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

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Report Nos.: 50-261/94-09

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

Docket Nos.: 50-261 Licensee Nos.: DRP-23

Facility Name: H. B. Robinson

Inspection Conducted: March 7-11, 1994

Inspectors: _____ 04/06/94
B. A. Parker Date Signed

_____ 04/07/94
F. N. Wright Date Signed

Approved by: _____ 4/8/94
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 management controls; audits and appraisals; training and qualification; external exposure control; internal exposure control; surveys, monitoring, and control of radioactive materials and contamination; maintaining occupational exposures as low as reasonably achievable (ALARA); and a review of previously identified inspection findings.

Results:

Based on interviews with licensee management, supervision, and station personnel, and records review, the radiation protection program continued to be effective in protecting the health and safety of the plant workers and the public. No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*D. Baur, Regulatory Affairs Specialist
W. Brand, Radiation Control (RC) Supervisor, Environmental & Radiation Control (E&RC)
*S. Collins, RC Supervisor, E&RC
R. Gieger, RC Senior Technician, E&RC
*J. Harrison, Manager, E&RC Support
*J. Henderson, Principal Specialist, Nuclear Assessment Department (NAD)
*S. Hinnant, Vice President, Robinson Nuclear Plant
R. James, RC Senior Technician, E&RC
*K. Jury, Manager, Licensing and Regulatory Programs
*A. Padgett, Manager, E&RC
*M. Pearson, Plant General Manager
W. Ritchie, RC Senior Specialist, E&RC

Other licensee employees contacted during the inspection included technicians, maintenance personnel and administrative personnel.

Nuclear Regulatory Commission

C. Ogle, Resident Inspector
*W. Orders, Senior Resident Inspector

*Denotes attendance at the exit meeting held on March 11, 1994

2. Organization and Management Controls (83750)

The inspector reviewed the licensee's organization, staffing levels, and lines of authority as they relate to radiation protection. No significant changes were noted since the last inspection conducted October 25-29, 1993, and documented in NRC Inspection Report (IR) 93-26.

Since the last inspection, the unit was restarted on November 12, 1993, after completing Refueling Outage (RFO) 15. However, on November 18, 1993, the unit shut down after being notified of potential misloaded fuel rods by the vendor. After completing repairs associated with the fuel, the unit was restarted on February 8, 1994. On February 18, 1994, the unit shut down once again due to diesel generator problems, and the unit stayed down due to steam generator concerns. At the time of the inspection, the licensee had completed diesel generator repairs and was conducting tests and performing maintenance on the "C" steam generator. By the end of the inspection, steam generator repairs were completed and the licensee was preparing for restart.

No violations or deviations were identified.

3. Training and Qualification (83750)

10 CFR 19.12 requires that licensees instruct all individuals working or frequenting any portion 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 the training of selected individuals, including those personnel in the "C" steam generator tube plugging job, discussed in Paragraph 8, and noted no problems. Of those reviewed, all aspects of necessary training were completed as required. General Employee Training was completed, as well as respiratory protection and mock-up training, where applicable.

No violations or deviations were identified.

4. Audits and Appraisals (83750)

Technical Specification (TS) 6.5.4.1 requires audits of the facility to be performed by the NAD encompassing conformance of facility operation to the provisions contained within the TS and applicable license conditions at least once per 12 months and the Process Control Program (PCP) and implementing procedures at least once per 24 months.

The NAD staff conducted one audit in the radiological protection program area since the last inspection conducted October 25-29, 1993, and documented in IR 93-26. NAD Audit R-ERC-94-01, issued February 7, 1994, was an assessment of the site's radiation protection program and was conducted during the period of January 4-12, 1994. The inspector discussed the scope and findings of the audit with the lead auditor and representatives of the licensee's E&RC staff. The assessment appeared thorough and appropriate in scope to address the principal areas reviewed. In addition, the inspector noted that the assessment team members were appropriately qualified in health physics and the regulations to assess this area adequately. The inspector determined that the audit results were reported to appropriate management levels for review.

The audit identified four issues requiring corrective actions: 1) inadequate management attention and controls in certain chemistry activities; 2) radioactive waste shipping documentation; 3) controls of radioactive material outside the radiologically controlled area (RCA); and 4) controls for tools and equipment contaminated with fixed radioactive material. The audit report also discussed needed improvements in scheduling and completing E&RC self-assessments. The inspector reviewed the E&RC response to the RC issues, dated March 2, 1994. Since this assessment had been recently performed, completion of specific corrective actions associated with each of the findings was not evaluated by the inspector for adequacy. However, the

proposed corrective actions appeared appropriate for the identified issues.

Licensee procedure PLP-057, "Self Assessment," Rev. 1, dated January 8, 1994, established a self-assessment program for plant staff with the purpose to involve all levels of the plant staff in achieving higher levels of standards. The inspector reviewed procedure E&RC-014, "Environmental and Radiation Control Self Assessment Program," Rev. 2, dated May 21, 1993, which provided guidance for the conduct of self-assessment activities performed by the E&RC Unit. Units were required to perform at least one self-assessment per quarter. The inspector reviewed selected E&RC self-assessments and noted that the E&RC staff conducted 10 self-assessments in 1993. The inspector noted that some meaningful issues requiring attention or corrective actions were being identified in the assessments.

The E&RC Unit previously utilized a corrective action sub-program to track many of the issues identified by the E&RC staff, NAD, or the NRC. The corrective action sub-program was driven by license procedure PLP-26, "Corrective Action Program." Corrective action sub-programs were utilized for adverse conditions that were below the trigger levels requiring the issuance of an Adverse Condition Report (ACR). However, E&RC and NAD representatives reported that the corrective action sub-program system had not always been as effective as needed for prompt corrective action. In response to those concerns the staff decided to do away with the corrective action sub-program and enter all issues requiring corrective action into the site's ACR corrective action program. The E&RC related issues were assessed and classified by the staff in accordance to the significance of each issue. ARCs were classified as Levels One through Three with the most significant being Level One. At the time of inspection, the E&RC staff was reviewing all E&RC-related ACRs to trend problems and look for common root causes. Preliminary results of the E&RC's review of existing Level One and Two ACRs indicated that most of the problems recently identified were related to procedures. E&RC representatives reported that there appeared to be a need to increase the level of guidance in unit procedures. Use of the site's ACR corrective action program should result in improved and timely corrective actions and was considered a program improvement.

No violations or deviations were identified.

5. External Exposure Control (83750)

a. Whole Body Exposure

10 CFR 20.1201(a) requires each licensee to control the occupational dose to individual adults, except for planned special exposures under 20.1206, to the following dose limits:

(1) An annual limit, which is the more limiting of:

(i) The total effective dose equivalent being equal to 5 rems; or
(ii) The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems;

(2) The annual limits to the lens of the eye, to the skin, and to the extremities, which are:

(i) An eye dose equivalent of 15 rems; and
(ii) A shallow-dose equivalent of 50 rems to the skin or to any extremity.

The inspector discussed the cumulative whole body exposures for plant and contractor employees. Licensee representatives indicated, and the inspector independently confirmed, that all whole body exposures assigned since the previous NRC inspection of this area were within 10 CFR Part 20 limits. The typical administrative dose limit was 2,000 millirem utility-acquired administrative dose limit plus the amount of year-to-date incoming dose. As of March 11, 1994, the licensee had not granted any dose extensions, and the maximum individual year-to-date dose (utility and non-utility dose) was 732 millirem.

No violations or deviations were identified.

b. Personnel Dosimetry

10 CFR 20.1502(a) requires each licensee to monitor occupational exposure to radiation and supply and require the use of individual monitoring devices by:

(1) Adults likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of the limits in 10 CFR 20.1201(a);

(2) Minors and declared pregnant women likely to receive, in one year for sources external to the body, a dose in excess of 10 percent of any of the applicable limits of 10 CFR 20.1207 or 10 CFR 20.1208; and

(3) Individuals entering a high or very high radiation area.

10 CFR 20.1501(c) requires all personnel dosimeters (except for direct and indirect reading pocket ionization chambers and those dosimeters used to measure the dose to the extremities) that require processing to determine the radiation dose and that are used by licensees to comply with 10 CFR 20.1201 be accredited by NVLAP for the type of radiation or radiations included in the

NVLAP program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored.

The inspector selectively reviewed the dosimetry program to ensure the licensee was meeting the monitoring requirements of revised 10 CFR Part 20. During tours of the plant, the inspector observed proper use of thermoluminescent dosimeters (TLDs) and self-reading dosimeters.

The inspector verified that the licensee was accredited by NVLAP to process personnel TLDs for radiations routinely encountered by the site's radiation workers. The inspector reviewed licensee procedures addressing the issuance and analysis of TLDs. The inspector also reviewed procedures and records for quality controls, calibrations and maintenance of TLD readers used to process the licensee's TLDs. The licensee's procedures were thorough and sufficiently detailed to provide appropriate guidance for the licensee's dosimetry staff. Calibration and quality control records were selectively reviewed and all reviewed records were complete and appropriately maintained.

The licensee was pilot-testing the use of digital alarming dosimeters (DADs) with the RC Technicians and planned to use the DADs to replace self-reading pocket dosimeters for the plant staff in 1994. The inspector discussed recent problems identified at other utilities with some DADs and determined that the staff was aware of the issues.

No violations or deviations were identified.

c. Planned Special Exposures

10 CFR 20.1206 permits the licensee to authorize an adult worker to receive doses in addition to and accounted for separately from the doses received under the limits specified in 10 CFR 20.1201 provided that certain conditions are satisfied. Such exposures cannot exceed the dose limits in 10 CFR 20.1201(a) in any year or five times the annual dose limits during an individual's lifetime.

Section 6.10 of the licensee's Radiation Control and Protection Manual, Rev. 22, dated December 20, 1993, describes the Carolina Power and Light policy on planned special exposures. Specifically, the utility indicated that it will not utilize the planned special exposure provisions of 10 CFR Part 20 to allow individuals to receive dose in excess of annual dose limits. Discussions with licensee personnel noted that in light of the policy no procedures were developed at the Robinson plant for implementation of this aspect of the new 10 CFR Part 20 regulations.

No violations or deviations were identified.

d. High and Very High Radiation Areas

10 CFR 20.1601, 10 CFR 20.1602 and 10 CFR 20.1902 specify the control and posting requirements for high radiation areas and very high radiation areas. In addition, TS 6.12 provides additional requirements for the control of high radiation areas.

The inspector reviewed and discussed with licensee representatives the program for controlling access to high radiation areas (HRAs), locked high radiation areas (LHRAs), and very high radiation areas (VHRAs). During the last inspection conducted October 25-29, 1993 and documented in IR 93-26, a violation was identified for failure to implement the requirements of licensee Administrative Procedure AP-031, "Administrative Controls for Entry into Locked High Radiation Areas," Rev. 17, dated March 11, 1993. It was discovered that when keys were changed out following the loss of a LHRA key, only the keys in the RC office were exchanged, leaving the three keys in the Control Room invalid. Therefore, for approximately one month, the Control Room unknowingly possessed incorrect keys for LHRA access if needed to respond to an emergency situation. In addition, another example of the violation of AP-031 was identified concerning the control of LHRA keys issued to the Unit 2 Control Room for emergency use. In that instance, the inspector determined that on two occasions the Unit 2 Operations Shift Supervisor issued LHRA keys for non-emergency purposes.

During this inspection, the inspector reviewed the licensee's corrective actions to the aforementioned violation. Immediate corrective actions implemented by the licensee included replacement of the Control Room keys with valid core keys and initiation of ACR 93-CRN-137. The licensee attributed the violation to an inadequate procedure (AP-031) in that the procedures did not identify the location for all RC keys and no procedure guidance existed for the process of replacing or exchanging LHRA keys/lock cores. The inspector reviewed Revision 18 of AP-031, dated January 4, 1994. The revised procedure stated that the RC Supervisor was responsible for ensuring Unit 2 Operations had appropriate LHRA keys and VHRA keys. Step 3.6 of the revised procedure indicated that the Unit 2 Operations Shift Supervisor was responsible for administratively controlling the LHRA keys maintained in the Unit 2 Control Room and the Fire Protection Building. Step 5.3.4 indicated that "the RC Supervisor shall supply Unit 2 Operations Shift Supervisor with a minimum of three keys for plant emergency use in Control Room and three keys for Plant emergency use in the Fire Protection Building if the LHRA doors are being changed." The inspector verified that (1) the RC Supervisors were trained to prevent a recurrence of the key control event; (2) Operations shift personnel with access to the LHRA key locker were made aware of the importance of not issuing the keys for non-emergency use; (3) a new key locker was hung in the Operations Shift Supervisor's

office in the Control Room for keys that are not issued routinely and labeled "Do Not Issue - Emergency Use Only"; and (4) the key locker in the Fire Protection Building possessed an RC seal to prevent unauthorized entry/key removal.

No violations or deviations were identified.

6. Internal Exposure Control (83750)

a. Bioassay

10 CFR 20.1204(a)(3) requires, in part, that the licensee, as appropriate, use measurements of radioactivity in the body, measurements of radioactivity excreted from the body, or any combination of such measurements as may be necessary for timely detection and assessment of individual intakes of radioactivity by exposed individuals.

The inspector reviewed the licensee's procedures for Whole Body Counting System operation and calibration. The inspector reviewed selected records of whole body counter calibration and routine quality controls performed. All records reviewed were complete as required by procedures and were appropriately maintained.

b. Respiratory Protection

10 CFR 20.1701 requires the licensee to use, to the extent practicable, process or other engineering controls to control the concentrations of radioactive material in air.

10 CFR 20.1703(a)(3) requires that if the licensee uses respiratory protection equipment to limit intakes pursuant to 10 CFR 20.1702, the licensee will implement and maintain a respiratory protective program that includes: air sampling sufficient to identify the potential hazard, permit proper equipment selection, and estimate exposures; surveys and bioassays to evaluate the actual exposures; written procedures to select, fit, maintain, and test respirators; written procedures regarding supervision and training of personnel and issuance of records; monitoring; recordkeeping; and determination by a physician prior to initial fitting of respirators, and at least every 12 months thereafter, that the individual user is physically able to use respiratory protective equipment.

10 CFR 20, Appendix A, Footnote (d), requires adequate respirable air of the quality and quantity in accordance with NIOSH/MSHA certification described in 30 CFR Part 11.

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 the licensee's respiratory protection program and noted that testing, fitting, cleaning, inspection, and repair of respirators was adequate. Respirator use was limited through engineering controls (i.e. permanent modifications) or portable means, such as HEPA filters and glovebags. Respirator usage continued to decline as evidenced by the number of respirators used during the last two refueling outages. During RFO 14, approximately 3,700 respirators were used, whereas only 1,400 respirators were used during RFO 15.

The inspector verified that the air used in-plant for breathing air purposes was maintained as Grade D or higher quality. Seven points of the air supply system were tested quarterly, and no problems were noted. The inspector noted that the licensee recently purchased and put into use a number of upgraded manifolds. The manifolds monitored for and were calibrated to detect specified levels of carbon monoxide and oxygen content, low air pressure, and differential pressure across the air filter. Each monitored item could initiate alarms, both audible and visible.

The licensee informed the inspector that the manifolds were purchased in response to a breathing air incident that occurred in October 1993. The incident occurred when nitrogen inadvertently entered the air system through back pressure or some other leakage, causing three workers to be treated and released for symptoms for oxygen deficiency (i.e. shortness of breath, headache, weakness, dizziness, nausea, and incoherence). The inspector reviewed the licensee's actions to date in response to the event and discussed the industrial safety implications of such an event. The new manifolds were used during the steam generator job discussed in Paragraph 8 without incident.

No violations or deviations were identified.

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

a. Surveys

10 CFR 20.1501(a) 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 radioactive hazards that may be present.

The inspector reviewed selected records of radiation and contamination surveys performed during 1993, and discussed the survey results with licensee representatives. During tours of the plant, the inspector observed HP technicians performing radiation and contamination surveys. No concerns were identified.

b. Posting and Labeling

10 CFR 20.1904(a) requires the licensee to ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "Caution, Radioactive Material," or "Danger, Radioactive Material." The label must also provide sufficient information (such as radionuclides present, and the estimate of the quantity of radioactivity, the kinds of materials and mass enrichment) to permit individuals handling or using the containers, to take precautions to avoid or minimize exposures.

During tours of the plant and selected outside radioactive material storage areas, the inspector noted that the licensee's posting and control of radiation areas, high radiation areas, airborne radioactivity areas, contamination areas, radioactive material areas, was adequate. The inspector also noted radioactive material was properly labeled.

c. Personnel and Area Contamination

During facility tours, the inspector noted that contamination control and general housekeeping practices were adequate. Surface contamination was aggressively being controlled at its source, as evidenced by a low amount of controllable contaminated area (1,526 square feet, as of March 8, 1994) in the RCA (approximately 87,000 square feet) and a low number of catch containments needed throughout the plant (eight, as of March 8, 1994).

The inspector reviewed the licensee's personnel contamination events (PCEs). The 1993 PCE target was 130 or less, and a total of 141 PCEs were documented for the year. As of March 8, 1994, 16 PCEs were documented for the year. The inspector selectively reviewed a number of the PCEs reports from 1993 and 1994 and noted no concerns. Skin contaminations were assessed appropriately and individuals with facial contamination were whole body counted and their internal dose calculated as required. The inspector also discussed personnel decontamination with RC personnel, including dealing with open wounds, and toured the personnel decon area. No concerns were noted.

No violations or deviations were identified.

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

10 CFR 20.1101(b) requires that the licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are As Low As Reasonably Achievable (ALARA).

Collective dose was down slightly in 1993 at 337 person-rem total, which included the lowest dose refueling outage (RFO 15) in the site's history at 254 person-rem. Much of the dose outside of the RFO was attributed to the large amount of forced outage experienced by the licensee during 1993. As of March 9, 1994, forced outage dose also accounted for most of the 27 person-rem accumulated since the first of the year. The annual goal for 1994 was originally set at 58 person-rem, but the licensee indicated that it would be difficult to meet.

The inspector noted a number of ALARA initiatives on the part of the licensee. In general, more management support of ALARA philosophy was evident throughout the plant and the workforce. Each work group or department had an assigned ALARA "champion" who was responsible for searching out and evaluating dose saving initiatives. Other initiatives included use of robotics and auto-welding machines, and an increased use of remote cameras, radios, and a video "surrogate" tour system.

The inspector reviewed the ALARA planning and execution of a job involving the plugging of steam generator (S/G) tubes. During the inspection, eddy current testing on the "C" S/G was completed and the decision made to plug one or two tubes. This required the development of an ALARA plan for the S/G "jumps" necessary to complete the job. Based on the S/G tubesheet dose rates, five R/hour general area and seven R/hour contact, manual plugging was more ALARA than completing the job with robotic tube-plugging machines. The inspector discussed the development of the pre-job ALARA package with licensee ALARA representatives. A TEDE ALARA evaluation for respirator usage determined that potentially 123 millirem external dose could be saved by doing the job without a respirator; however, due to the high contamination levels in the S/G bowl, respiratory protection was recommended in case high airborne concentrations were created from the work in the bowl. Therefore, the estimated dose for the job was initially set at 0.60 person-rem, but was revised to 0.90 person-rem when the final decision was made to plug two tubes. The job was completed for approximately 0.72 person-rem. The maximum whole body dose, 441 millirem, was received by the S/G jumper who did the plugging, and his backup/assistant received 103 millirem whole body. The remaining 180 millirem was spread among six additional workers supporting the job. The inspector reviewed the videotape of the actual job and noted no concerns. The S/G jumper used an airline bubblehood respirator and installed two tube plugs on both the hot leg side and the cold leg side of the S/G. The installation went quickly and without incident. Training, medical qualifications, respirator fit-tests, and dose histories of the individuals involved were all found to be satisfactory. A post-job ALARA debriefing was held with no major comments or suggestions, and the inspector informed the licensee that the job was well-planned and executed.

No violation or deviations were identified.

9. Followup on Previously Identified Inspection Findings (92702)

a. (Closed) VIO 50-261/93-26-01: Failure to follow procedures for administratively controlling LHRA keys.

The inspector reviewed the licensee's corrective actions to the violation. The corrective actions were discussed in Paragraph 5.d of this report. Based on those corrective actions, the inspector considered this item closed.

b. (Closed) VIO 50-261/93-26-03: Failure to follow procedures for controlling an irradiated bolt with contact dose rates of 650 Rem/hour while stored in the spent fuel pool.

The inspector reviewed the licensee's corrective actions to the violation. The corrective actions included revising Health Physics Procedure HPP-007, "Handling and Storage of Contaminated and Radioactive Materials," to more adequately address the storage and control of radioactive materials in the spent fuel pool. A locking device called a "curb hanger" was acquired to secure such materials and prevent them from being inadvertently removed from the pool. Keys to the curb hanger lock would be controlled by RC in the same manner as other high radiation area keys. Special labels were also developed to provide necessary information related to the material connected to the curb hanger. During the inspection, the inspector noted that no materials were stored in the spent fuel pool. Based on the corrective actions, the inspector considered this item closed.

10. Exit Meeting (83729)

At the conclusion of the inspection on March 11, 1994, an exit meeting was held with those licensee representatives denoted in Paragraph 1 of this report. The inspector summarized the scope and findings of the inspection. No violation or deviations were identified and the inspector received no dissenting comments.