

# CP&L

~~PRP~~  
OFFICIAL COPY

Carolina Power & Light Company

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

July 11, 1984

FILE: B10-13510E  
SERIAL: BSEP/84-1597

Mr. James P. O'Reilly, Administrator  
U. S. Nuclear Regulatory Commission  
Suite 2900  
101 Marietta Street N.W.  
Atlanta, GA 30323

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2  
DOCKET NOS. 50-825 AND 50-324  
LICENSE NOS. DPR-71 AND DPR-62  
RESPONSE TO INFRACTIONS OF NRC REQUIREMENTS

Dear Mr. O'Reilly:

The Brunswick Steam Electric Plant (BSEP) has received IE Inspection Report 50-325/84-14 and 50-324/84-14 and finds that it does not contain information of a proprietary nature.

The report identified one item that appeared to be in noncompliance with NRC requirements. The item and Carolina Power & Light Company's response are provided in the following text:

Violation (Severity Level V)

Technical Specification 6.8.1.a requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, November 1972, which includes Chemical and Radiochemical Control.

E&RC-2201, Calibration/Operation of ND 6600 Multichannel Analyzer, and E&RC-2206, Radioactive Standards Preparation for Calibration of the ND 6600 Multichannel Analyzer, in paragraphs 2.0 and 6.0 respectively, state that instrument dead time limits of 5 percent should not be exceeded.

Contrary to the above, the licensee failed to fully implement E&RC-2201 and 2206 in that the procedural dead time limits were exceeded during the recalibration of GeLi Detector System No. 835 in March 1984. This resulted in an improperly calibrated system for effluent measurements.

8408270431 840731  
PDR ADOCK 05000324  
G PDR

84-121

1. Admission or Denial of Violation

Carolina Power & Light Company acknowledges that from March 28 to May 25, 1984, the GeLi Detector System No. 835 was not calibrated properly for the analysis of charcoal cartridges.

2. Reason for Violation

Carolina Power & Light BSEP's GeLi detectors are calibrated at least annually for all geometrics (vial, particulate filter, charcoal filter, Marinelli beakers, etc.) in use. Several NBS traceable standards, including a charcoal filter, were received in June 1983. BSEP's three GeLi detectors, which included Detector No. 835, were subsequently calibrated for the charcoal cartridge geometry on June 19, 1983, without incident. Detector No. 835 failed in February 1984 and was sent to the manufacturer for repair. The detector was returned to BSEP in March, recalibrated for all geometrics including charcoal cartridges, and returned to service on March 28, 1984. An NRC confirmatory measurements inspection was initiated on May 21, 1984, and a discrepancy noted for comparison of the charcoal filters. The BSEP staff immediately began an investigation and informed the inspector on May 25, 1984, that the discrepancy apparently resulted during the recalibration of GeLi Detector No. 835 after repair. The BSEP staff initially concluded that the discrepancy was due to recalibration with a charcoal cartridge source which had too much activity for the detector. The analysis dead time was 10.2 percent during the calibration count. E&RC-2201, Calibration/Operation of the ND 6600 Multichannel Analyzer, and E&RC-2206, Radioactive Standards Preparation for Calibration of the ND 6600 Multichannel Analyzer, state that dead time limits of 5 percent should not be exceeded. This is a recommendation and not a requirement.

The BSEP staff continued to investigate possible causes for the discrepancy and eventually determined that the true cause was electronic malfunction in the analog to digital (A/D) converter for GeLi Detector No. 835. Apparently, the A/D converter slowly malfunctioned over a long period of time. Studies were conducted which proved conclusively that the GeLi system functioned normally where samples and standards below 5 percent dead time were counted, but responded incorrectly when the electronics were challenged by the more frequent pulses associated with increasing dead time. The counting room has several QC programs, one of which involves counting a check source daily which will test the system electronics. This activity failed to detect the malfunctioning A/D converter because the check sources are limited to less than 5 percent dead time.

The BSEP staff also evaluated the impact of increasing dead time on detector efficiency to determine if the recommendation not to exceed 5 percent dead time should be a requirement. The plant determined that

no loss in efficiency (approximately 0.2 percent) occurred up to 10.2 percent dead time with detectors and electronics operating correctly. GeLi Detector No. 835 experienced a 34 percent loss in efficiency using the malfunctioning A/D converter as measured against normal efficiency curves for that detector at 1332 keV. This indicates that the 5 percent procedural recommendation is sufficiently conservative and that had the electronics functioned normally in GeLi Detector No. 835 during the March recalibration, the use of a 10 percent dead time charcoal cartridge would not have resulted in an error.

Although the detector is most accurate with dead time less than 5 percent and without special hardware and software correction for pulse pileup, which is the normal operating mode at BSEP, analyses above the recommended 5 percent dead time may still be performed where the data is considered nonsensitive and with concurrence of the E&RC Foreman or Supervisor. This administrative control should not have been exercised during a calibration because all subsequent analyses would be affected. The error in the charcoal filter geometry calibration resulted in overestimating 11 effluent release samples by approximately 50 percent. The impact of this conservative gaseous release overestimation was evaluated against the particulate and iodine limits in the plant technical specifications and found to be insignificant. The total plant gaseous release for the time period March 28 to May 22, 1984, was determined to be less than 0.01 percent of the site annual limit for particulates and iodine at the most restrictive location. BSEP has a comprehensive counting room QC program which would have detected the calibration error. Analytics Incorporated is under contract to provide quarterly unknown samples in nearly all geometrics (including charcoal filters) for the counting room. The second quarter 1984 samples were received May 22. The Analytics cross-check program tests the entire capability of the BSEP counting room and would have detected the problem. A second, semiannual QC program tests the capability of each technician to correctly analyze unknown samples in different geometrics. The samples (including a charcoal cartridge) were prepared during the week prior to the unannounced inspection and would have been analyzed between May 21-25, 1984. Had this activity not been postponed to support the inspection, this program would also have identified the discrepancy.

Daily and weekly source calibrations are also performed on each GeLi detector. These tests do not measure performance in each geometry. They simply guarantee that the detectors and computer are performing as they should.

Carolina Power & Light Company acknowledges that the charcoal geometry calibration for GeLi Detector No. 835 was in error from March 28 to May 22, 1984. The E&RC procedures referenced were followed. Administrative controls which would normally have prevented this error failed.

3. Corrective Steps Taken and Results Achieved

As a result of the incident, the following corrective actions were taken:

- A. The impact of the calibration error on effluent accountability requirements was evaluated and discussed in Section 2.
- B. The A/D converter in GeLi Detector No. 835 was replaced.
- C. The cause of the calibration error was discussed with the Chemistry counting room staff and the importance of dead time evaluation emphasized.

4. Corrective Steps to be Taken

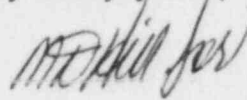
As a result of the incident, the following corrective steps will be taken:

- A. E&RC-2201 and 2206 will be revised such that where GeLi detector geometry calibrations are performed, the allowable tolerance for dead time shall not exceed 5 percent. Data Sheets associated with these calibrations will be revised to present dead time calculations with the 5 percent limitation as an acceptance criteria.
- B. E&RC will evaluate the possibility of modifying the counting room software such that the technician is flagged on the report when 5 percent dead time is exceeded.

5. Date When Full Compliance Will be Achieved

The items described in Section 4 will be complete by September 1, 1984.

Very truly yours,



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