



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

Report Nos.: 50-324/78-18 and 50-325/78-18

Docket Nos.: 50-324 and 50-325

License Nos.: DPR-62 and D. 71

Licensee: Carolina Power and Light Company  
336 Fayetteville Street

Raleigh, North Carolina 27602

Facility Name: Brunswick Steam Electric Plant, Units 1 and 2

Inspection at: Brunswick site, Southport, North Carolina

Inspection conducted: August 8-11, 1978

Inspectors: G. L. Troup  
J. H. Davis

Reviewed by:

*A. F. Gibson*  
A. F. Gibson, Chief  
Radiation Support Section  
Fuel Facility and Materials Safety Branch

*9/20/78*  
Date

Inspection Summary

Inspection on August 8-11, 1978 (Report No. 50-324/78-18 and 50-325/78-18)

Areas Inspected: Routine, unannounced inspection of radiation protection program including qualifications of new radiation control personnel; radiation protection training; changes to radiation protection procedures; external exposure control; internal exposure control; posting, labeling and control of radiation and contamination areas; neutron monitoring practices; airborne effluent monitoring, and review of IE circulars and bulletins. The inspection involved 53 inspector-hours on-site by two NRC inspectors.

Results: Within the ten areas inspected, no items of noncompliance or deviations were found in nine areas; one apparent item of noncompliance was found in one area [infraction: control of high radiation areas (324/325/78-18-01)].

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DETAILS I

Prepared by:

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9/20/78  
Date

*for* A. F. Gibson  
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Dates of Inspection: August 8-11, 1978

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1. Individuals Contacted

- \*A. C. Tollison, Jr., Plant Manager
- \*W. M. Tucker, Superintendent, Technical and Administrative
- \*S. E. Thorndyke, Operating Supervisor
- \*L. F. Tripp, Environmental & Radiation Control Supervisor (Acting)
- \*L. A. Rogers, Regulatory Coordinator
  - R. P. Cross, Plant Engineer
  - E. H. Norwood, Training Coordinator
- \*J. L. McKnight, RC&T Foreman
- \*J. A. Kaham, RC&T Foreman
- \*R. D. Pasteur, RC&T Foreman
  - J. B. Cook, RC&T Foreman
- \*J. L. Kiser, Jr. Plant Engineer

The inspectors also talked with and interviewed other licensee employees, including engineering technicians, RC&T technicians, shift supervisors and plant operators.

\*Denotes those present at the exit interview.

2. Licensee Action on Previous Inspection Findings

Previous findings were not reviewed during this inspection.

3. Unresolved Items

No new unresolved items were identified during this inspection.

4. Posting, Labeling and Control

- a. The inspectors observed the licensee's practices for posting, labeling and control. Specific areas inspected were: (1) posting of radiation areas per 10 CFR 20.203.b, (2) posting of high radiation areas per 10 CFR 20.203.c and control of high radiation areas per Technical Specifications Section 6.12, (3) posting of radioactive materials area per 10 CFR 20.202.e, and (4) container labeling requirements of 10 CFR 20.203.f. During a plant tour, the inspectors also took radiation dose rate measurements to verify that areas were posted and controlled as required.
- b. Technical Specifications 6.12.2 requires that the entrance to a high radiation area in which the radiation levels exceed 1000 millirem/hour shall be posted as a high radiation area and shall be locked. On August 9 during a plant tour the inspectors found the entrance to the Unit 2 condenser room at elevation 20' unlocked although the entrance was posted as a high radiation area with posted radiation levels for general areas in the room of 1,500 millirem/hour. Upon determining that the door was unlocked, the inspectors informed the shift foreman, who initiated action to have the door locked. An inspector later reviewed the most recent radiation surveys for the area, which confirmed the radiation levels of 1,500 millirem/hour. An inspector informed licensee management that this was considered an item of noncompliance against Technical Specification 6.12.2. A licensee management representative acknowledged this and stated that the method of locking these doors would be reviewed. (324/325/78-18-01).
- c. The inspectors observed that plywood barriers and doors are installed in the turbine buildings at elevation 70' to prevent entry to the area around the turbines and moisture separator/reheaters, which are high radiation areas with intensities greater than 1000 millirem/hour. The doors in these barriers are secured with padlocks and chains. An inspector pointed out to licensee representatives that 10 CFR 20.203 (c)(3) requires that controls that are established over the entrances to high radiation areas shall be established in such a way that no individual shall be prevented from exiting the area. A licensee representative pointed out that the locks are accessible from inside the barrier and that personnel in the area would have the proper keys but acknowledged that the barriers and doors should be changed to provide better security and rapid egress. A licensee management representative

informed the inspector that a design change had been issued to install new doors and that the work would be expedited. The inspector stated that this would be reviewed later (324/ 325/78-18-02).

- d. 10 CFR 20.207 specifies the requirements for the storage and control of licensed materials in unrestricted areas. During the inspection, the inspector observed no radioactive material stored in unrestricted areas. The inspector also discussed the storage of licensed material with the cognizant supervisor, who confirmed that licensed materials were not stored in unrestricted areas. The inspector had no further questions.

#### 5. External Exposure Control

- a. An inspector reviewed the licensee's program for external exposure control, including review of procedures, and records, observation of control practices, and discussions with licensee personnel. Specific areas were: (1) personnel monitoring requirements of 10 CFR 20.202.a, (2) permissible doses of 10 CFR 20.101.a, (3) extended permissible doses of 10 CFR 20.101.b, (4) exposure history requirements of 10 CFR 20.102., and (5) exposure records of 10 CFR 20.401.a. The inspector reviewed exposure history files for both licensee employees and temporary personnel and verified that exposure histories and authorizations were on file for personnel who were authorized to receive extended doses and that exposure records were being maintained. The inspector had no further questions.
- b. 10 CFR 20.104 specifies the limits for occupational exposure of minors. A licensee management representative informed the inspector that while employment of minors at a power plant is not prohibited by state law, the practice is discouraged by the company, and that no minors were employed at the plant. The inspector reviewed the computer printout which serves as the equivalent for NRC form -5 and determined from the birth dates, that no minors were included in the exposure program. The inspector had no further questions on the exposure of minors.

#### 6. Internal Exposure Control

##### a. Air Sampling

Examination of selected air sampling records for the period January-July 1978 revealed that air sampling had been performed as required by 10CFR 20.103, covering both routine air monitoring and special circumstances involving work in potential airborne radioactivity areas. During plant tours the inspectors observed air

monitors in operation throughout the facility. With the exception of the drywells for both units, routine air sample results showed air concentration of less than 25 percent of MPC. Discussions with licensee representatives indicated that drywell entries were covered by special surveys to determine airborne radioactivity levels. The inspector had no further question regarding air sampling. No items noncompliance or deviations were identified.

b. Bioassays

Discussions with licensee representatives and examination of licensee's procedure BSEP/OM/ Volume VIII, Section 5 revealed that the licensee relies upon the CP&L mobile whole body counter to determine uptake of radioactive material for licensee employees. Examination of selected whole body counting records for 1977 and 1978 revealed that the bioassay program was conducted as required by 10 CFR 20.103 and licensee's procedures. Records examined revealed body burdens of a few percent of MPBB of the radionuclides of concern. The inspector had no further questions pertaining to the bioassay program. No items of noncompliance or deviations were identified.

7. Respiratory Protection Program

a. Policy Statement

This item originally discussed in Report Number 50-325/ 78-5-50, 324/78-5 paragraph 8.b.(1). In that report reference was made to changes being made to the corporate health physics manual which contained the management policy statement on respiratory protection as required by Regulatory Guide 8.15, C.2, which is incorporated into 10 CFR 20.203. The inspector examined the licensee's formal policy statement on respiratory protection and had no further questions.

b. Respiratory Protection Procedures

An inspector examined licensee procedure RC&T instruction 7017 "Respiratory Protection Program" and determined that it contained the required procedural elements stated in Regulatory Guide 8.15. This procedure further required respiratory protection training records to be kept in the RC&T exposure file along with medical clearance, and fitting and testing records. These records were not kept in the exposure file and, as a result, confirmation of an individual's respiratory protection training was difficult and time consuming. The inspector discussed with licensee representatives the merits of transferring the training records for respiratory

protection to the exposure file. Licensee representatives stated that closer attention would be given to following the procedure and that the training records would be in-corporated into the individual's exposure file in the RC&T office. The inspector pointed out that this was especially important since the RC&T office is the point from which respirators are assigned and issued to individual users (324/325/78-18-03).

c. Respiratory Protection Practices

Examination by an inspector of the respirator users log for 1978 revealed that respirator assignments were made by RC&T personnel as required by procedures. By cross-reference, the inspector verified individual respirator usage with appropriate air sample records and confirmed that no exposures in excess of 40 MPC-HR had occurred; therefore no investigations were necessary under 10 CFR 20.103. These records further indicated that no exposures had occurred in excess of 2 MPC-hr/day or 10 MPC-hr/Week.

Examination of respirator inspection, decontamination, and survey records for 1978 revealed that respirators were inspected and decontaminated following use as required by licensee procedures. Discussion with licensee representatives revealed used respirator filters were discarded after being used once. The inspector discussed with licensee representatives the merits of more careful documentation of surveys performed on respirators, to include direct radiation survey results and resurvey result when radiation/radioactivity levels exceeded action levels presented in licensee procedures. Licensee representatives stated that survey results would be fully documented (324/325/78-18-04).

8. IE Circulars and Bulletins

- a. Bulletin 78-03, "Potential Explosive Gas Mixture Accumulations Associated with BWR offgas system Operations." The licensee's review and evaluation of the bulletin are contained in CP&L letter serial GD-78-868 of March 29, 1978. An inspector review the licensee's evaluation and associated plant procedures, and discussed the bulletin with licensee representatives. The inspector provided several editorial comments to licensee representatives regarding the emergency instruction procedure; these comments were acknowledged by a licensee management representative. The inspector determined that two actions in the CP&L letter were incomplete concerning installation of a combustible gas detection system in the offgas filter house and modifications for the loop seals. The inspector reviewed the progress of these items with licensee representatives and was informed that installation of the gas detection system was

awaiting receipt of parts and the loop seal modification was proceeding with prefabrication and would be installed when plant conditions permitted. The inspector informed licensee management that the installation of the modifications would be reviewed at a later time (324/325/78-18-05).

- b. Bulletin 78-07, "Protection Afford by Air-Line Respirators and Supplied-Air Hoods." This bulletin describes conditions under which the protection factors for air-line respiratory protection devices must be reduced from previously assigned values. An inspector discussed the licensee's review and actions on the bulletin with licensee representatives. A licensee representative informed the inspector that the plant only uses air-supplied masks in the continuous flow mode and that air-supplied hoods are not used. After discussing the use of air-line respirators, the inspector informed licensee management that he had no further questions on this bulletin.
- c. Circular 78-03, "Packaging Greater Than Type A Quantities of low Specific Activity Radioactive Material for Transport." An inspector discussed the methods for assuring that shipments of radioactive materials comply with 10 CFR 71.12 with licensee representatives. The representatives informed the inspector that the evaluation was still in progress. The inspector stated that the action on this circular was considered to be open (324/325/78-CI-03).

9. Monitoring of Gaseous Effluent Streams

- a. An incident occurred at a nuclear facility when an iodine monitor in a gaseous effluent stream indicated high release rates of iodines, resulting in evacuation of the facility. Subsequent analysis determined that the indicated high release was due to adsorption of radioactive noble gases on the charcoal filter in the monitor and the resulting anomalous readings were due to the operating characteristics of the monitor system. An inspector discussed this situation with a licensee representative and reviewed the monitoring systems for gaseous effluent streams. The inspector determined that the licensee does not use an iodine monitor as the sole monitoring method on any of the effluent paths but rather uses a separate gas monitor in conjunction with an iodine monitor or uses a gas monitor by itself. This would preclude a similar occurrence.
- b. At another facility, an incident occurred when gaseous effluent monitor gave a spurious reading due to the saturation of the Geiger - Muller detector. The inspector discussed this occurrence

with a licensee representative and determined that the detectors on gaseous effluent streams are different types of detectors which are not subject to saturation and the resulting spurious readings. The inspector had no further questions on the gaseous monitors.

10. Qualifications of Radiation Protection Personnel

- a. Technical Specifications 6.3 states in part, "Minimum qualifications with regard to educational background and experience of key supervisory and professional personnel shall meet or exceed the criteria outlined in ANSI N18.1-1971." FSAR Section 13.1.3.1 states, in part, that "technicians in responsible positions shall have a minimum of two years experience. . . shall have a minimum of one year or related technical training. . ." The inspector discussed the interpretation of "key supervisory personnel" and "technicians in responsible positions" with licensee representatives, and was advised that RC&T foreman were considered to be supervisory personnel and level I technicians were considered to be "in responsible positions."
- b. An inspector reviewed the qualifications for a new RC&T Foreman and Level I technicians appointed or hired during 1977. Qualifications of the individuals appeared to be consistent with the Technical Specifications and the FSAR. The inspector also discussed the qualifications of new Level II and III technicians with licensee representatives regarding previous experience and training and on-the-job training. The inspector had no further questions.

11. Changes to Radiation Protection and Radioactive Waste Procedures

Technical Specifications 6.8.2 specifies the requirements for the review and approval of changes to plant procedures. RC&T procedure 0001 specifies the requirements for the review and approval of changes to RC&T instructions. An inspector reviewed changes to eight RC&T instructions made during calendar year 1978 to verify that they were made in accordance with the applicable requirements. The inspector also reviewed the content of the changes to verify that they were consistent with the Technical Specifications and 10 CFR 20 as well as affording a comparable or higher level control. The inspector had no further questions.

12. Posting of Notices

10 CFR 19.11 requires the posting of Form NRC-3 and various documents or a notice stating where the documents may be examined. The inspector observed that Form NRC-3 and an notice to workers stated where the documents may be examined were posted at the entrance to the radiation controlled area. The inspector had no further questions.

13. Radiation Protection Training

- a. Paragraph 11.1 of the Radiation Control and Protection Manual states, in part, "All facility personnel, non-facility personnel and non-company personnel shall be indoctrinated in radiation control and emergency procedures before being allowed within the Controlled Access Area without an escort." An inspector discussed the initial and refresher training with a licensee representative and determined that training was being conducted. The inspector reviewed ten exposure files to verify that successful completion of the training was documented.
- b. The inspector discussed changes in the radiation protection program with a licensee representative to determine that such changes were consistent with 10 CFR 19.12, and the Technical Specifications. A licensee representative informed the inspector that no changes had been made in the hand-outs or course content in the last year, but that a different approach to retraining was being considered where training would be covered in several sessions rather than in one session.
- c. The inspector expressed concern to licensee management that if training were covered in several sessions that due to shift coverage, off days etc., some personnel might miss this training and that make up periods might not be timely. This concern was acknowledged by a licensee management representative who stated that the training program would be reviewed to assure that retraining was completed in a timely manner.

14. Neutron Monitoring Practices

- a. An inspector reviewed the licensee's neutron monitoring program, including surveys, dosimetry and records. A licensee representative informed the inspector that in calendar year 1977 neutron exposures had been determined using neutron dosimeters. However, due to operational considerations, the dosimeters had been removed from service and neutron exposure are currently determined by calculations based on neutron survey results and stay times. This is an acceptable procedure as discussed in Regulatory Guide 8.14. The inspector reviewed records of individuals who had entered areas where neutron exposures were expected and verified that the doses had been determined, and that the doses had been entered in the exposure records. The inspector had no further questions.
- b. A licensee representative informed the inspector that the licensee was participating in a study for determining neutron doses using a thermoluminescence dosimeter (TLD), and that the use of the neutron

TLD's was being evaluated in lieu of computing doses. However, no date has yet been determined for introducing the TLD's. The licensee representatives stated that until such time as TLD's are used, neutron doses will continue to be determined based on calculations.

15. Exit Interview

At the conclusion of the inspection on August 11, 1978, the inspectors met with licensee representatives (denoted in paragraph 1). The inspectors summarized the scope and findings of the inspections. Licensee representatives made the following comments on the findings:

- a. Mr. Tollison, Plant Manager, acknowledged the item of noncompliance on the unlocked high radiation door, and acknowledged that the plywood doors at the turbine would be replaced with permanent, rapid exit doors.
- b. Ms. McKnight, RC&T Foreman, acknowledged the comments on respiratory protection training records and survey records and stated that the survey records were already being changed.
- c. Mr. Tollison, Plant Manager, acknowledged the comments on assuring the timeliness of radiation protection retraining and stated that the matter would be reviewed to assure that retraining was done in a timely manner.