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

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Report Nos.: 50-325/92-43 and 50-324/92-43

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

Docket Nos.: 50-325 and 50-324 License Nos.: DPR-71 and DPR-62

Facility Name: Brunswick 1 and 2

Inspection Conducted: December 14-18, 1992

Inspectors: Elan D. Testa 1/12/93
E. D. Testa Date Signed

Elizabeth B. Pharr 1/12/93
E. B. Pharr Date Signed

Approved by: William H. Rankin 1/13/93
W. H. Rankin, Chief Date Signed
Facilities Radiation Protection Section
Radiological Protection and Emergency Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the area of occupational radiation safety and included an examination of: organization and staffing, audits and appraisals, training and qualifications, external exposure control, respiratory protection, control of radioactive materials and contamination, surveys and monitoring, and maintaining occupational exposures ALARA.

Results:

In the areas inspected, no violations or deviations were identified. Based on interviews with licensee management, supervision, personnel from station departments, records review, and observation of training and work in progress, the inspector found the radiation protection program to be managed adequately. The licensee's programs for external and internal radiation exposure controls were effective and functioning adequately to protect the health and safety of radiation workers. The inspector identified the Nuclear Assessment Department audits of the radiation protection program as being beneficial in identifying issues to improve the overall effectiveness of the program. As well, dose

reduction initiatives for maintaining personnel exposures ALARA during the current outages was identified as a program strength. Weaknesses were identified in the lack of a formalized tracking and trending mechanism in the licensee's self-identification program (Paragraph 3), and the licensee's tendency to overpost Radiation Controlled Areas (Paragraph 7.a).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*M. Bradley, Manager, Nuclear Assessment Department (NAD)
*S. Callis, On-Site Representative, Licensing
*P. Dadlani, Quality Assurance, Bechtel
*S. Floyd, Manager, Regulatory Compliance
*J. Gurganious, NAD
*T. Jones, Senior Specialist, Regulatory Compliance
*W. Leininger, Manager, Nuclear Engineering Department
*R. Morgan, Acting Vice President, Brunswick Nuclear Project
*K. Neuschaefer, NAD
*C. Robertson, Manager, Environmental and Radiation Control (E&RC)
*R. Shichter, NAD
*R. Smith, Manager, Radiation Controls, E&RC
*R. Smith, NAD
*P. Snead, Manager, Radiation Controls, E&RC
*J. Terry, Radiation Control Project Specialist
*G. Warriner, Manager, Control and Administration

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

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*H. Christensen, Section Chief, Division of Reactor Projects
*D. Nelson, Resident Inspector

*Attended the December 18, 1992 exit meeting

2. Organization and Staffing (83750)

Technical Specification (TS) 6.3.1 states that each member of the facility staff shall meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable positions, except for (1) the Manager-Environmental and Radiation Control (E&RC) who shall meet or exceed the qualifications of Regulatory Guide 1.8, September 1975.

The inspector reviewed the qualifications of the E&RC Manager against the qualifications found in Regulatory Guide 1.8 and found that the E&RC Manager more than met the requirements.

The inspector reviewed the E&RC manpower as of December 18, 1992, and found that there were 65 licensee Radiation Control personnel out of 176 personnel in the E&RC Group. The inspector noted that the licensee appeared to have adequate numbers of technical and supervisory personnel available to support the dual unit outage and the Am-241 recovery project on the 117' level of the Unit 2 Reactor Building.

No violations or deviations were identified.

3. Audits and Appraisals (83750)

The inspector discussed with licensee representatives and reviewed 1992 Nuclear Assessment Department (NAD) audits of the radiation protection program. The inspector found the 1992 audits to be more intensive and detailed than previous (1991) NAD audits. The audits appeared to be well planned and documented with valid nonconformances and items of substance relating to the program being identified. The inspector informed licensee representatives that since the NAD audits presently appeared to adequately assess the radiation protection program, they should prove beneficial in identifying radiological and technical issues for correction and E&RC program improvements.

The inspector also reviewed the licensee's program for self-identification of weaknesses related to the radiation protection program and the appropriateness of corrective action taken. The E&RC corrective action program was established for investigation, resolution, tracking, and trending of negative as well as positive work practices in the area of E&RC responsibilities. The inspector noted that from January 1, to December 14, 1992, 263 exemplary and deficient chemical or radiological events were identified and investigated. The inspector further noted that the licensee had implemented corrective actions in order to close approximately 200 of those reports.

During review of the event reports the inspector noted that the licensee had identified multiple occurrences of workers in satellite Radiation Controlled Areas (RCAs) not being on the correct Radiation Work Permit (RWP) and therefore not having proper dosimetry, not monitoring correctly after exiting the RCA, improper eating, drinking, or smoking while in a RCA, and improper or inadequate control of radioactive material (tools with fixed contamination being found outside the RCA). The inspector noted that although the safety significance of these repeat instances appeared to be minimal, the licensee did not appear to have in place, within their self-identification program, a true method for tracking and trending these occurrences and determining whether their corrective actions were indeed effective. The inspector discussed these concerns with licensee representatives. The inspector was informed that the licensee had recognized this deficiency and was in the process of incorporating a new procedure which would provide the function of tracking and trending event report issues.

No violations or deviations were identified.

4. Training and Qualifications (83750)

10 CFR 19.12 requires the licensee to instruct all individuals working or frequenting any portions of the restricted areas in the health protection aspects associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposure, and in the purpose and function of protection devices employed, applicable provisions of the Commission Regulations, individuals responsibilities, and the availability of radiation exposure data.

The inspector reviewed and discussed general and specialized training information provided to selected employees. From review of the General Employee Training (GET) manual, the inspector noted that current training provided to plant employees on an annual basis included discussion of the licensee's Fitness-for-Duty (FFD) program; plant security; personnel/industrial safety; chemical control; emergency preparedness; quality performance; fundamentals of radiation protection; and basic plant operation. The inspector noted that this general training adequately addressed regulatory exposure limits, postings and labellings throughout the plant, radiation detection instrumentation (including alarming dosimeters) and dosimetry, contamination control techniques, and personnel responsibilities for maintaining exposures ALARA.

The inspector noted that the licensee had recently identified deficiencies in their program for providing adequate GET for visitors entering and performing work activities inside the RCA. At the time of the onsite inspection the licensee was in the process of implementing detailed guidance for providing access training to visitors which would appropriately and adequately meet the intentions of 10 CFR 19.12 for the purpose of their visit.

The inspector also reviewed the course outline for HP technicians' fourth quarter continuing training which was ongoing at the time of the onsite inspection. The inspector noted that the training was scheduled for approximately four hours. The training sessions included discussion of regulatory revisions, industry events, recent revisions of plant procedures, and an overview of 10 CFR Part 20 revisions. The inspector attended the session which dealt with NRC policy concerning falsification of plant records. The inspector noted good class participation and that the material was covered comprehensively.

The inspector informed licensee representatives that the information presented during GET and/or specialized training met 10 CFR Part 19 requirements.

No violations or deviations were identified.

5. External Exposure Controls (83750)

10 CFR 20.101 requires that no licensee possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter a total occupational dose in excess of 1.25 rem to the whole body, head and truck, active blood forming organs, lens of the eyes, or gonads; 18.75 rem to the hands, forearms, feet and ankles; and 7.5 rem to the skin of the whole body.

10 CFR 20.202(a) requires each licensee to supply appropriate monitoring equipment to specific individuals and requires the use of such equipment.

10 CFR 20.202(c) requires that dosimeters used to comply with 10 CFR 20.202(a) shall be processed and evaluated by a processor accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the types of radiation for which the individual is monitored.

The inspector reviewed and discussed the licensee's dosimetry program with Corporate and site personnel. The licensee employed the Panasonic UD-802 thermoluminescent dosimetry (TLD) system. The TLDs consisted of two lithium borate elements with density thicknesses of 14 mg/cm^2 and 350 mg/cm^2 and two calcium sulfate elements with density thicknesses of 350 mg/cm^2 and 1000 mg/cm^2. The inspector was informed that a TLD analysis algorithm, based on energy levels detected, corrected the measured values to report deep and shallow dose at 1000 mg/cm^2 and 7 mg/cm^2, respectively. Algorithms were also used to measure neutron exposure. The TLDs were processed onsite by the dosimetry group, and the inspector noted that the licensee was NVLAP accredited in all eight dosimetry categories. The licensee's normal frequency for reading a TLD was quarterly. The minimum TLD sensitivity for measured gamma and neutron whole body dose was 10 millirem (mrem).

The inspector reviewed the licensee's program for evaluating beta dose to the skin. The licensee stated that the TLD algorithm included beta correction factors for adjusting measured values between deep and shallow dose elements.

The inspector reviewed the background TLDs for the first three quarters of 1992. The TLDs were used for background subtraction and correction for the personal dosimeters. The TLDs were located at the primary access point (PAP) and the secondary access point (SAP). Only the highest of the four TLD chips was reported. The values in mrem/quarter were as follows:

	1stQ	2ndQ	3rdQ
PAP	38	25.2	32.1
SAP	40.5	27.3	29.6

These values appeared to be lower due to the absence of hydrogen water chemistry and the shutdown of both of the units since April 1992.

No violations or deviations were identified.

6. Respiratory Protection Program (83750)

10 CFR 20.103(c)(2) permits the licensee to maintain and to implement a respiratory protection program that includes, at a minimum: air sampling to identify the hazard; surveys and bioassays to evaluate the actual exposures; written procedures to select, fit and maintain respirators; written procedures regarding the supervision and training of personnel

and issuance of records; and determination by a physician prior to the use of respirators and at least every 12 months thereafter, that the individual is physically able to use respiratory protective equipment.

30 CFR 11.121 requires that compressed, gaseous breathing air meets the applicable minimum grade requirements for Type 1 gaseous air set forth in the Compressed Gas Association (CGA) Commodity Specification for Air, G-7.1 (Grade D or higher quality).

The inspector reviewed for the first three quarters of 1992, supplied air system sampling records. The reviewed records indicated that for each sample location the supplied air system was sampled and verified as meeting Grade D quality air, at minimum, on a quarterly basis.

The inspector also reviewed the licensee's methods for processing used respirators. After respirators were used and collected, they were prepared for cleaning. Following washing, rinsing, and drying, the respirators were surveyed and decontaminated further, if necessary. Each respirator was then inspected for damage/defects and bagged for reissue. The inspector also noted that respirators were periodically pulled from service, leak-tested, and repaired/discarded, as appropriate.

No violations or deviations were identified.

7. Control of Radioactive Material and Contamination, Surveys, and Monitoring (83750)

10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations and (2) are reasonable under the circumstances to evaluate the extent of radiological hazards that may be present.

a. Posting and Labeling

10 CFR 20.203(f) requires, in part, each container of licensed material containing greater than Appendix C quantities to bear a durable, clearly visible label identifying the radioactive contents and providing sufficient information to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures.

During tours of the Reactor Buildings, Turbine Buildings, Waste Processing Building, Low Level Radwaste Building, Radioactive Material and Container Storage Building, and review of surveys of the Drywells, the inspector noted that radioactive material areas were appropriately posted and containers were properly labeled. However, the inspector reviewed the information contained in Information Notice No. 84-82 entitled "Guidance for Posting Radiation Areas," dated November 19, 1984, against the postings as found and noted several areas that may have been overposted.

Overposting of RCAs may cause workers to become complacent and may desensitize them to the radiation hazards of the area. This was brought to the licensee's attention and the licensee agreed to evaluate postings and make any necessary posting changes and revisions to procedure 0-E&RC-0250 titled "Posting of Areas/Materials."

No violations or deviations were identified.

b. High Radiation Areas

TS 6.12.1 required, in part, that each High Radiation Area (HRA) with radiation levels greater than or equal to 100 mrem/hr but less than or equal to 1000 mrem/hr be barricaded and conspicuously posted as a HRA. In addition, any individual or group of individuals permitted to enter such areas are to be provided with or accompanied by a radiation monitoring device which continuously indicates the radiation dose rate in the area or a radiation monitoring device which continuously integrates the dose rate in the area, or an individual qualified in radiation protection procedures with a radiation dose rate monitoring device.

Licensee Procedure E&RC -0100 lists the locked High Radiation Area doors and gates.

During tours of the Reactor Buildings, Radwaste Building and Turbine Buildings, the inspector noted that all HRAs and locked HRAs were locked and/or posted, as required. The inspector observed that all normal access gates and doors were in good physical condition and that any walls or fences were of sufficient height to restrict normal access.

The inspector reviewed the use of alarming dosimeters and the training given to the workers. The dosimeters have external alarms so that workers can hear the alarms. These alarms were generally placed on the outside of the protective clothing or on the upper arm, closer to the head, so that alarms could be heard.

The inspector witnessed a pre-job briefing for work activities in the Unit 2 Drywell and found that appropriate cautions and warnings concerning radiation and contamination areas as well the proper use of the alarming dosimeters were presented.

No violations or deviations were identified.

c. Radioactive Material Control

The inspector reviewed E&RC procedure-0502, entitled "Receipt of Radioactive Materials," dated November 25, 1992. The inspector noted that the procedure contained appropriate guidance for receiving, performing radiation and contamination checks, opening, and documenting radioactive materials received at the facility.

The inspector also reviewed training records for selected licensee employees which were involved with receipt of radioactive materials and shipping activities. The inspector noted that these selected individuals had up to date general/specialized training and qualification cards.

No violations or deviations were identified.

d. Independent Surveys

During facility tours, the inspector independently verified radiation and/or contamination levels in radioactive waste storage areas, Units 1 and 2 Reactor Buildings, Units 1 and 2 Turbine Buildings, lunch rooms, control rooms, and HP areas. No unexpected levels of contamination were found. Tools and other work items were smeared and no unacceptable levels were found.

No violations or deviations were identified.

8. Program for Maintaining Exposures As Low As Reasonable Achievable (83750)

10 CFR 20.1(c) states that persons engaged in activities under licenses issued by the NRC should make every reasonable effort to maintain radiation exposures as low as reasonably achievable.

Regulatory Guides 8.8 and 8.10 provide information relevant to attaining goals and objectives for planning and operating light water reactors and provide general philosophy acceptable to the NRC as a necessary basis for a program of maintaining occupational exposures ALARA.

The inspector reviewed the personnel exposure total as of December 16, 1992, and noted that the year to date total was 633.5 person-rem. The goal for the year was set at 672 person-rem. The goal should be achieved barring an unplanned exposure event. The licensee also set a personnel contamination event (PCE) goal of 180 and as of December 16, 1992, there had been 153 thus far. This goal also appeared achievable.

The inspector also reviewed recent ALARA initiatives. These initiatives included the Unit 1 Residual Heat Removal (RHR) chemical decon which resulted in contact and general area dose rate (measured at 18 inches) reductions by factors of approximately 23.5 and 9, respectively; the floor drain decon project in which 18 drains had been flushed, to date, with 13 blocked drains having been opened and dose rates reduced to less than 100 mrem/hr; removal of three hot spots using high pressure water lasars with a dose reduction factor of 6 to 10 and estimated dose savings of 50 person-rem per year.

Based on the above, the inspector informed licensee representatives that ALARA initiatives associated with the current outages were a program strength.

No violations or deviations were identified.

9. Exit Meeting (83750)

The inspector met with licensee representatives indicated in Paragraph 1 at the conclusion of the inspection on December 18, 1992. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents or processes as proprietary. Dissenting comments were not received from the licensee.