



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30303

SEP 20 1984

Report Nos.: 50-325/84-26 and 50-324/84-26

Licensee: Carolina Power and Light Company
 411 Fayetteville Street
 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: August 21-24 and September 13, 1984

Inspector: R. H. Albright
 R. H. Albright

9-20-84
 Date Signed

Approved by: G. R. Jenkins
 G. R. Jenkins, Section Chief
 Division of Radiation Safety and Safeguards

9/20/84
 Date Signed

SUMMARY

Scope: This routine, unannounced inspection involved 22 inspector-hours at the Brunswick site in the areas of training and qualification, external exposure control and personal dosimetry, internal exposure control, surveys, monitoring, and control of radioactive material, solid waste and inspector followup items. An additional 6 inspector hours at the Harris Environmental and Energy Center (HEEC) involved the personnel thermoluminescent dosimeter (TLD) quality control (QC) program administered by the HEEC for all CP&L TLD users.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Licensee Employees Contacted

- **S. Brown, Project Specialist - Health Physics
- *A. G. Cheatam, Manager, Environmental and Radiation Control
- **S. Croslin, Technical Specialist - Health Physics
- *C. R. Dietz, Plant General Manager
- *K. E. Enzor, Director, Regulatory Compliance
- *M. D. Hill, Manager, Technical and Administrative Support
- **J. A. Padgett, Director - Health Physics
- *J. F. Terry, Project Specialist ALARA
- *L. F. Tripp, Radiation Control Supervisor
- C. Barnhill, Radiation Control Foreman
- J. Davis, Environmental and Chemistry
- B. Failor, Radiation Control Foreman
- T. Priest, Radiation Control Foreman
- H. Shaver, Planning and Scheduling

Other licensee employees contacted included technicians, and mechanics and two Chem Nuclear Systems Inc. employees.

NRC Resident Inspectors

- *D. Myers, Senior Resident Inspector

- *Attended exit interview at the Brunswick site
- **Attended exit interview at the HEEC

2. Exit Interview

The inspection scope and findings for Brunswick were summarized on August 24, 1984, with those persons indicated in paragraph 1 above. The inspection scope and findings for HEEC were summarized on September 13, 1984, with those persons indicated in paragraph 1 above.

3. Licensee Action on Previous Enforcement Matters

Not inspected.

4. Training and Qualification (83723)

Technical Specification 6.3.1 requires that each member of the facility staff meet or exceed the minimum qualification of ANSI N18.1-1971 for comparable positions.

Paragraph 4.3.2 of ANSI N18.1 states that supervisors not requiring a license shall have a minimum of four years experience in the craft or discipline supervised. The inspector reviewed the experience and training records for two newly appointed Radiation Control Foremen and discussed radiological control activities related to the new positions with the appointees.

10 CFR 19.12 requires the licensee to instruct all individuals working in or frequenting any portion of the restricted area in the health protection problems associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposures, and in the purpose and functions of protective devices employed, applicable provisions of Commission regulations, individual responsibilities and the availability of radiation exposure data.

During tours of the plant, the inspector interviewed workers to assess their knowledge and understanding of radiation protection requirements.

No violations or deviations were identified.

5. External Exposure Control and Personal Dosimetry (83724)

The inspector discussed with HEEC personnel the quality control program for the sources used to irradiate TLDs for the TLD QC, the daily TLD reader QC and the monthly blind cross check programs. Source documentation from the manufacturer dated January 3, 1980, indicated the two Cs-137 sources in the irradiator to be 12 curies and 130 curies. The radiation fields from the two sources are calibrated on a six month frequency using calibrated instruments with calibrations traceable to NBS. The inspector reviewed documentation for the instruments which are used to calibrate the radiation fields of the sources. The instruments were within their annual calibration frequency. The latest calibrations of the 12 and 130 curie sources dated April 4, 1984, were reviewed.

The inspector discussed the TLD QC program with licensee representatives at the HEEC site. The HEEC representative stated that TLD's are QC tested upon receipt from the manufacturer and are retested on a six month frequency thereafter. This TLD QC test is described in corporate dosimetry procedure RC-PD-18, Quality Control Testing of TLDs. This test requires the TLD to be irradiated to 500 mrem and then read. If less than 500 TLDs are tested the individual TLDs must respond to within ± 15 percent of the 500 mrem. If more than 500 TLDs are in the test each TLD must respond to within ± 15 percent of the average TLD response. Any TLDs outside the required ± 15 percent acceptable response band must be retested. If a TLD failed the first test, it must be retested two times and pass both subsequent tests. If a TLD fails either of the two successive tests, it is removed from service. TLDs remaining in service after the above tests are reread to determine residual dose. If the residual dose is greater than 15 mrem the TLD is removed from service. TLD exposure data since the previous TLD QC is reviewed for any TLDs removed from service during the QC. This review determines if any changes to personnel exposure data must be made. The inspector reviewed and

discussed TLD QC data for July 1984, with HEEC personnel. The inspector reviewed the personnel exposure reviews required for four TLDs removed from service after the July, 1984 TLD QC.

Plant TLD readers are calibrated on a six month frequency using procedure E and RC-0413, Calibration of Panasonic D-710 Automatic TLD reader. The inspector observed a calibration label on the plant TLD reader which indicated the reader was last calibrated May 1984. For the TLD reader calibration, corporate personnel expose several TLDs to 0.5 rem and 2.0 rem. These TLD's are used to establish new conversion coefficients which are entered into the TLD reader's programming. The TLD reader uses the conversion coefficients to convert photons counted while reading the TLD to rem. After the new coefficients are established, the TLD reader calibration is verified by reading several badges irradiated to the following exposures: a) 0.25 rem, b) 0.50 rem, c) 1.00 rem, d) 2.00 rem, e) 3.00 rem. The acceptance criteria for the verification test are: a) the average reading for each element is ± 10 percent of the irradiated value and b) the percent standard deviation for each element is ± 10 percent of the average reading. The inspector reviewed data from the most recent Brunswick TLD reader calibration on May 26, 1984, and the most recent HEEC TLD reader calibration on August 16, 1984.

After reading TLD badges each month, the TLDs are returned to the HEEC for annealing or QC testing if the six month QC is due. At the end of the month, the badges are returned to the plant for change out. Included with the monthly batch of personnel badges sent to the plant from HEEC are a set of spiked badges for use as a blind cross check. The cross check badges include 6 badges irradiated to different values between 30 mrem and 5 rem and 3 unirradiated control badges. The plant dosimetry section reads the cross check badges and sends the data to the HEEC where the data is evaluated as a check on the proper functioning of the plant TLD reader. The acceptance criteria for this cross check is that the average bias plus standard deviation are less than 0.3. This test is described in HEEC dosimetry procedure RC-PD-2, TLD Reader Intercomparison and Performance Testing. The inspector reviewed the Brunswick cross check data for January - August, 1984. All TLD cross checks performed by Brunswick for the period January - August, 1984 were acceptable.

Also included in the monthly batch of badges received from corporate are badges with the following exposures: a) background b) 0.5 rem, and c) 4.0 rem. Each day before using the TLD reader a QC is run to ensure proper operation of the reader before beginning to read TLDs and to indicate that TLD readings since the previous QC are valid. The TLD has 4 elements containing TL material. In order to pass the QC, two specified elements must indicate within ± 15 percent of the irradiated value. The inspector discussed with plant personnel and HEEC personnel what actions would be taken if the reader failed the QC. If failure of the QC is determined to be a problem with the TLD reader, HEEC dosimetry personnel are called in to evaluate subsequent actions. The inspector reviewed the Brunswick TLD reader QCs for the period August 4-22, 1984 and the HEEC TLD reader QCs for

the period September 4-13, 1984. No TLD reader QC failures were indicated for these periods. The inspector, during inspection at HEEC, reviewed an investigation of abnormal TLD reader operation for H. B. Robinson during February, 1984. A failed daily QC resulted in a review of TLD data since the previous TLD reader QC. This review resulted in exposure adjustment for personnel whose TLDs were read over the previous 24 hours. This will be inspected during the next H. B. Robinson inspection.

The inspector discussed the TLD exposure recording system with dosimetry personnel at the Brunswick and HEEC sites. TLDs are normally read at the plant using the automatic TLD reader, but a manual reader is available. Both readers produce a hard page record of the TLD measured exposure and/or the data is recorded on a disc by a computer connected to the TLD reader. The inspector discussed with Brunswick dosimetry personnel the method of recording exposures from the hard page record to the respective computerized personnel exposure records and observed one technician enter a record and a second technician then verify the entry. The technicians indicate who made the initial record entry and the entry verification by putting their unique operator numbers inside a stamp on the hard page record. Licensee personnel stated that a third plant technician verified the computer record entries prior to the hard page record being sent to HEEC dosimetry. When the hard page record is received at HEEC another technician verifies that the data was properly entered into the computer. This technician documents this verification by entering a unique operator number on the hard page record. Several hard page records were reviewed at the HEEC. These records showed three operator numbers which indicated the initial record entry and entry verification at the plant and the entry verification performed at HEEC. If several records are to have TLD exposure entries, the record entries will be made by direct transfer from the computer connected to the TLD reader, to the main records computer.

No violations or deviations were identified.

6. Audits of the Dosimetry Program (83724)

The inspector reviewed two 1984 audits of the CP&L dosimetry program. One audit by the CP&L Corporate Health Physics Staff was issued March 22, 1984, and included review of procedures, methods of TLD/pocket dosimeter issuance, the monthly TLD exchange process, operation of the TLD reader, QC program, multi-badging, neutron dose determination, use and handling of dosimetry devices, TLD calibration, and dosimetry records. The audit identified deficiencies in the H. B. Robinson dosimetry program. Corrective actions for the above audit findings will be reviewed during the next NRC Region II inspection at H. B. Robinson. The second audit was performed by an independent assessor representing the National Bureau of Standards National Voluntary Laboratory Accreditation Program (NVLAP). This audit reviewed various aspects of the TLD program. No programmatic deficiencies were identified during the audit.

No violations or deviations were identified.

7. Internal Exposure Control (83725)

10 CFR 20.103(b) requires the licensee to use process or other engineering controls, to the extent practicable, to limit concentrations of radioactive material in air to levels below that specified in Part 20, Appendix B, Table I, Column 1 or limit concentrations, when averaged over the number of hours in any week during which individuals are in the area, to less than 25 percent of the specified concentrations.

The use of process and engineering controls to limit airborne radioactivity concentrations in the plant was discussed with licensee representatives and the use of such controls was observed during tours of the plant.

10 CFR 20.103(b) requires that when it is impracticable to apply process or engineering controls to limit concentrations of radioactive material in air below 25% of the concentrations specified in Appendix B, Table I, Column 1, other precautionary measures should be used to maintain the intake of radioactive material by any individual within several consecutive days as far below 40 MPC-hours as is reasonably achievable. By review of records and discussions with licensee representatives, the inspector evaluated the licensee's MPC-hour control program.

No violations or deviations were identified.

8. Surveys, Monitoring, and Control of Radioactive Material (83726)

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 radiation hazards that may be present.

The inspector observed personnel using the personnel frisker (RM-14 with HP-210 pancake probe) to perform contamination surveys of themselves prior to exiting the controlled area.

The licensee uses Radiation Control personnel at controlled area exits located at the protected area portal, turbine building breezeway, and radwaste building. These personnel ensure that personnel frisk properly and keep records of personnel found to be contaminated while frisking at the respective exit point.

No violations or deviations were identified.

9. Solid Waste (84722)

10 CFR 20.311 requires a licensee who transfers radioactive waste to a land disposal facility to prepare all waste so that the waste is classified in accordance with 10 CFR 61.55 and meets the waste characteristics requirements of 10 CFR 61.56.

The inspector reviewed selected manifests prepared for waste shipments made during the period June - July 1984 to verify that a tracking system was being used to ensure that shipments arrived at the intended destination without undue delay.

Technical Specification 3/4.11.3 requires the licensee to prepare waste for burial in accordance with a Process Control Program (PCP). The inspector discussed the provisions of the PCP with contractor personnel who provide resin dewatering and solidification services to the plant. The vendor PCP is used to ensure that solidified resins shipped to a burial facility comply with burial facility license requirements and 10 CFR Part 61. The inspector reviewed documentation for July 1984 which indicated that test samples had solidified properly and met the requirements of the PCP. The inspector discussed the method of sampling resin waste so that a representative sample was obtained.

No violations or deviations were identified.

10. Inspector Followup Items (92701)

- a. (Closed) Inspector Followup Item (IFI) (324/84-02-01). This item concerned the need for certain post accident sampling valves in containment to be administratively controlled open. The inspector reviewed licensee valve lineup procedures which require these valves to be left open.
- b. (Closed) IFI (324/84-02-02) This item concerned the need for the licensee to determine a correction factor for a post accident sample system rotameter used to determine flow rate of containment atmosphere samples through filters. The inspector reviewed a licensee procedure which established a correction factor curve for the rotameter.
- c. (Closed) IFI (325/83-18-01) This item concerned the subtraction of higher than normal background exposures from personal TLD exposures. The inspector reviewed a licensee evaluation of the cause for the control badges to read higher than normal and the action to be taken if background badges read greater than 50 mrem.
- d. (Closed) IFI (325/83-38-01) This item concerned the need for special dosimetry surveillance to ensure that personnel on high dose jobs were not tampering with their dosimetry. The inspector reviewed procedure E&RC-0460 Appendix C which established the surveillance and records of the surveillance for the period February - April 1984. No cases of TLD tampering were revealed.