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

JUL 08 1987

Report No.: 50-400/87-22

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: June 15-19, 1987

Inspector: for R. E. Weddington 7/6/87 Date Signed

Accompanying Personnel: R. B. Shortridge

Approved by: for C. M. Hosey, Section Chief 7/6/87 Date Signed
Division of Radiation Safety and Safeguards

SUMMARY

Scope: This was a routine, unannounced inspection in the areas of organization and management controls, training and qualifications, external exposure control, internal exposure control, control of radioactive material, facilities and equipment, licensee's program for maintaining occupational exposures as low as reasonably achievable (ALARA), solid wastes, transportation, followup on bulletins, followup on inspection followup items and followup on Information Notices.

Results: One violation was identified: inadequate evaluation of individual exposures to noble gas.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. L. Harness, Assistant Plant General Manager
*J. R. Sipp, Manager, Environmental and Radiation Control
*D. L. Tibbitts, Director, Regulatory Compliance
*O. N. Hudson, Senior Engineer, Regulatory Compliance
*H. W. Bowles, Director, Onsite Nuclear Safety
*J. Bradley, Radwaste Supervisor
*T. Morton, Acting Manager, Maintenance
*W. R. Wilson, Technical Support Supervisor
*E. Willett, Plant Modifications Manager
*C. L. McKenzie, Principal Quality Assurance Engineer
*G. L. Forehand, Director Quality Assurance Engineer
*A. D. Poland, Project Specialist Radiation Control
*T. E. Woenker, Radiation Control Foreman
*J. L. Floyd, Radiation Control Foreman
J. W. McDuffee, Radiation Control Supervisor
J. O'Halloran, Radiation Control Foreman
B. Webster, Corporate Health Physicist
S. Croslin, Corporate Health Physics Staff
D. L. Beidelman, Senior Specialist, ALARA

Other licensee employees contacted included radiation control staff and technicians, security and office personnel.

NRC Resident Inspectors

*G. F. Maxwell, Senior Resident Inspector
S. Burris, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 19, 1987, with those persons indicated in Paragraph 1 above. The apparent violation concerning inadequate evaluation of individual exposures to noble gas was discussed in detail (Paragraph 5). Licensee representatives acknowledged the inspection findings and took no exceptions. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Organization and Management Controls (83722)

Through discussions with licensee representatives, the inspector determined that the licensee had not made organization changes which had any adverse effect on the licensee's ability to control radiation and radioactive material.

The inspector discussed with licensee representatives their system for documenting identified problems and corrective actions. Licensee Administrative Procedure (AP)-513, Radiation Safety Violation, Revision 2, October 1, 1986, described the licensee's program. Radiation Safety Violations (RSVs) were written by Radiation Control based on either their own observations or reports from other work groups. The RSVs were classified as being one of three possible severity levels and then routed to the responsible organization for a written response. The written response was sent to either the Environmental and Radiation Control Manager, the Plant General Manager or the Site Vice President for review and approval of corrective actions depending on the severity level. The inspector determined that six RSVs had been written in 1987 and that five had been written in 1986. The inspector reviewed the RSVs that had been written in the past two years. The inspector noted that only one RSV had been written concerning inadequate personnel contamination surveys and that none concerned radiation work permit or procedure violation.

Licensee representatives also stated that they had recently prohibited personnel from carrying all products that could be smoked, eaten, or chewed into the control area since they had found evidence of smoking and other prohibited activities inside the controlled area. Some personnel had reportedly been caught in the act. None of the RSVs on file documented this problem. The inspector stated to licensee representatives that it appeared that identified problems were not being documented and as a result appropriate management review of trends and corrective actions could not be performed. The licensee acknowledged the comment and stated that the emphasis in the radiation control group had been educating workers and that writing RSVs initially might have been counterproductive. The inspector stated documentation of problems and corrective actions can be performed in a constructive, nonpunitive manner. The licensee acknowledged the comment and stated that actions would be taken to ensure that problems are documented via the RSV.

No violations or deviations were identified.

4. Training and Qualifications (83723)

The inspector discussed the licensee's organization and staffing with licensee representatives and selectively reviewed the training and qualifications of various members of the radiation control staff. The inspector interviewed selected unit staff members and observed performance of selected radiation control functions. The inspector determined that acceptable training had been performed.

No violations or deviations were identified.

5. External Exposure Control (83724)

The inspector discussed with licensee representatives the organization and staffing of the dosimetry section. The section was headed by a radiation control foreman and had assigned four licensee and three contract technicians and five contract technician aides. The dosimetry office was continuously manned, with at least one technician and one technician aide on each shift.

The inspector reviewed records of occupational radiation exposure received by licensee employees and determined that individual quarterly exposures were being maintained well below the limits of 10 CFR 20.101.a. The inspector reviewed selected records of dose assignments and investigations performed during 1987 as a result of lost or damaged dosimetry or other nonroutine circumstances and determined that the licensee's followup actions had been appropriate. The inspector noted that there had been 35 thermoluminescent dosimeters (TLDs) reported lost during 1987. The licensee acknowledged that this was an excessive number and that they were evaluating means of reducing the number of lost TLDs.

The inspector reviewed the following external exposure control procedures:

DP-001, Dosimetry Issue, Rev. 4, January 7, 1987
DP-003, Personnel Exposure Investigation, Rev. 4, January 6, 1987
DP-004, Updating Dose Records, Rev. 5, January 6, 1987
DP-012, Dose Limit Extension Authorization, Rev. 4, April 6, 1987
DP-105, Operation of Automatic UD-710A/Manual UD-702E TLD Reader, Rev. 5, May 1, 1987
DP-100, Skin Dose Determination from Contamination, Rev. 1, March 27, 1987

The inspector discussed with licensee representatives their system of administrative exposure limits. The licensee had a system of incremental exposure limits which required an increasing higher level of management approval. The licensee had not yet processed any requests for exposure extensions.

The licensee processes TLDs onsite. The inspector discussed the operation and calibration of the TLD reader with licensee representatives and reviewed records of daily quality control checks and calibrations performed during 1987. The daily quality control check included reading three TLDs (background and two spiked to 500 millirem and 4000 millirem). Calibrations were performed semi-annually by personnel from the licensee's Harris Energy and Environmental Center (HEEC).

On the morning of June 17, 1987, there was a reactor scram and an operator accompanied by a health physics technician was assigned to enter containment to inspect the "C" circulating water pump. Prior to the entry, the licensee noted that the Radiation Monitoring System (RMS)

instrumentation showed that no particulate airborne radioactivity was detectable, but that noble gas activity was approximately at maximum permissible concentration (MPC) levels as defined in 10 CFR 20, Appendix B, Table 1, Column 1. The licensee also obtained a grab air sample from an RMS connection which samples the air just inside the airlock. That sample indicated that particulate and iodine airborne radioactivity were not detectable and that noble gas was present, but the concentration was a factor of 25 lower than that indicated by the RMS instrumentation. The entry lasted approximately 30 minutes, eighteen minutes of which was inside the bioshield in the vicinity of the circulating water pump.

The inspector questioned the licensee on how the exposure from noble gas, especially skin exposure, was assessed and was informed that the TLD measured noble gas exposure. After reviewing the documentation that was available on the licensee's TLD dose algorithms onsite, the inspector visited the dosimetry section at the HEEC for a more detailed explanation on the TLDs ability to measure noble gas exposure. The TLD dose algorithm used a beta correction factor based on either Thallium-204 or Strontium-90, Yttrium-90 depending on the characteristics of the radiation to which the TLD was exposed. Therefore the lowest energy beta radiation for which corrections were made was for that of Thallium-204 (approximately 0.7 MeV). Exposures due to radiations with energy levels below those of Thallium would therefore be underestimated. The licensee had performed a test with Technetium-99 (which has a maximum beta energy comparable to Xenon-133). The study indicated that the dose algorithm underestimated the skin dose from Technetium-99 by a factor of 2.6. The inspector stated that it appeared that the licensee had not adequately assessed the potential exposure during containment entries to the lens of the eye and the skin of the whole body from noble gas. Licensee representatives acknowledged that the personnel at the Harris site had a misconception concerning the capabilities of the TLD, but stated that if noble gas concentrations had been higher they would have recognized that additional assessments were necessary.

10 CFR 20.201(b) requires that each licensee make or cause to be made such surveys as may be necessary for the licensee to comply with the regulations in 10 CFR Part 20, and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present.

10 CFR 20.101(a) specifies the quarterly occupational radiation dose limits to the lens of the eyes and the skin of the whole body.

Failure of the licensee to have a program in place to evaluate potential hazards from noble gas exposure during containment entries was identified as an apparent violation of 10 CFR 20.201(b) (50-400/87-22-01).

6. Internal Exposure Control (83725)

The inspector reviewed the following internal exposure control procedures:

HPP-300, Quantitative and Qualitative Fit Testing, Revision 3, May 11, 1987

HPP-302, Selection and Issue of Respiratory Equipment, Revision 1, May 1, 1987

The licensee performed quantitative respirator fit test inside a test booth using corn oil. The inspector discussed the operation of the fit booth with licensee personnel. Records of selected fit tests were reviewed. The licensee's records indicated that respirator fit testing was being adequately performed and that individuals were achieving measured mask filtration efficiencies in excess of the published protection factors.

The inspector reviewed results of physical examinations performed to determine that individuals were medically qualified to wear respiratory protective devices. Medical evaluations were performed at least every 12 months.

The inspector discussed with licensee representatives their procedures for ensuring air quality to airline respirators and self-contained breathing apparatuses. A dedicated compressor which was tested for Grade D air quality every 3 months was used to fill air bottles. Plant instrument air was used for airline supplied respirators. Air quality was checked every 3 months and the first time a connection was made to a given outlet.

The inspector observed the operation of the licensee's equipment issue room from which respiratory protection equipment was issued. Each qualified person carried a card indicating his fit test, training and medical qualification expiration dates. A log sheet was used to document the issuance of respirators.

The inspector discussed the operation of the whole body counter with licensee personnel. The inspector also discussed whole body counting frequency and the performance of daily and other periodic performance checks. The inspector reviewed records of whole body counts performed during 1987. There had been no confirmed internal exposures.

No violations or deviations were identified.

7. Control of Radioactive Material (83726)

The inspector reviewed selected records of special and routine radiation and contamination surveys. During tours of the facility, the inspector noted the posting and control for radiation and high radiation areas. The inspector performed independent radiation surveys and noted no inconsistencies with licensee postings and survey results.

No violations or deviations were identified.

8. Facilities and Equipment (83727)

By observation and discussion with licensee representatives the inspector determined that there had been no changes to the licensee's facilities and equipment for radiation protection activities which adversely affected the radiation protection program.

No violations or deviations were identified.

9. Licensee's Program for Maintaining Exposures as Low as Reasonable Achievable (ALARA) (83728)

The inspector reviewed the following ALARA procedures:

PLP-501, ALARA Program, Rev. 2, September 16, 1986

AP-502, ALARA Subcommittee, Rev. 1, October 7, 1986

AP-509, ALARA Improvement Program, Rev. 2, September 26, 1986

AP-510, Radiation Dose Budgeting, Rev. 0, August 21, 1985

AP-514, ALARA Job Evaluations, Rev. 1, December 12, 1986

AP-520, RC/ALARA Review of Plant Procedures, Rev. 1, March 31, 1987

The inspector discussed with licensee representatives their criteria for performing preplan and post job ALARA reviews. ALARA preplans were required for jobs with exposure estimates of greater than one man-Rem, or if the exposure field was greater than 10 Rem per hour or as designated by radiation control management for special work such as steam generator entries. Post job reviews were required for all work which expended more than 10 man-Rem or which exceeded the exposure estimate by more than 2 man-Rem for those jobs with exposure estimates between one and ten man-Rem. The ALARA subcommittee also reviewed jobs whose total exposure exceeded 25 man-Rem. The inspector noted that a criteria for performing ALARA post job reviews as a percentage in excess of the estimate might be more meaningful than the 2 man-Rem criteria used by the licensee. The licensee had not yet performed any post job reviews and only three jobs had met the preplan criteria.

The licensee had an ALARA suggestion program. The licensee had received 15 suggestions in 1986 and 3 in 1987. The inspector reviewed selected suggestions and noted that the licensee had been responsive and had documented their action in response to the suggestion. A person wishing to make a suggestion had to reproduce a copy of the suggestion form from the administrative procedure and mail his suggestion to the ALARA specialist. The inspector stated that having blank copies of the suggestion form and a drop box in a conspicuous location might promote

participation in the ALARA program. The licensee acknowledged the comment and stated they would pursue putting up a suggestion box.

Licensee representatives stated that they had an ALARA awareness program which included posters and ALARA talks during monthly safety meetings. However, the licensee did not have a suggestion incentive or awards program.

As of April 1987, the total exposure at the facility was 11.178 man-Rem compared to the annual goal of 100 man-Rem. The radioactive waste goal was 6500 cubic feet and, as of the inspection, none had been shipped. The goal on area of the plant controlled as contaminated was less than 25,000 of the 461,783 square feet (5.4%) in the facility excluding containment. As of June 8, 1987, only 1517 square feet of the facility was being controlled as contaminated, which had decreased from 3021 square feet on May 4, 1987.

No violations or deviations were identified.

10. Solid Wastes (84722)

At the time of the inspection, the licensee had not yet identified or sampled any plant waste steams for 10 CFR Part 61 classification purposes. The licensee used contractor provided generic scaling factors to determine concentrations of nuclides in wastes that could not be measured onsite. Licensee representatives stated that they expected to complete their first group of waste stream samples within the next three months and would sample quarterly thereafter to build up a waste stream data base.

The licensee used an onsite vendor service to solidify waste and to dewater resins. The inspector reviewed the licensee's preparations for their first radioactive waste shipments. Waste liners of evaporator bottoms were being solidified and resin dewatering was also in progress. The inspector reviewed the licensee's process control program which had been submitted to the NRC on September 4, 1985. The inspector also reviewed the following contractor procedures:

Chem-Nuclear Systems, Inc. Process Control Program for CNSI Cement Solidification Units, Rev. T, June 17, 1986

CNSI Bead Resin/Activated Carbon Dewatering Procedure for CNSI 14-195 or Smaller Liners, Rev. F, January 13, 1987

Licensee representatives stated that they had performed a technical review of the vendor procedures, but the procedures had not been submitted to the Plant Nuclear Safety Committee for review. However they did incorporate into their approved procedures a checklist which followed the vendor process and provided various quality control checks by the licensee's radwate personnel during and after the completion of the process. The inspector determined this arrangement provided an acceptable degree of control over the vendor process.

No violations or deviations were identified.

11. Transportation (86821)

The inspector reviewed the following transportation of radioactive material procedures:

HPP-103, Curie Determination in Radioactive Material Packages, Rev. 3, May 1, 1987

HPP-111, Segregation and Packaging of Dry Active Waste, Rev. 0, May 23, 1985

HPP-113, Receipt of Radioactive Material, Rev. 2, January 27, 1987

HPP-115, Classification of Radioactive Material for Shipments, Rev. 3, May 1, 1987

HPP-116, Classification of Radioactive Waste for Burial, Rev. 1, October 3, 1985

HPP-120, Shipment of Empty Radioactive Material Packaging, Rev. 2, October 21, 1986

HPP-123, Shipment of LSA-Type A Radioactive Waste to the Barnwell Disposal Site, Rev. 2, October 21, 1986

HPP-124, Shipment of LSA-Type B Radioactive Material to the Barnwell Disposal Site, Rev. 1, October 21, 1986

HPP-125, Shipment of Type A Radioactive Material to the Barnwell Disposal Site, Rev. 1, October 21, 1986

HPP-126, Shipment of Type B Radioactive Material to the Barnwell Disposal Site, Rev. 1, October 21, 1986

HPP-127, Shipment of Highway Route Controlled Quantity Radioactive Material to the Barnwell Disposal Site, Rev. 1, October 21, 1986

HPP-133, Shipment of LSA-Type A Dry Active Waste to Scientific Ecology Group, Inc., Rev. 0, December 9, 1986

The inspector determined that the licensee did not use any radioactive material packages for which an NRC Certificate of Compliance had been issued. The licensee also did not perform any waste compaction or laundering of contaminated protective clothing onsite. Shipments had been made to an offsite contaminated laundry and provisions had been established to send compactable waste to a licensed waste broker who would reduce the volume, repackage the waste and then deliver it to the disposal site.

No violations or deviations were identified.

12. Followup on Bulletins (92703)

(Closed) 78-BU-07, Protection Afforded by Air-Line Respirators and Supplied-Air Hoods. The licensee had not made a written response to this bulletin and had not been required to do so as part of the licensing process. The inspector determined that the licensee's use of protection factors for respiratory protective devices was consistent with the information contained within the bulletin.

13. Followup on Inspector Identified Items (92701)

(Closed) IFI (50-400/86-43-09) Finish Installing High Radiation Area Doors in the Radwaste Building. Licensee representatives stated that lockable doors had been installed in areas anticipated to become high radiation areas. During tours of the radwaste building, the inspector observed lockable doors and gates at the entrances to cubicles and other areas.

14. Followup on IE Information Notices (92717)

The inspector determined that the following NRC IE Information Notices (IEN) had been received by the licensee, reviewed for applicability, distributed to appropriate personnel and that actions, as appropriate were taken or scheduled.

IEN 86-103: Respirator Coupling Nut Assembly Failures

IEN 86-107: Entry Into PWR Cavity With Retractable Incore Detector Thimbles Withdrawn

IEN 87-03: Segregation of Hazardous and Low-Level Radioactive Wastes

IEN 87-07: Quality Control of Onsite Dewatering/Solidification Operations by Outside Contractors

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

Carolina Power and Light Company
ATTN: Mr. E. E. Utley
Senior Executive Vice President
Power Supply and Engineering
and Construction
P. O. Box 1551
Raleigh, NC 27602

Gentlemen:

SUBJECT: NOTICE OF VIOLATION
(NRC INSPECTION REPORT NO. 50-400/87-22)

This refers to the Nuclear Regulatory Commission (NRC) inspection conducted by R. E. Weddington on June 15-19, 1987. The inspection included a review of activities authorized for your Shearon Harris facility. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed inspection report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

The inspection findings indicate that certain activities appeared to violate NRC requirements. The violation, references to pertinent requirements, and elements to be included in your response are described in the enclosed Notice of Violation.

It is our understanding that the problem described in the enclosed Notice of Violation concerning your thermoluminescent dosimeter (TLD) dose algorithms and assessments of exposure to noble gas may also exist at your Robinson and Brunswick facilities. Therefore, your response should also include a statement of the applicability of this finding to your other facilities and the corrective actions taken at these facilities. Your response should also include an assessment of the magnitude of previous individual exposures to noble gas which may have gone unassigned.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

The responses directed by this letter and its enclosures are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.