CP&L
Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429

86 APR 24 A10:33

April 21, 1986

FILE: B09-13510E
SERIAL: BSEP/86-0529

Dr. J. Nelson Grace, Administrator
U.S. Nuclear Regulatory Commission
Suite 2900
101 Marietta Street NW
Atlanta, GA 30323

BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2
DOCKET NOS. 50-325 AND 50-324
LICENSE NOS. DPR-71 AND DPR-62
RESPONSE TO INFRACTIONS OF NRC REQUIREMENTS

Dear Dr. Grace:

The Brunswick Steam Electric Plant (BSEP) has received I&E Inspection Report 50-325/86-06 and 50-324/86-07 and finds that it does not contain information of a proprietary nature.

This report identified one violation that appeared to be in noncompliance with NRC requirements. Enclosed please find Carolina Power & Light Company's response to that violation.

Very truly yours,

C. R. Dietz, General Manager
Brunswick Steam Electric Plant

RMP/mbh

Enclosure

cc: NRC Document Control Desk

1/1 IE01

Violation

10CFR20.103(a)(3) required the licensee to use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas.

Contrary to the above, the requirement to use suitable measurements of concentrations of radioactive materials in air were not met in that work area airborne radioactivity surveys were not performed on December 8, 1985, during the installation of the Unit 2 fuel transfer canal protection chute.

This is a Severity Level IV violation (Supplement VI).

Response

I. Admission or Denial of the Alleged Violation

Carolina Power & Light Company denies that it failed to use suitable measurements of concentrations of radioactive materials in air on December 8, 1985.

II. Event Description

Unit 2 was shut down on the evening of November 30, 1985, to commence a scheduled 29-week refueling and maintenance outage. Cold shutdown was achieved at 0630 on December 1, 1985. Over the next six days, the following work was undertaken in preparation for personnel entry into the reactor cavity:

- Refueling floor shield block removal
- Reactor cavity decontamination
- Drywell head removal
- Reactor head piping removal and detensioning
- Reactor head venting, lifting, and landing
- Dryer transfer

An extensive reactor cavity decontamination was conducted over a 37-hour period. The purpose of this work was to reduce the potential for personnel contaminations and airborne radioactivity (reducing the dependency on respiratory protection) during future cavity work. Initial contamination levels of greater then 5,000,000 dpm/100 cm^2 were reduced to generally less than 100,000 dpm/100 cm^2. Over 130 air samples were obtained from the reactor cavity area and analyzed during this period.

On December 7-8, 1985, preparations were underway for installation of the fuel transfer chute, cavity flood-up, moisture separator transfer, and fuel pool gate removal. A total of 38 air samples (including 16 on December 8, 1985) were obtained and analyzed within the reactor cavity or at the cavity rail during these two days. The highest level of airborne radioactivity observed was 1.92 E-9 µCi/cc (0.044 MPC) on December 7, 1985, following movement of the dryer. Consequently, respiratory protection was not required, though full anticontamination clothing and rainsuits were employed.

At approximately 2000 on December 8, 1985, three mechanics dressed out in accordance with RWP requirements to connect the hoisting chokers to the fuel transfer chute on the refueling floor. The chute was then partially lowered into the cavity area while the men prepared to enter the reactor cavity to land the chute and disconnect the chokers. Based on survey information obtained immediately prior to this entry, a contact dose rate of 50 R/hr and general area of 5 R/hr were located directly in front of the fuel pool gate where the cattle chute was to be landed. Contamination survey results indicated 100,000-400,000 dpm/100 cm^2 in front of the fuel pool gates. The floor surfaces were wet with water pooled in some locations. The three men were dressed in full anticontamination clothing and the lower half of a rainsuit. The men were cautioned by the radiation control (RC) technician to position themselves to the side of this gate area where measured dose rates were 60-600 mR/hr. The RC technician also told the workers to wait until the chute was lowered into position by the crane before entering the cavity in order to reduce exposure. The RC technician determined that respirators were not needed based on air samples obtained during the previous two days. In order to assess airborne radioactivity levels during this job, an air sample was attached to a tie line (anchored on either side of the cavity rail) and lowered to approximately six feet above the cavity floor.

A mechanic entered the cavity prior to the other two men. While he collected some tape and miscellaneous material from the cavity floor, one of his coworkers noticed what appeared to be some small paint chips laying in the fuel pool gate shielding block area. The refueling floor technical director was informed, and he requested that the material be picked up in order to minimize foreign material entry into the reactor vessel. The RC technician was informed of the problem. He advised the worker in the cavity to slowly and carefully dab up the chips with a wet rag. A similar cavity cleanup had been performed the previous night by workers in similar dress (i.e., no respirators) with no airborne radioactivity problems encountered. While in a crouched position, the worker pushed the loose material into a small pile using wetted bar towels. He picked up the material with his gloved hand and placed it into a plastic bag which he was holding open with his other hand. This work lasted approximately one minute and was monitored continuously by a high volume air sampler located within three feet of the worker's head. (Note: Subsequent analysis of this sample showed no discernable increase in airborne radioactivity levels.)

When this job was completed, the other two men, who had been on the refueling floor guiding the fuel transfer gate with tag lines, entered the cavity. The three men proceeded to guide the chute into place by hand and disconnect it from the hoist. This work phase was continuously monitored with a high volume and low volume air sampler with the highest level of measured radioactivity being 1.76 E-9 µCi/cc or 0.087 MPC. Total time spent in the cavity was approximately 15 minutes for the first worker (140 mrem accumulated dose) and slightly less for the other men (135 mrem and 60 mrem, respectively). The men exited the cavity and performed a whole body frisk. The first worker had indications (400-600 cpm above background with an RM-14) of facial contamination and reported to personnel decon for further assessment and decontamination. The individual's coworkers had no measurable external contamination and

whole body counts of these two individuals proved negative. After repeated, unsuccessful efforts to fully decontaminate the worker, the RC Supervisor directed that he be whole body counted. Based on the average of an initial and confirmatory count, a total of 211.3 µCi of Co^{60} and 115.3 µCi of Mn^{54} were detected in the lower torso. The individual was recounted daily until the morning of December 11, 1985, when all radioactivity had been eliminated from his body. An assessment of his uptake indicated 33.74 MPC-hrs (based on airborne radioactivity) and a dose commitment to the critical organ (lower large intestine) of 13.8 mrem; this represents 6.5% of the inhalation limit of 10CFR20.103(a)(1).

This incident and follow-up actions were detailed in a plant Operating Experience Report and approved by the Plant Nuclear Safety Committee and General Manager. The report concluded that the uptake of radioactive material was an ingestion, resulting from the worker's inadvertent brushing of the facial area with highly contaminated work gloves worn for the duration of the job. (The individual was observed on at least one occasion lifting his safety glasses with his work glove.)

NOTE: Following this incident, reactor cavity work continued without incident through December 9, 1985, when cavity floodup and fuel pool gate installation were completed. In all, 168 air samples were obtained during the period December 1-9, 1985, in support of cavity work. Other than five samples obtained during initial cavity decontamination, no airborne radioactivity levels of greater than 0.25 MPC (CP&L respiratory protection criteria) were detected. (Note: Maximum level of 0.47 MPC.)

III. Conclusions

10CFR20.103(a)(3) states: "For purposes of determining compliance with the requirements of this section the licensee shall use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas and in addition, as appropriate, shall 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."

1. From the period of reactor shutdown to installation of the fuel pool gates following reflood, 168 air samples were obtained in support of cavity work. Other than five samples obtained during initial cavity decontamination (maximum of 0.47 MPC), no airborne radioactivity levels greater than 0.25 MPC were detected.

2. Based on the effectiveness of cavity decontamination, keeping the cavity wet, and consistency of air sample results, hands-on work in the cavity was performed without respiratory protection, thus reducing radiation exposure.

3. On the day prior to the contamination incident (December 7, 1985), 22 cavity air samples were obtained. A maximum airborne radioactivity level of 0.044 MPC was detected. Collection of small chips from the cavity floor was performed with no measurable increase in airborne radioactivity.

4. An analysis was performed to determine what airborne concentration would have produced an inhalation of 34 MPC-hrs, conservatively assessing a two-minute exposure period. Based on whole body count results and 10CFR20.103 breathing rates, an average airborne concentration of 1,056 MPC would have had to have been present in the work area. Based on the result from an air sample taken continuously during this work which indicated no increase in airborne radioactivity, Carolina Power & Light Company totally discounts the presence of significant airborne radioactivity during this job.

The NRC Inspection Report, Section 9b, states that the air sample taken "was not evaluated until approximately two hours after the event." Carolina Power & Light Company considers this a misrepresentation of actions taken. On the day of the contamination incident (December 8, 1985), 16 cavity air samples were obtained. A maximum airborne radioactivity level of 0.087 MPC was detected during fuel transfer chute installation. RC personnel instituted a special rigging, utilizing tie lines, to lower an air sampler into the cavity to obtain representative air samples during this evolution. A high volume air sample was obtained within three feet of the individual's head while he collected chips on the cavity floor. Once the air sample was obtained, it was frisked for gross radioactivity, transported to the counting room, cut and sized for counting, isotopically analyzed, reviewed, and approved by RC supervision, at which time the results were provided to the field; no measureable increase in airborne radioactivity was detected. This turnaround process nominally takes approximately two hours, which is representative of the nuclear industry.

Carolina Power & Light Company recognizes that breathing zone air samples obtained during work are used to verify the adequacy of existing radiological controls in addition to establishing protection requirements for future work of a similar nature. It is the position of Carolina Power & Light Company that radiation protection actions taken before, during, and after this incident were in full compliance with 10CFR20.103 and did not result in an unmonitored airborne radiological hazard. Should you need supplemental information in order to resolve this matter, please do not hesitate to contact us.