CP&L

Carolina Power & Light Company

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Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
United States Nuclear Regulatory Commission
Washington, D.C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
RESPONSE TO AUGUST 15, 1981 EXPOSURE VIOLATIONS

Dear Mr. DeYoung:

Carolina Power & Light Company (CP&L) has reviewed the December 1, 1981, Notice of Violation and the December 2, 1981 Inspection Report 81-24. The discussion that follows the responses to the alleged violations provides the additional information requested in your transmittal letter.

NRC Comment:

Violation "A" Severity Level III (IER-81-24-02)

Technical Specification 6.8.1 states, in part, that written procedures shall be established, implemented and maintained that meet or exceed the requirements and recommendations of Appendix A of U.S. NRC Regulatory Guide 1.33 dated November 3, 1972. Section G and I of Appendix A to Regulatory Guide 1.33 list procedures for repair of PWR steam generator tubes and for special radiation work permits.

Contrary to the above, on August 15, 1981, between 3:00 a.m. and 6:35 a.m., the licensee failed in conjunction with marking steam generator tubes to comply with required plant procedures for steam generator repairs and radiation permits. The failure, which resulted in an overexposure (item B below) is exemplified by the four departures from the procedures described below, any or all of which constitute a violation of TS 6.8.1.:

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1. Section 3.5.2 of HP-12, Revision 8, requires that the health physics technician ensure that high and low range dosimeters are worn by persons engaged in primary side steam generator work. The dosimeters shall be worn on the body at or near the field of the highest dose rates. Section 3.5.2 indicates that the highest dose rates occur in the region of the head, and self-reading dosimeters may be worn on the shoulders. However, the health physics technician on duty specified that high and low range self-reading dosimeters be worn on the chest and not on the shoulders or head of the person engaged in primary side steam generator work.

CP&L Response:

1. Admission or Denial of Alleged Violation

CP&L admits to this alleged violation in part. The Radiation Control (RC) Technicians covering the job never specified the placement of the pocket chamber, however, upon observing that the man's pocket chambers were on the chest, the RC Technicians failed to relocate them to the shoulder as stated in Plant Procedure HP-12, Revision 8.

2. Reason for the Violation

The RC Technicians covering the job were not thoroughly familiar with Part 3.5.2 of procedure HP-12 (Revision 8).

3. Corrective Steps Which Have Been Taken and the Results Achieved

The immediate action was to place pocket chambers on the head and chest of those actively engaged in primary side Steam Generator (S/G) work. Plant procedures have been revised to require the placement of pocket chambers with each TLD badge, other than extremity TLDs, worn in a Radiation Controlled Area to afford better exposure control. At the time of the occurrence, procedures required that TLD badges be worn on the head, chest, and gonad area. There have been no further occurrences.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

All RC Technicians and Foremen will be trained on the S/G mockup. This training will include the multi-badging process, the use of pocket chambers, and the authority and responsibilities of the Technicians and Foremen. Lesson Plans will be developed so that all contract personnel who work on S/Gs can be given consistent, specific instructions on S/G work. Radiation control work performed in any S/G outage prior to the completion of the above training will be conducted only by those Technicians and Foremen who have completed this training.

5. Date When Full Compliance Will Be Achieved

The above mentioned training will be completed by January 15, 1982, and the lesson plans and instructions for training of contract personnel will be completed by January 30, 1982.

NRC Comment:

2. Special Plant Procedure SP-319 incorporates Westinghouse procedure No. MRS 2.2.2 GEN-12 which in Section 7.2 requires that a minimum of two health physics technicians provide continuous health physics coverage. However, during the time referenced above, only one health physics technician at a time provided coverage.

CP&L Response:

1. Admission or Denial of the Alleged Violation

CP&L admits to the above violation as stated.

2. Reason for the Violation

The Westinghouse S/G repair procedures were reviewed by PNSC and approved as Special Procedure SP-319. The requirement for two HPs was unique to the tube marking procedure and was not brought to the attention of Radiation Control personnel. The plant procedures required at least one RC Technician.

3. Corrective Steps Which Have Been Taken and Results Achieved

When it was identified that the procedure was not being fully satisfied, a second RC Technician was assigned to the operation.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

This unique procedural requirement is being reviewed to determine the appropriateness of its being continued. This review will be completed prior to eliminating this extra health physics coverage.

5. Date When Full Compliance Will Be Achieved

This requirement for the extra health physics coverage will be reviewed prior to the next S/G outage.

NRC Comment:

3. Special Radiation Work Permit SRWP 815-6 and Section 7.2 of MRS 2.2.2 GEN-12 require continuous health physics coverage of steam generator marking operations. Section 5.0 of MRC 2.2.2 states that steam generator tube marking is a "high exposure task and requires vigilance

on the part of the health physics technicians to carefully monitor the marking team and to keep track of the exposure dose rate and total dose." However, the tube marking operation was neither continuously nor vigilantly monitored by the assigned health physics technician since he did not maintain continuous visual contact with workers performing tube marking operations. Additionally, he did not control and record entries into the steam generator.

CP&L Response:

1. Admission or Denial of the Alleged Violation

CP&L denies this alleged violation as stated.

2. Reason for Denial of Violation

The RC Technicians' vigilance in their coverage was evidenced by an RC Technician's continuous presence on the S/G platform and frequent monitoring of the tube marker's pocket chamber throughout the tube marking operation to ensure the tube marker did not exceed his allowed dose of 500 mrem for that particular containment entry. To ensure that the tube marker did not approach his allowed dose, the RC Technician directed the tube marker out of containment when the tube marker's pocket chamber reading approached 470 mrem. After exiting the containment, the tube markers pocket chamber read 470 mrem. CP&L believes that the job coverage rendered was both continuous and vigilant and does not interpret "continuous" in this context to require direct line of sight coverage at all times. Such an interpretation would require one RC Technician for each contract worker. By procedure, the contract worker had the responsibility of informing the RC Technician of each entry. The exposure occurred due to the improper placement of pocket chamber dosimetry and not to the lack of vigilance on the part of the RC Technicians.

NRC Comment:

4. Section 3.2 of plant procedure HP-12, Revision 8, requires the "Steam Generator Entry Log" to be filled in and completed whenever a steam generator entry is performed. However, the health physics technician on duty did not record the four entries into the steam generator made by one worker.

CP&L Response:

1. Admission or Denial of the Alleged Violation

CP&L admits to the above violation.

2. Reason for the Violation

A S/G entry is defined as any part of the body passing through the imaginary plane of the S/G manways. A re-enactment of this tube markers' activities on the S/G platform indicated that four S/G entries may have occurred. This information was obtained from the individual who was marking the tubes. This individual demonstrated how the alleged entries were made on our S/G mockup. The alleged entries consisted of sticking his arm into the channel head all the way up to his shoulder with his head staying completely out of the manway opening and shielded by the wall of the S/G from the radiation shine inside the channel head. The RC Technicians, although continuously on the S/G platform, did not observe any S/G entries (any part of the body passing through the plane of the manway) and the tube marker did not inform the RC Technician that he made any entries, therefore, the purported S/G entries were not logged.

3. Corrective Steps Which Have Been Taken and Results Achieved

The RC Technicians knew of the requirement to log entries and knew what constituted a S/G entry. Had the RC Technicians been aware of such entries, CP&L believes they would have been properly logged. The definition of a S/G entry and the necessity of ensuring all S/G entries are properly logged was emphasized to the contract personnel working on the S/G's.

4. Corrective Steps to Avoid Further Violation

The training of contract personnel who work on S/G's as discussed in our response to Violation A, Item 1, will emphasize the necessity of ensuring that all S/G entries are logged, thus preventing purported S/G entries.

5. Date When Full Compliance Will Be Achieved

As stated in Violation A, Item 1, the lesson plans and instructions for training of contract personnel will be completed by January 30, 1982.

NRC Comment:

Violation "B" Severity Level III (IER-81-24-01)

10CFR20.201(b) requires licensees to make or cause to be made such surveys as may be necessary to comply with the regulations in 10CFR20. A survey as defined in 20.201(a) is an evaluation of the radiation hazards under a specific set of conditions. 10CFR20.101(a) requires licensees to restrict the total occupational dose to the head of each individual in a restricted area to 1.25 rems during any calendar quarter except as provided in paragraph (b) of 10CFR20.101.

Contrary to the above, between August 11 and 16, 1981, surveys of the radiation hazards associated with marking steam generator tubes were not conducted adequately to assure compliance with the head dose limit specified in 10CFR20.101(a) in that radiation exposure to individuals marking steam generator tubes was controlled based on readings from self-reading pocket dosimeters worn on the chest instead of the head where the exposure to radiation levels was higher. One individual received a radiation dose to the head of 1.3 rems during the third calendar quarter of 1981, specifically, on August 15, 1981, which was in excess of the applicable limit.

CP&L Response:

1. Admission or Denial of the Alleged Violation

   CP&L denies the inadequacy of the survey of the radiation hazards associated with marking S/G tubes, but admits that one individual received a radiation dose to the head of 1.3 rems during the 3rd quarter of 1981.

2. Reason for Denial of Portion of Above Alleged Violation

   The surveillance data for S/G tube marking was in sufficient quantity to accurately evaluate the hazard. HP-12, which required the pocket chambers be placed on the head or shoulders, was in complete concert with the survey which indicated that the highest dose was to be in the region of the head. Had this procedure been followed, the overexposure would not have occurred. CP&L has previously in this response admitted to the failure to follow procedure.

3. Reason for Admission of Portion of Above Alleged Violation

   The reasons for the exposure and corrective actions for the exposure of 1.3 rems in a quarter has been addressed in Violation "A".

NRC Comment:

Violation "C" - Severity Level IV (IER-81-24-03)

Technical Specification 6.3.1 requires that each member of the facility staff shall meet or exceed ANSI N18.1-1971 with regard to the minimum qualifications for comparable positions. Paragraph 4.5.2 of ANSI N18.1-1971 states, in part, that technicians in responsible positions shall have a minimum of two years working experience in their specialty.

Contrary to the above, between approximately 4:30 a.m. and 6:35 a.m. on August 15, 1981, a Radiation Control Technician was serving in a responsible position who had approximately 11 months experience, most of which consisted of observing personnel monitoring themselves for contamination as they left the controlled area. This technician was solely responsible for monitoring and controlling doses to four individuals on the "B" steam generator platform. Two of these individuals were marking steam generator tubes, a task that was identified by the licensee as a high exposure task requiring vigilance on the part of the health physics technician to carefully monitor and control radiation dose rates and total worker doses.

CP&L Response:

1. Admission or Denial of the Alleged Violation

   CP&L admits the alleged violation.

2. Reason for the Alleged Violation

   A contract RC Technician who had 11 months of experience and had received on-the-job training concerning S/G Health Physics (HP) Coverage on more than six occasions was assigned to the S/G platform to cover a tube marking operation that was not to include a S/G entry. Existing plant procedures provide adequate instructions for a more experienced RC Technician to provide the proper HP coverage of the S/G tube marking operation. However, an RC Technician with less than the ANSI N18.1-1971 level of experience should have been given detailed written instructions so that no discretion in the establishment of specific work requirements could be required or implied in the performance of his duties. This was not done in this case.

3. Corrective Steps Which Have Been Taken

   As of January 1, 1982, any S/G primary side work will be monitored by an RC Technician who meets the 2 year prior experience requirement of ANSI N18.1-1971 or by an RC Technician who has been provided with sufficient additional instructions to minimize discretion in the performance of his duties.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

   The position taken in Step 3 above will ensure that a properly qualified RC Technician is covering any S/G primary side operation.

5. Date When Full Compliance Will Be Achieved

   The above position was established on January 1, 1982; applicable procedures will be revised by February 28, 1982.

Additional Information Required By the Transmittal Letter

In your letter of December 1, 1981 you requested that CP&L address the underlying causes of the failure of our radiation control program and how we plan to correct this failure. CP&L disagrees with your charge that it has a programatic problem in the area of radiation control. As discussed in our response to the specific violations, we have demonstrated that this occurrence was an isolated failure to follow procedures. In the following paragraphs we have provided additional information relating to your inspection activities and the measures we have and/or will take to refine our radiation Control Program.

During the Health Physics Appraisal Team Inspection on January 26, 1981 - February 6, 1981, the team reviewed the external radiation exposure control program relative to the S/G tube plugging operations in 1980. The Team concluded that because S/G survey data showed that non-uniform radiation field existed on the S/G channel heads, workers may have received greater whole body dose than previously recorded by a TLD worn on the chest.

On February 19, 1981, CP&L notified the NRC that it was possible, by calculation, that two individuals could have received quarterly doses to the head in excess of three (3) rems/quarter. A NRC Inspection on March 2-4 resulted in two (2) civil penalties issued on May 12, 1981. The first, a $30,000 fine, was imposed for inadequate evaluation of S/G channel head surveys and the failure to provide adequate personnel dosimetry (TLD) for individuals entering S/Gs. The second, a $10,000 fine was imposed for the two calculated doses to the head in excess of 3 rems/quarter. The Inspector noted that a revision to HP-12 in January, 1981, made the use of multiple whole body dosimeters (TLDs) mandatory during S/G entries. No additional actions were necessary as a result of these two civil penalties.

On May 30, 1981, a contract employee "signed in" on a RWP for eddy current work on "C" S/G. He was issued a head TLD, chest TLD, gonad TLD, a high and low range pocket chamber to be worn on the shoulder for S/G entries or otherwise on the chest. He did not contact RC personnel prior to starting work and proceeded to "B" S/G (not "C" S/G as stated on the RWP) where he ignored a posted sign "Contact HP prior to entry." Upon exiting, his pocket chambers indicated 370 mrem. His multiple TLD read 2807 mrem on the head, 1019 mrem on the chest, and 178 mrem to the gonad area. He admitted he failed to comply with the RWP and area postings and that he neglected to contact HP personnel in the containment vessel (CV) prior to starting work. The dose to his head (2807 mrem) when added to his previous quarterly whole body dose of 302 mrem resulted in exceeding the 3 rem/quarter limit. The root cause of this occurrence was clearly the contractor's failure to follow written (i.e., RWP) and posted instructions provided to him by Radiation Control personnel, however, several weaknesses in S/G coverage were identified during the Investigation of this incident

and as a result, all work in the CV was stopped and the following actions adopted. All personnel on shift were instructed on the incident and corrective actions before work in the CV would be restarted. S/G entry was defined as any part of the body passing through the imaginary plane of the S/G manway and would require full time HP coverage. S/G entries would be controlled by pocket chamber readings and stay time calculations. All RC personnel working in the CV would wear a distinguishing arm band for ease in identification. A RC Technician would be specifically assigned to each job performed by contract personnel in the CV. The cause of the incident would be documented and the corrective actions reviewed by all plant personnel. This review was completed on June 10, 1981.

HP-12, "Steam Generator Inspection and Maintenance" was revised (Revision 8) on June 22, 1981, to incorporate into procedure the aforementioned instructions and corrective actions as applicable. In addition, this revision incorporated the following guidance to the RC Technician on the proper placement of pocket chambers for S/G work; "High and low range dosimeters are worn in a position on the body at or near the field of the highest dose rate in the steam generator. Our experience has shown that, in most cases, the highest dose rate occurs about the region of the head. In that case, dosimeters may be worn on the shoulders (Section 3.5.2, HP-12, Revision 8)."

Regarding the August 15, 1981, incident where a contractor was exposed in excess of the 10CFR20.101(a) limit, we determined that the root cause of this incident was an isolated failure to follow procedure in that the individual placed his high and low range pocket chambers on his chest and not on his head or shoulder as required by HP-12. The RC Technicians covering the S/G activity (tube marking) were not aware of this requirement in HP-12, Revision 8, and therefore did not relocate the pocket chambers from the chest to the shoulder.

The NRC Resident Inspector was promptly notified that an individual was exposed to 1308 mrem/quarter which was in excess of his 1250 mrem/quarter allowed dose. As an immediate corrective action, all further S/G entries required the use of high and low range pocket chambers adjacent to both the head TLD and the whole body TLD (chest).

Although Revision 8 to HP-12 was discussed with the majority of Radiation Control personnel following its approval by PNSC on June 22, 1981, it was identified that the change had not been routed for a documented review by all personnel. Therefore, on August 18, 1981, Revision 8 to HP-12 was routed by the Training Unit for documented review by all Radiation Control personnel. This review was completed on September 18, 1981.

Long term corrective actions to prevent a recurrence are:

1. Insure and document that all RC Technicians are notified in a timely manner of the latest revisions to Health Physics procedures.

2. All RC Technicians and Foremen will be trained on the S/G mockup. This training will include the multi-badging process, the use of pocket chambers, and the authority and responsibilities of the Technicians and Foremen. Lesson Plans will be developed so that all contract personnel who work on S/Gs can be given consistent, specific instructions on S/G work. Radiation control work performed in any S/G outage prior to the completion of the above training will be conducted only by those Technicians and Foremen who have completed this training.

3. HP coverage of S/G work will be limited to RC Technicians with two years experience <u>or</u> technicians provided with additional written instructions which minimize the need for discretion.

The occurrence on August 15, 1981, was due to a failure to follow procedures in that the Tube Marker, although wearing multiple whole body TLDs, did not wear his pocket chamber on his head or shoulder as required in HP-12, Revision 8. The previous violation and civil penalty regarding calculated doses to the head was a result of S/G entries being made prior to 1981 without TLDs on the head. Therefore, CP&L does not believe this occurrence was a repeat event. Furthermore, the overexposure and its causes were identified by CP&L, the causes were corrected by CP&L, and the violation (overexposure) was promptly reported to the Resident Inspector. Unlike the earlier incidents, this incident was the direct result of an isolated failure to follow a procedure which was adequate in itself.

If you have any further questions concerning this information, please contact my staff.

Yours very truly,

E. E. Utley
Executive Vice President
Power Supply and
Engineering & Construction

DCW/lr (1407)

cc: J. P. O'Reilly (NRC)

Sworn to and subscribed before me this 5th day of January, 1982.

Franklin Murray
Notary Public

My commission expires: Oct. 4, 1986

FRANKLIN MURRAY NOTARY PUBLIC WAKE COUNTY, N. C.