

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-277/92-10
50-278/92-10

Docket Nos. 50-277
50-278

License Nos. DPR-44
DPR-56

Licensee: Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Facility Name: Peach Bottom Atomic Power Station, Units 2 and 3

Inspection At: Delta, Pennsylvania

Inspection Conducted: April 6-10, 1992

Inspector:

J. J. Kottan
J. J. Kottan, Laboratory Specialist
Effluents Radiation Protection Section (ERPS)

4-22-92
date

Approved by:

for Jason C. Lang
R. J. Bores, Chief, ERPS
Facilities Radiological Safety and Safeguards Branch
Division of Radiation Safety and Safeguards

4-22-92
date

Areas Inspected: Inspection of the non-radiological chemistry program. Areas reviewed included chemistry standards analyses and laboratory QA/QC.

Results: The licensee had in place an effective program for measuring chemical parameters in plant systems. No violations or deviations were observed.

DETAILS

1.0 Individuals Contacted

Principal Licensee Employees

- *R. Arters, Chemistry Technical Assistant
- *P. DiStefano, Process Chemist
- J. Donnell, Count Room/Instruments Technician
- *A. Fulvio, Regulatory Engineer
- W. Hodges, Chemistry Technician
- *R. Knieriem, Delmarva Power Representative
- *S. Lee, NQA Engineer
- *D. LeQuia, Superintendent of Plant Services
- *D. Mowery, Supervisory Chemist
- *A. Odell, Senior Chemist
- *P. Ott, PSE&G Site Representative
- R. Schenning, Count Room/Instruments Technician
- *R. Smith, Regulatory Inspection Engineer

NRC Employees

- *S. Holmes, Radiation Specialist

* Denotes those present at the exit meeting on April 10, 1992. The inspectors also interviewed other licensee personnel, including members of the chemistry and health physics staffs.

2.0 Purpose

The purpose of this inspection was to review the following areas.

1. The licensee's ability to measure chemical parameters in various plant systems
2. The licensee's ability to demonstrate the acceptability of analytical results through implementation of a laboratory QA/QC program

3.0 Chemical Measurements - Standards Analyses

During this part of the inspection, standard chemical solutions were submitted to the licensee for analysis. The standards were prepared by Oak Ridge National Laboratory (ORNL) for the NRC, and were analyzed by the licensee using routine methods and equipment. The analysis of standards is used to verify the licensee's capability to monitor chemical parameters in various plant systems with respect to Technical Specifications and other regulatory requirements. In addition, the analysis of standards is used to evaluate the licensee's procedures with respect to accuracy and

precision. The standards were submitted to the licensee for analysis in triplicate at three concentrations spread over the licensee's normal calibration and analysis range. However, the sulfate analyses were not performed in triplicate, but rather in duplicate at two concentrations and singly at one concentration due to the time constraints involved in preparing these low level standards. Additionally, the chloride results are reanalysis results because the first set of chloride samples appeared to contain chloride contamination. When working with samples or standards containing low levels of chloride and sulfate, great care must be exercised in preparing the samples in order to avoid contamination. It should be noted that the licensee's ion chromatograph (IC) automatically prepares its own low level anion calibration standards in a closed system by automatic dilution of a concentrated standard which is located inside the IC itself, thus minimizing contamination problems. Also, the titrimetric boron analyses were performed at only two concentrations because the volume of sample required for the analyses did not permit dilution of the NRC standards to concentrations within the licensee's normal analysis range.

The results of the standards measurement comparisons indicated that all of the results were in agreement or qualified agreement under the criteria used for comparing results (see Attachment 1 to Table 1) with the exception of the boron results obtained by the potentiometric titration method. Although these results were only lower than the NRC values by approximately five to seven percent, they were still outside the NRC agreement criteria of plus or minus three percent ($\pm 3\%$). The inspector discussed this disagreement with the licensee and also provided the licensee with data and a publication concerning boron analysis by the potentiometric titration method. The licensee stated that this documentation would be reviewed and appropriate changes made to the boron analysis procedure. The inspector stated that this area would be reviewed during a subsequent inspection.

4.0 Laboratory QA/QC

The inspector reviewed the licensee's chemistry/laboratory QA/QC program. The program was described in a number of procedures, but principally the following two procedures.

RCA-1e - "Chemistry Quality Control Program"
CH-39 - "Preparation, Use and Review of Control Charts"

These procedures provide for both an intralaboratory QC program and an interlaboratory QC program. The intralaboratory program consisted of instrument and procedure control charts to trend analytical performance, and the interlaboratory program consisted of the analysis of spiked samples prepared by an outside laboratory on a quarterly basis. The inspector reviewed selected data generated by the licensee's laboratory QA/QC program for 1991 and 1992 to date and noted that the licensee appeared to be implementing the program as required.

In reviewing the above data the inspector noted that the licensee appeared to use control charts as "real time" documents in order to provide active control of the measurement process. The reviews of the control charts were documented in detail and included the total number of data points, the number of points above or below the mean, and any identifiable trends. The inspector noted this excellent oversight of the control charts and stated that this was a noted strength of the laboratory QA/QC program. No safety concerns or violations were identified in this area.

5.0 Exit Interview

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the inspection on April 10, 1992. The inspector summarized the purpose, scope and findings of the inspection.

TABLE I

Peach Bottom Units 2 and 3

Chemistry Test Results

| Chemical Analysis | Method of Analysis | NRC Known Value | Licensee Value | Ratio (Lic/NRC) | Comparison |
|------------------------------------|--------------------|-----------------|----------------|-----------------|------------|
| Results in parts per billion (ppb) | | | | | |
| Silicon | SP | 14.43 ± 0.15 | 13.3 ± 1.1 | 0.92 ± 0.08 | Agreement |
| | | 31.2 ± 0.4 | 29.5 ± 0.7 | 0.95 ± 0.03 | Agreement |
| | | 50.4 ± 0.7 | 46.7 ± 1.4 | 0.93 ± 0.03 | Agreement |
| Iron | DCP | 200 ± 10 | 192 ± 4 | 0.96 ± 0.05 | Agreement |
| | | 410 ± 20 | 381 ± 9 | 0.93 ± 0.05 | Agreement |
| | | 830 ± 60 | 759 ± 6 | 0.91 ± 0.07 | Agreement |
| Copper | DCP | 197 ± 9 | 199 ± 2 | 1.01 ± 0.05 | Agreement |
| | | 400 ± 30 | 390 ± 8 | 0.98 ± 0.04 | Agreement |
| | | 820 ± 40 | 770 ± 7 | 0.94 ± 0.05 | Agreement |
| Nickel | DCP | 195 ± 8 | 205.7 ± 1.2 | 1.05 ± 0.04 | Agreement |
| | | 390 ± 30 | 399 ± 6 | 1.02 ± 0.08 | Agreement |
| | | 790 ± 50 | 795 ± 6 | 1.01 ± 0.06 | Agreement |
| Chromium | DCP | 193 ± 11 | 204 ± 3 | 1.01 ± 0.06 | Agreement |
| | | 400 ± 30 | 396 ± 7 | 0.99 ± 0.08 | Agreement |
| | | 810 ± 70 | 793 ± 11 | 0.98 ± 0.09 | Agreement |

TABLE I (contd)

Peach Bottom Units 2 and 3

Chemistry Test Results

| <u>Chemical Analysis</u> | <u>Method of Analysis</u> | <u>NRC Known Value</u> | <u>Licensee Value</u> | <u>Ratio (Lic/NRC)</u> | <u>Comparison</u> |
|------------------------------|-------------------------------|----------------------------|---------------------------|----------------------------|-------------------|
|------------------------------|-------------------------------|----------------------------|---------------------------|----------------------------|-------------------|

SP = UV - VIS Spectrophotometry

Tit = Potentiometric Titration

ICP = Inductively Coupled Plasma Spectrometry

DCP = Directly Coupled Plasma Spectrometry

IC = Ion Chromatography

*Single determination only

**Duplicate analysis only

ATTACHMENT 1 TO TABLE I

Criteria for Comparing Analytical Measurements from Table II

This attachment provides criteria for comparing results of capability tests. In these criteria the judgement limits are based on data from Table 2.1 of NUREG/CR-5244, "Evaluation of Non-Radiological Water Chemistry at Power Reactors". Licensee values within the plus or minus two standard deviation range ($\pm 2Sd$) of the ORNL known values are considered to be in agreement. Licensee values outside the plus or minus two standard deviation range but within the plus or minus three standard deviation range ($\pm 3Sd$) of the ORNL known values are considered to be in qualified agreement. Repeated results which are in qualified agreement will receive additional attention. Licensee values greater than the plus or minus three standard deviations range of the ORNL known value are in disagreement. The standard deviations were computer using the average percent standard deviation values of each analyte in Table 2.1 of the NUREG.

The ranges for the data in Table II are as follows.

| <u>Analyte</u> | <u>Agreement Range</u> | <u>Qualified Agreement Range</u> |
|----------------|------------------------|----------------------------------|
| Boron | $\pm 2\%$ | $\pm 3\%$ |
| Iron | $\pm 10\%$ | $\pm 15\%$ |
| Copper | $\pm 10\%$ | $\pm 15\%$ |
| Chloride | $\pm 8\%$ | $\pm 12\%$ |
| Sulfate | $\pm 10\%$ | $\pm 15\%$ |
| Silicon | $\pm 10\%$ | $\pm 15\%$ |
| Nickel | $\pm 8\%$ | $\pm 12\%$ |
| Chromium | $\pm 10\%$ | $\pm 15\%$ |
| Zinc | $\pm 10\%$ | $\pm 15\%$ |