout this report are listed in the last paragraph.

2. Organization (84750 and 86750)

Technical Specification (TS) 6.2 describes the licensee's organization.

The inspector reviewed the licensee's organization, staffing levels, and lines of authority as they related to the Chemistry Department, Radioactive Waste Shipping Group, and the Radiochemistry Section of the Laboratory and Facility Services Section (L&FSS) to verify that the licensee had not made organizational changes which would adversely affect the ability to control radiation exposures or radioactive material.

The Chemistry Department was part of the Environmental and Radiation Control (E&RC) Department, which was staffed by a contingent of 83 persons, including one vacancy at the time of the inspection. The organizational structure had changed modestly since the last Inspection Report (IR 50-400/92-01). A new position, that of Chemistry Manager, who reported to the E&RC Manager, had been created and filled. The two E&C Supervisors (Plant Operations and Count Room) currently reported to the Chemistry Manager rather than directly to the Plant Manager. The E&RC Technical Support Group had been reorganized into two separate entities; Technical Support for Environmental and Chemistry (E&C) and Technical Support for Radiation Control (RC). The E&C Technical Support Group was under the direction of the Chemistry Manager and consisted of four specialists and a secretary. The RC Technical Support Group was under the direction of the E&RC Support Manager and had been augmented with the addition of two specialists, one from the Plant Chemistry Operations Unit and the other from the ALARA Job Evaluation Group, and consisted of a staff of seven specialists and a secretary.

The Radwaste Shipping Section is one of four sections in the Radiation Control Operations Branch. It is composed of ten technicians and a supervisor, who reported to the Manager of Radiation Control Operations, who, in turn, reported to the E&RC Manager. In addition to preparing the normal radwaste shipments, this group was also responsible for receiving the spent fuel casks from the Brunswick and Robinson plants and assuring that they may be released from the Harris site upon removal of the spent fuel. There had been no changes in this organization since the last report.

The Radiochemistry Section was located off site at the Harris Energy and Environmental (E&E) Center. Organizationally, it was part of the L&FSS and had the responsibility of counting the environmental samples of all three Carolina Power and Light Company (CPL) nuclear power plants. The staff included the Supervisor (who reported to the Manager-L&FSS), a Specialist, a member from Health Physics Support, and six Technicians. The vacancy which existed at the time of the last inspection had been filled.

The inspector determined that staffing levels were adequate to accomplish their respective responsibilities and that the staff was knowledgeable and competent.

No violations or deviations were identified.

3. Audits (84750 and 86750)

TS 6.5.4.1 specifies the types and frequencies of audits to be conducted under the direction of the Nuclear Assessment Department (NAD). In order to evaluate compliance with the TSs and assess quality of the licensee's audit programs, the inspector reviewed an Assessment Report of an assessment of the E&RC Unit conducted March 23-27, 1992. The assessment was affected through performance-based, real-time observations; technical reviews; and interviews with plant personnel. Furthermore, data was collected under operating plant conditions involving work on both day and night shifts. The data/observations were categorized by functional area with a short description, and indicated as a strength/weakness, if appropriate. The descriptions were clearly-stated and explained the reason for a given strength/weakness. The assessment included audits of several specified areas, including the E&RC Organization, Radiological Environmental Monitoring Program (REMP), Offsite Dose Calculation Manual (ODCM), Process Control Program (PCP), and radwaste handling, packaging, and transport, and was found to be well-planned and documented, with a clearly-defined scope. It also included a description of the methods used in the course of the audit as well as conclusions which identified detailed findings of both strengths and weaknesses for management consideration. All of the data/observations were reviewed and distilled to arrive at a general evaluation for the assessment.

The effectiveness of the licensee's audit/assessment program was greatly improved since the previous inspection. The inspector concluded that the audit process was capable of identifying programmatic weaknesses and making recommendations for corrective action and that the TS audit requirements were satisfied.

No violations or deviations were identified.

4. Plant Water Chemistry (84750)

During this inspection, the Shearon Harris Nuclear Power Plant (SHNPP) operated between 95 percent and 100 percent power. The unit was in its fourth fuel cycle, with the next refueling outage tentatively scheduled to begin September 12, 1992. The inspector reviewed the plant

chemistry controls and operational controls affecting plant water chemistry since the last inspection (92-01) in this area.

TS 3.4.7 specifies that the concentrations of dissolved oxygen (DO), chloride, and fluoride in the Reactor Coolant System (RCS) be maintained below 0.10 parts per million (ppm), 0.15 ppm, and 0.15 ppm, respectively. TS 3.4.8 specifies that the specific activity of the primary coolant be limited to less than or equal to 1.0 microcuries/gram (uCi/g) dose equivalent iodine (DEI).

These parameters are related to corrosion resistance and fuel integrity. The oxygen parameter is based on maintaining levels sufficiently low to prevent general and localized corrosion. The chloride and fluoride parameters are based on providing protection from halide stress corrosion. The activity parameter is based on minimizing personnel radiation exposure during operation and maintenance.

Pursuant to these requirements, the inspector reviewed graphical daily summaries which correlated reactor power output to chloride, fluoride, and dissolved oxygen concentrations, and specific activity of the reactor coolant for the period of April 1, 1992 through May 31, 1992 and determined that the parameters were maintained well below TS limits. Typical values for DO, chloride, and fluoride were one part per billion (ppb), two ppb, and two ppb, respectively. Typical DEI values at steady-state conditions ranged from 1.1E-2 uCi/g to 6.5E-3 uCi/g.

The inspector concluded that the Plant Water Chemistry was being maintained well within the TS requirements.

No violations or deviations were identified.

5. Radiological Effluents (84750)

a. Semiannual Radioactive Effluent Release Report

TS 6.9.1.4 requires the licensee to submit a Semiannual Radiological Effluent Release Report within the time periods specified in TS 6.9.1.4 covering the operation of the facility during the previous six months of operation.

The inspector reviewed the semiannual radioactive effluent release report for the second half of 1991. This review included an examination of the liquid and gaseous effluents for the second half of 1991 as compared to those of full years 1989 and 1990 and first

half 1991 results. The data for the whole years are summarized below.

Harris Radioactive Effluent Release Summary

	1989	1990	1991
Abnormal Releases			
a. Liquid	0	0	1
b. Gaseous	1	2	0
Activity Released (curies)			
a. Liquid			
1. Fission and Activation Products	2.42E-1	7.31E-1	6.62E-1
2. Tritium	4.58E+2	7.26E+2	2.92E+2
3. Gross Alpha	0.00E+0	< LLD	< LLD
b. Gaseous			
1. Fission and Activation Products	1.15E+2	5.96E+2	8.63E+2
2. Iodines	9.47E-7	0.00E-0	0.00E-0
3. Particulates	6.56E-7	7.72E-5	4.71E-5
4. Tritium	0.00E+0	1.56E+0	8.13E-1

A comparison of the listed data for 1989, 1990, and 1991 showed no significant changes.

No unplanned releases occurred during this reporting period.

For 1991, Harris liquid, gaseous, and particulate effluents were maintained well within TS, 10 CFR 20, and 10 CFR 50 effluent limitations.

The following table summarizes solid radwaste shipments for the previous three years. These shipments typically include spent resins, filter sludges, dry compressible waste, and contaminated equipment.

Harris Solid Radwaste Shipments

	1989	1990	1991
Volume (cubic meters)	160.4	77.4	78.0
Activity (curies)	25.4	62.5	301.8

For solid radwaste, the only noted trend was that the total annual activity appeared to increase for the period reviewed.

There were no changes to the PCP, Environmental Monitoring Program, or Land Use Census during this reporting period.

One change was made to the ODCM during the current reporting period. When making a previous change to the ODCM to allow for tritium-only releases from the settling basin in support of a Primary-to-Secondary leak, an incorrect assumption was made which changed the value of the Dose Factor, D_w (which thereby resulted in a change to the Ingestion Dose Commitment Factor, A_i). Since that change, the original basis document calculation was found and shows that tritium need not be treated differently from other isotopes. The current change restored D_w and A_i to their previous values.

The inspector concluded that the Semiannual Radioactive Effluent Release Report was complete and satisfied TS requirements.

b. Out of Service Monitors

Out of service monitors were addressed in Paragraph 5.b of Inspection Report (IR) 50-400/91-22 and Paragraph 9 of IR 50-400/92-01. The inspector followed up this item with a status review to determine when the monitors were expected to be placed back in service.

- Plant Change Request (PCR) 4746, which addressed fixing process flow rate monitors FT-21WL-6119 (for the Waste Monitor Tanks (WMTs)) and FT-*1WL-6193 (for the Treated Hot Shower Tank), was closed in April when the monitors had been declared operational.

- PCR 3170, which addressed the Flow Rate Monitors for the Reactor Auxiliary Building (RAB) Vent Stack 1, Waste Processing Building Vent Stack 5, and Waste Processing Building Vent Stack 5A, had been turned over with four exceptions: procedural revisions, documentation changes, periodic maintenance specifications, and personnel training. These items were expected to be completed and the PCR closed out by the end of August, 1992.

- PCR 2290 addressed the reliability of the gas analyzers associated with the Waste Gas Decay Tanks (WGDTs). The original system was obsolete and constantly broke down. The PCR replaced the

analyzers with upgraded technology and was closed in April, when the analyzers were declared operational.

- PCR 5107 addressed modifications to the flow measurement system to correct moisture interferences which resulted in discrepancies between actual and expected flow rates of the flow rate monitor for Turbine Building Vent Stack 3A. The moisture subjected the flow velocity probe to burnout. No design change was made by this PCR. Rather, new equipment of the same type was to be installed. The new equipment was installed but broke down while testing procedures were being developed. The equipment was returned to the vendor for repair/ replacement. The equipment was expected to be returned to the site and installed in the near future, with final turnover by the end of August, 1992.

The inspector concluded that the licensee had taken positive steps in the resolution of the problem associated with its out-of-service monitors.

No violations or deviations were identified.

6. Possibility of Introduction of Erroneous Data into Safety Related Computers (84750)

The licensee's Corporate NED recommended alteration of the control configuration of the Radiation Monitoring System (RMS) based on knowledge of an actual problem experienced at another power plant. A problem was identified in which a non-safety-related processor, RM-11, malfunctioned and downloaded erroneous data to all radiation monitors (safety- as well as non-safety-related), resulting in all of the monitors being inoperable. The safety-related radiation monitors were designed to meet IEEE-279-1071 standards, including the "single failure" criteria, which requires that any single failure shall not prevent proper protective action at the system level, when required. SHNPP utilized the same design as that which had experienced the problem.

The design configuration had been approved via a revision to the Final Safety Analysis Report (FSAR) on February 4, 1987 which allowed downloading of data to, and control of, safety-related radiation monitors from the non-safety-related RM-11 computer. The change was considered to be administrative in nature, allowing for a more convenient method of database control. The change was carried out by simply changing the position of "slide switches" of the RM-80 microprocessors of the safety-related radiation monitors

to the "OFF" position. On April 22, 1992, the licensee initiated Adverse Condition Report (ACR) 92-140 and Licensee Event Report (LER) 92-04 to prevent the potential problem of downloading erroneous data by taking appropriate corrective action and to determine the root cause of the condition.

The LER determined the root cause to be an inadequate safety review of the FSAR revision by licensee personnel in 1987. The single failure criterion was not adequately considered at that time. No actual safety consequences resulted from the inadequate safety review. No failure of the RM-11 system was recorded. Corrective actions included the repositioning of the "slide switches" to inhibit the downloading of erroneous data from the non-safety-related RM-11 computer to the RM-80 microprocessors of the safety-related radiation monitors (completed on May 8, 1992), revision of the FSAR to reflect the new (corrected) configuration concerning database control, and revision of the plant procedures which are affected by the reconfiguration of the "slide switches."

The inspector reviewed the original (1987) FSAR revision, ACR 92-140, and LER 92-04 and discussed the issue with cognizant licensee personnel. The inspector was shown the switches in question and how they could be changed.

The inspector concluded that the licensee had taken prompt remedial action upon recognizing the potential consequences of the previous configuration of the radiation monitors.

No violations or deviations were identified.

7. Ventilation Ductwork Contamination (84750)

Inspection Report 50-400/92-08 identified a condition in which contaminated water had collected in ventilation ductwork. The inspector reviewed the condition, with a special interest in determining if an unmonitored pathway existed. The inspector reviewed ACR 92-169, ACR 92-172, PCR-6368, Isometric Drawings 2165-G-125S01 and 2165-G-125S02, and the Simplified Flow Diagram of the Valve Stem Leakoff System, and discussed the issue with the responsible System Engineer. The inspector then walked down the problem in the field to verify the documentation. A valve leakoff header, which was designed to collect and separate the liquid and gaseous components of valve leakoff was improperly installed and, therefore, did not function as designed. As currently installed, the header permits liquid to enter the ventilation ductwork rather than directing it into the equipment drain, as designed. The liquid which entered the header was traced to its source, the packing

gland valve leakoff line from Valve 1SI-327. Work Ticket 91-ADDW4 had been written to replace the upper valve packing (to control the leakage through the packing) with the packing gland leakoff line isolated. This work was completed on April 2, 1992. Isolation of the line precluded any leakage from draining into the valve leakoff header. Therefore, there was no water in the ventilation ductwork at the time of the inspection. The ductwork had been tagged by HP as being internally contaminated. However, when the valve was isolated, water leaked through the valve packing and overflowed the installed drip bag to the floor below. Decontamination procedures were utilized on the floor and the drip bag was modified with a hose to direct the leaking liquid into the floor drainage system for processing. Work Ticket 91-ADDW1 was written to repair the valve stem and/or packing but will not be worked until the next refueling outage, scheduled to begin in September, 1992.

PCR-6368 was initiated to resolve the header installation problem. Work on the PCR was expected to be completed by the end of August, 1992.

The inspector noted that all air from the building's ventilation system was monitored before being released from the plant vent stack. Similarly, all liquids entering the equipment or floor drainage systems were processed through the radwaste system prior to being released. Therefore, no unmonitored pathway existed.

The inspector concluded that the licensee was making satisfactory progress in resolving the condition.

No violations or deviations were identified.

8. Post Accident Sampling System (PASS) (84750)

NUREG-0737 requires that the licensee be able to obtain a sample of the reactor coolant and containment atmosphere. Furthermore, the sample must be promptly obtained and analyzed (within three hours total) under accident conditions without incurring a radiation exposure to any individual in excess of 3 and 18 3/4 rem to the whole body or extremities, respectively.

TS 6.8.4.e requires that a program be established, implemented, and maintained to ensure the capability to obtain and analyze, under accident conditions, reactor coolant, radioactive iodines and particulates in plant gaseous effluents, and containment atmosphere samples. The PASS should provide these capabilities and should enable the licensee to obtain information critical to the efforts to assess and control the course and effects of an accident.

The ability of the stripped gas isotopic results to meet NUREG-0737 acceptance criteria had been resolved at the time of this inspection. The inspector spoke to the cognizant licensee Technical Specialist responsible for the system to get a status update. The problem with the gas stripper had been its inability to maintain a constant pressure or flow. The Technical Specialist showed the inspector a sketch (SK-6161-M-2000, Rev. A, issued May 11, 1992) of the system and explained the installed modification, designed to prevent fluctuation of pressure or flow into the gas stripper due to leakage around pressure regulation valve 1SP-979. The configuration of the valves was changed. Originally, motor-operated valve (MOV) 1SP-978 was to be moved upstream of valve 1SP-979 in an effort to relieve surges and resultant by-pass leakage. PCR 6161 had been initiated to make the change. However, the initial scope of the PCR was later expanded in an attempt to control the flows of the degassifier inlet and outlet gas and liquid as well as to control pressure changes and liquid level. The expansion included the following actions:

- Relocation of flow control valve 1SP-978 to a position downstream of the degasser. This would prevent the flow control valve and pressure regulator from adversely interacting against each other.

- Relocation of dilution valve 1SP-1004 outside the PASS Panel to a location closer to the Grab Sample Dilution Panel. This would minimize any dilution water loses due to adhesion to the walls of the dilution tubing. (The total diluted sample volume is only ten milliliters.)

- Installation of a bypass line around dilution valve 1SP-1004, a small four-way valve utilized in obtaining diluted boron samples. This would allow a constant flow rate and degassifier level to be maintained when a grab is collected.

- Installation of a drag valve upstream of inlet pressure control valve 1SP-979. This would reduce the pressure spike on the inlet pressure control valve when the RCS flow was aligned to the PASS.

The installation of the PCR had been completed and minor adjustments were made to the drag valve and needle valve settings to obtain optimal flow and thereby improve the PASS operation.

Also, tests on the gas stripper had been conducted according to instructions provided in the PASS sampling procedure,

Chemistry and Radiochemistry (CRC) Procedure CRC-821, "Post Accident RCS/RHR Sampling," to determine its efficiency. Previous to the system modifications, the efficiency had been taken to be 74%, but the Technical Specialist thought that it was higher, greater than 90%. The average hydrogen stripping efficiency was determined by testing to be 96.8% +/- 2.8%.

Before the PASS can be turned over for operation, several procedures must be revised to reflect the new valve and flow configurations, to incorporate lessons learned during the testing and evaluation phases, to incorporate new methods for boron analysis, etc.

The inspector concluded that the licensee was making substantial progress in its efforts to upgrade the PASS.

No violations or deviations were identified.

9. Spent Fuel Pool (SFP) Facility (84750)

The inspector met with cognizant licensee representatives to discuss the status of the clean-up effort of the SFPs. Pool A was used for storage of new fuel as well as some spent fuel and Pool B exclusively for the storage of spent fuel from all three CPL nuclear facilities. Pools C and D were used for temporary storage of contaminated filters, scaffolding, etc.
The licensee had removed all equipment and various miscellaneous items previously stored in Pool C and filled the pool with demineralized water to maintain the water level at the same elevation as that of the Transfer Canal, thereby reducing the stress on the isolation gates between the pool and canal. The pool was then borated to a concentration of 1950 ppb to prevent a potential dilution problem with Pools A and B and the Transfer Canal in the event of a leak through the isolation gates. Pool D was filled with water and continued to serve as a temporary repository for various contaminated items, although all spent demineralizer filter canisters had been removed. Water clarity, due to undissolved solids, in Pools C and D continued to be a problem. The licensee hypothesized that this phenomenon was due to the carbon steel content of some of the items which had been stored in the pools. The licensee planned to utilize a submersible filter system to remove the undissolved solids in the D Pool and later transfer the system to the C Pool.

The licensee had observed sulfate levels in all the pools/transfer canals, except Pools C and D, which slightly exceeded those of the administrative limits, 125 ppb vs. 100 ppb, respectively. (This represented an improvement since

the last inspection when the sulfate levels were 300 ppb.) Chloride and fluoride levels were less than their limits of 150 ppm. The silica concentration was within the new administrative limit of 5000 ppb, being 2000 ppb and in an apparent state of equilibrium. The previous administrative limit was 1000 ppb and proved very difficult to maintain. The licensee suggested that the silica concentration was due to silica which leached from the boraflex matrix of the storage racks. (Boraflex is a neutron-absorbing material commonly used in the past in the design of spent fuel storage racks.) The new storage racks in Pool B were constructed using boral, a boron-aluminum matrix, thereby precluding silica leaching.

The inspector concluded that the licensee was making good progress in the cleanup of Pools C and D and that Pools A and B and the Transfer Canal were generally well-maintained.

No violations or deviations were identified.

10. Discussion of Information Notice (IN) 92-34

The inspector discussed IN 92-34, "New Exposure Limits For Airborne Uranium and Thorium," with the Chemistry Supervisor to be sure that he and his staff were cognizant of it and its implications. The IN emphasizes the two changes due to the NRC's adoption of the dose-assessment methodology recommended by the International Commission on Radiation Protection (ICRP) 26 and 30 in the new 10 CFR 20. These are significant changes in occupational exposure limits and equivalence of internal and external dose and could have great impact on licensees
that experience airborne concentrations of uranium and thorium compounds.

11. Radiological Environmental Monitoring Program (REMP) (84750)

The purpose of the REMP is to measure any accumulation of radioactivity in the environment and to assess trends, to determine whether this radioactivity is the result of operations at the plant, and to assess the potential dose to the off-site populations based on the cumulative measurements of any plant-originated radioactivity via the monitoring of specific elements of exposure pathways, and to detect unanticipated pathways for the transport of radionuclides through the environment.

a. Annual Radiological Environmental Operating Report

TS 6.9.1.3 requires that the Annual Radiological Environmental Operating Report be submitted prior to May 1 of the following year of the Report. TS 6.9.1.3

also states format and content requirements for the Report.

The inspector reviewed the Report for calendar year 1991 to verify compliance with the TSs. The Report had been submitted in compliance with TS 6.9.1.3 on April 21, 1992, and the format and contents were as prescribed by the TS. The inspector determined that the Report was in compliance with the TSs.

Approximately 900 samples of eleven different media types from indicator stations were collected, analyzed, and compared to approximately 200 control samples during the year. Detectable radioactivity attributable to plant activities was identified in four per cent of the measurements. All detectable radionuclides in the environmental samples were less than reportable levels, as defined in the TSs.

Overall, the radiological environmental data indicated that plant operations in 1991 had no significant impact on the environment or public health and safety. The only impact of the plant on the environment in its years of operation had been a slow, steady increase in the annual average tritium activity in Harris Lake from 3.4E+3 pCi/l in 1987 to 7.8E+3 pCi/l in 1991 as well as an accumulation of activation products (primarily cobalt and manganese) in bottom sediment near the cooling tower discharge point.

The Radiochemistry Laboratory at the Harris Energy and Environmental Center in New Hill, North Carolina, provides radioanalytical services for CPL's nuclear plant radiological environmental surveillance programs. The laboratory is a participant in the Environmental Protection Agency's (EPA's) cross-check program and uses its performance in the program as a major determinant for the accuracy and precision of its own analytical results. During 1991, a comparison of the laboratory's reported values with those of the EPA's known activity found 97% to be within three standard deviations. Specifically, one of 54 samples exceeded the three-sigma action level. A gross beta analysis of a water sample received in May 1991 fell outside the limit. Independent verification of the sample analyses was accomplished by reanalysis, the result of which was well within the known activity limits and, therefore, indicated a contamination problem from the beakers or planchets used in the initial sample analysis.

b. Observation of Sample Collection

The inspector reviewed Laboratory & Facility Services Section Instruction LS-ER-31, Rev. 6, "Radiological Environmental Monitoring Program for SHNPP," and accompanied a technician on his normal weekly rounds to collect samples to observe collection technique and to check the physical condition and operability of the sampling stations. Samples were taken at six stations, including: #2, #5, #26, #38, #40,and #47. They included both indicator and control stations and various combinations of media (air only, water only, and/or both, plus generally a thermoluminescent dosimeter (TLD)). Some of the stations were co-located with sampling stations of the State of North Carolina. All air sampling stations were located in areas free of tall weeds/vegetation which might interfere with the taking of a representative sample. Generally, a TLD was also placed at each of the air sampling stations; the exception being at Station #47, where none was required, per procedure. The inspector noted that all of the sampling units were within calibration and were well maintained. However, one of the water sampling stations was inoperable (due to construction at its site) and a grab sample was taken. NRC TLDs were observed at SHNPP Stations #5 and #26 (corresponding to NRC TLD Stations #13 and #22, respectively). NRC TLD #14 was observed attached to a telephone pole in Pittsboro, North Carolina. The inspector noted that the TLDs were properly located and that there was no evidence of vandalism, although comments by the technician indicated that vandalism was not uncommon despite efforts by the licensee to mitigate its effects.

The inspector concluded that the Instruction was complete and that the technician was knowledgeable, well-trained, and conducted his activities in a professional manner.

c. Comparison of State of North Carolina vs SHNPP Results

The North Carolina Division of Radiation Protection (NCDRP) entered into a contractual agreement with the NRC in May 1986 to measure the concentrations of radioactivity in the environs of three nuclear power plants within the state, including SHNPP. The principal objective of the contract is to provide reasonable assurance that environmental measurements made by NRC licensees are valid. To this end, the State of North Carolina:

- Coordinates sampling activities with those of the NRC licensees.

- Collects and analyzes environmental media samples.

- Takes appropriate action in the investigation of elevated levels of radioactivity in the environment.

- Participates in and reports results of the EPA's Intercomparison Studies Program.

- Reports the results of the State's and licensee's environmental radiological verification monitoring program.

The inspector compared several air particulate and air cartridge results as reported by the licensee to those listed in the "Report On Environmental Radiation Surveillance in North Carolina" for 1991, submitted by the North Carolina Department of Environment, Health and Natural Resources. The results compared favorably. The inspector discussed the comparison with the Radiochemistry Supervisor.

The inspector concluded that the licensee had good programs in place to monitor releases of radiological effluents. Plant operations caused minimum impact to the environment and virtually no dose to the general public.

No violations or deviations were identified.

12. Radwaste Processing and Transportation (86750)

10 CFR 71.5 (a) requires that each licensee who transfers licensed material outside of the confines of its plant or other place of use, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the regulations appropriate to the mode of transport of the Department of Transportation (DOT) in 49 CFR, Parts 170 through 189.

Pursuant to these requirements, the inspector reviewed the licensee's activities affiliated with these requirements, to determine whether the licensee effectively processes, packages, stores, and ships radioactive solid materials.

The licensee's program for the packaging and transportation of radioactive materials, including solid radwaste, was conducted by the Radioactive Waste Group within the Health Physics Department. Radwaste was processed and packaged by the Radwaste Group, including compacting contaminated

material, loading shipments, and preparing shipping documentation.

a. Radwaste Shipping Documentation

The inspector reviewed shipping logs for 1992. The logs showed that six burial shipments and fifty special, non-burial shipments were made to date (June 23, 1992). The non-burial shipments included a wide variety of items, from empty spent fuel shipping casks to samples to be counted at the E&E Center. The inspector reviewed three burial shipment packages, including D-02-92, D-04-92, and D-06-92 as well as three non-burial shipments, including S-10-92, S-26-92, and S-47-92 for completeness and compliance with the regulations. The packages documented the shipments and included items such as unique shipment and shipping container numbers, waste content and volume, total activity, analytical summary and breakdown of isotopes with a half-life greater than five years. The radiation and contamination survey results were within the limits specified and the shipping documents were being maintained as required.

b. Radwaste Shipments

Shipment of radioactive materials was the responsibility of the Radwaste Shipping Section, which prepared all shipping documents and procured the necessary disposal containers and shipping casks.

Two radwaste shipments were made during the period that the inspector was on site. The inspector observed the activities involved therein to evaluate the effectiveness of training, activities of personnel, procedures, etc. A shipment (S-47-92) of Low Specific Activity (LSA) material in the form of four containers of contaminated equipment was being sent to a decontamination center for processing. Another shipment (D-06-92) of LSA, greater than Type A material (specifically, four 17.7 ft^3 dewatered charcoal pressure vessels) destined for burial at the disposal site at Barnwell, South Carolina was observed. In reference to the shipment, the inspector reviewed Health Physics Procedure HPP-135, Rev. 0, "Utilization of the Chem-Nuclear Systems, Inc. (CNSI) 8-120B Cask," approved April 6, 1992. Its purpose was to provide procedural guidance in the handling and loading of the CNSI 8-120B shielded transportation cask to ensure compliance of such shipments with all applicable regulations and requirements. The inspector observed

part of the process of loading the boxes on the truck and noted that the technicians were checking labels and package markings on the shipping boxes prior to shipping.

Before the trucks left the site, the inspector reviewed the final survey records of both shipments and conducted a "spot check" of several of the survey points. The inspector found that the survey points checked were in agreement. The inspector concluded that the survey was properly done and well documented.

c. Non-Cited Violation (NCV) 50-400/92-12-01, Failure of Package to Meet Shipping Requirements

Upon arrival at Barnwell, South Carolina on June 24, 1992, one of the four packages containing contaminated equipment shipped as Low Specific Activity (LSA) material in Shipment S-47-92 was discovered to have two holes (approximately 4" x 4" each) in its bottom where an adapter plate had shifted during transit and its supporting "feet" had punctured the container. This condition violated the "strong, tight package" requirements of 49 CFR 173.425(b)(1). The Radiation Control Supervisor responsible for the radioactive shipping at Harris was notified that the shipment had arrived out of compliance with applicable shipping regulations. The supervisor left immediately to personally review the situation. HP survey results of the transport truck and external surface of the ruptured container showed no evidence of leakage of any radiological contents. (The adapter plate had fixed contamination in one specific part of the plate, the maximum activity being 1200 dpm/100cm^2 as per the smear results taken before packaging.) The NRC was notified of the incident on the same day. The licensee initiated ACR 92-234 to investigate the incident, determine its root cause, and take appropriate corrective actions to prevent recurrence. Specific corrective actions had not been identified by the end of the inspection but were expected to include procedure revisions and personnel training, as a minimum.

Although this represents a Severity Level V Violation, the violation is not being cited because the criteria specified in Section V.A. of the Enforcement Policy were satisfied. It is documented as NCV 50-400/92-12-01, "Failure to Address an Unplanned Release in the Semiannual Radioactive Effluent Release Report."

The inspector concluded that the Radwaste Group was staffed by competent personnel who effectively implemented the program. Although one NCV was identified, the response by the staff was timely and professional to assure that any radiological conditions resulting from the incident were mitigated.

13. Low Level Radwaste (LLW) Storage (84760)

The inspector requested an update on the contingencies being pursued by the Harris management with respect to LLW long-term on-site storage.

a. Disposal Site Status

The governor of South Carolina, the South Carolina Budget and Control Board, and the South Carolina Department of Health and Environmental Control recommended keeping the Barnwell disposal facility open to regional and non-regional radwaste generators. However, legislative action by the South Carolina General Assembly was required to extend the license and determine under what conditions and cost.

In late May, the General Assembly voted to extend the operating license for the disposal facility until December 31, 1995. During that period, the next host of the Southeast Compact will prepare a replacement facility.

b. Status of Harris Contingencies

The inspector discussed the status of the plant's long-term LLW storage contingencies and plans, especially how they may have been affected by the extension of the operation permit of the disposal site, with the E&RC Manager and other cognizant licensee personnel.

The licensee's NED had commissioned a study to review alternative storage plans. The study had been given to the corporate staff on June 23, 1992. It basically evaluated two alternatives:

- the establishment of one centralized storage facility for the three CPL nuclear sites.

- the establishment of storage facilities at each CPL nuclear site.

Corporate management was expected to make a determination in the near future about the issue.

The inspector concluded that the contingencies were appropriate and that the licensee's management was proceeding in a prudent manner.

No violations or deviations were identified.

14. Decommissioning Planning Records (84750)

10 CFR 50.75(g) requires that licensees maintain "records of information important to the safe and effective decommissioning of the facility in an identified location until the license is terminated by the Commission." Furthermore, information considered important by the Commission for decommissioning is identified as "records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site" and that the records "must include any known information on identification of involved nuclides, quantities, forms, and concentrations." Also identified are "as-built drawings and modifications of structures and equipment in restricted areas where radioactive materials are used and/or stored and of locations of possible inaccessible contamination such as buried pipes which may be subject to contamination."

The inspector requested the licensee's decommissioning records to verify compliance with the regulations. Discussions with the licensee's Nuclear Records Manager determined that the subject information was in the licensee's document control area, in the form of microfiche. Although the records were not segregated in one readily identifiable area, a computerized listing identifying such documents was available.
The inspector "exercised" the system by randomly selecting three of the computer-listed documents and going to the document control area and requesting a copy. Copies of the documents were retrieved in a timely manner and reviewed by the inspector.

The inspector concluded that the licensee had in place an effective program for identifying and maintaining records of information important to the safe and effective decommissioning of the facility in an identified location.

No violations or deviations were identified.

15. Exit Interview

The inspection scope and results were summarized on June 26, 1992, with those persons indicated in Paragraph 1. The inspector described the areas inspected and discussed the inspection results, including likely informational content

of the inspection report with regard to documents and/or processes reviewed during the inspection. The licensee did not identify any such documents or processes as proprietary. Non-Cited Violation 50-400/92-12-01 was identified and reviewed during the inspection. (Refer to Paragraph 12.) Dissenting comments were not received from the licensee.

16. Acronyms and Initialisms

ACR - Adverse Condition Report
A_i - Ingestion Dose Commitment Factor
ALARA - As Low As Reasonably Achievable
CFR - Code of Federal Regulations
Ci - curie
cm - centimeter
CNSI - Chem-Nuclear Systems, Inc.
CPL - Carolina Power and Light
CRC - Chemistry and Radiochemistry
DEI - Dose Equivalent Iodine
DO - Dissolved Oxygen
DOT - Department of Transportation
dpm - disintegrations per minute
D_w - Dose Factor
E&C - Environmental and Chemistry
E&E - Energy and Environmental
E&RC - Environmental and Radiation Control
EPA - Environmental Protection Agency
FSAR - Final Safety Analysis Report
g - gram
HP - Health Physics
HPP - Health Physics Procedures
ICRP - International Commission on Radiological Protection
IEEE - Institute of Electrical and Electronic Engineers
IN - Information Notice
IR - Inspection Report
l - liter
L&FSS - Laboratory and Facility Services Section
LER - Licensee Event Report
LLD - Lower Limit of Detection
LLW - Low Level Radwaste
LSA - Low Specific Activity
μCi - micro-Curie (1.0E-6 Ci)
mCi - milli-Curie (1.0E-3 Ci)
MOV - Motor-Operated Valve
NAD - Nuclear Assessment Department
NCDRP - North Carolina Division of Radiation Protection
NCV - Non-Cited Violation
NED - Nuclear Engineering Department
No. - Number
NRC - Nuclear Regulatory Commission
ODCM - Off-site Dose Calculation Manual

OOS - Out Of Service
PASS - Post Accident Sampling System
pCi - pico-Curie (1.0E-12 Ci)
PCP - Process Control Program
PCR - Plant Change Request
ppb - parts per billion
ppm - parts per million
RAB - Reactor Auxiliary Building
RC - Radiation Control
RCS - Reactor Coolant System
REMP - Radiological Environmental Monitoring Program
Rev - Revision
RHR - Residual Heat Removal
RMS - Radiation Monitoring System
SFP - Spent Fuel Pool
SHNPP - Shearon Harris Nuclear Power Plant
TLD - Thermoluminescent Dosimetry
TS - Technical Specification
WGDT - Waste Gas Decay Tank
WMT - Waste Monitor Tank