

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-277/81-01
50-278/81-01
Docket No. 50-277
50-278
License No. DPR-44 Priority - Category C
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: January 12-15, 1981

Inspectors: J. J. Kotlan 3-10-81
J. J. Kotlan, Radiation Laboratory Specialist date signed

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_____ date signed

Approved by: R. J. Boreş 3/27/81
R. J. Boreş, Chief, Independent Measurements date signed
and Environmental Protection Section, DEP&OS

Inspection Summary:

Inspection on January 12-15, 1981 (Report No. 50-277/81-01; 50-278/81-01)

Areas Inspected: Routine, unannounced inspection of the licensee's chemical and radiochemical measurements program using NRC: I Mobile Radiological Measurements Laboratory and laboratory assistance provided by DOE Radiological and Environmental Services Laboratory. Areas reviewed included: program for quality control of analytical measurements, audit results, performance on radiological analyses of split actual effluent samples, and effluent control procedures. The inspection involved 30 inspector-hours onsite by one NRC regionally based inspector.

Results: Of the four areas inspected, no items of noncompliance were identified in three areas, one item of noncompliance was identified in one area. (Severity Level 5-failure to have an approved procedure, Paragraph 6)

DETAILS

1. Individuals Contacted

Principal Licensee Employees

*W. Ullrich, Station Superintendent
*A. Hillsmire, Engineer, Health Physics and Chemistry
*H. Watson, Chemistry Engineer
K. James, Radiochemist
T. King, Technical Assistant Radiochemistry
E. Traverso, Technical Assistant
R. Costagliola, General Superintendent, QA

The inspector also interviewed other licensee employees, including members of the chemistry and health physics staffs.

*denotes those present at exit interview.

2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (277/79-02-07, 278/79-02-07): Verifying Isotopic Analyses. The licensee has modified procedure HPO/CO 71B, Sampling and Analysis of Spent Resins, to include a review of the results of the gamma spectroscopic analyses by a person other than the one who performs the analysis.

(Closed) Inspector Follow-up Item (277/78-13-01, 278/78-17-01): Tritium Measurement of RESL Sample: A sample split during a previous inspection was analyzed for tritium by both the licensee and the NRC. The results are in agreement. See Paragraph 5 and Table I.

3. Laboratory QC Program

The inspector reviewed the licensee's program for the quality control of analytical measurements. The inspector noted that the licensee's RT series procedures cover quality control for both reactor coolant chemistry analyses and radiological analyses of effluent samples. The licensee's effluent radiological analysis QC program consists of quarterly splits with an outside laboratory for analyses required by his Technical Specifications. In addition the licensee has analyzed unknown samples submitted by an outside laboratory. Also, the operation procedures for the various counting instruments specify daily background and source checks and where applicable, gain checks. The inspector discussed Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment, and laboratory quality control in general with the licensee. The inspector had no further questions in this area.

No items of noncompliance were identified.

4. Audit Results

The inspector determined that the licensee's chemistry and effluent monitoring programs were on the Quality Assurance Division audit list. The inspector reviewed Audit No. A80-04 HPC dated 2/14 - 3/28/80 and Audit No. A80-29SD dated 9/12 - 10/24/80 which covered the above areas. The inspector had no further questions in this area.

No items of noncompliance were identified.

5. Confirmatory Measurements

During the inspection, actual liquid, airborne particulates and charcoal, and gaseous effluent samples were split between the licensee and NRC:I for the purpose of intercomparison. The effluent samples were analyzed by the licensee using his normal methods and equipment, and by the NRC using the NRC:I Mobile Radiological Measurements Laboratory. Joint analyses of actual effluent samples are used to determine the licensee's capability to measure radioactivity in effluent samples.

In addition, a liquid effluent sample was sent to the NRC reference laboratory, Department of Energy, Radiological and Environmental Services Laboratory (RESL), for analyses requiring wet chemistry. The analyses to be performed on the samples are: Sr-89, Sr-90, gross alpha, gross beta and tritium. These results will be compared with the licensee's results when received at a later date, and will be documented in a subsequent inspection report.

The results of a liquid effluent sample requiring wet chemistry, which was split during a previous inspection, were also compared during this inspection.

The results of the sample measurement intercomparisons indicated that all of the measurements were in agreement or possible agreement under the criteria used for comparing results. (See Attachment 1) The results of the comparisons are listed in Table I.

6. Procedures

The inspector reviewed the licensee's procedures for chemical, radio-chemical and effluent analyses. The inspector noted that the licensee had a written and approved procedure for the operation of the computer-based multichannel analyzer (MCA) used for effluent gamma spectroscopy analysis, Procedure HPA-7D. The inspector noted that the licensee also had a procedure for the calibration of his MCA, but this procedure was not reviewed and approved as required by the licensee's Technical

Specifications. Section 6.8.1 of the Technical Specifications requires procedures as per Appendix A of Regulatory Guide 1.33, dated November, 1972. Appendix A of Regulatory Guide 1.33 requires procedures for both operation and calibration of instruments used for radioactive effluent analyses. Section 6.8.2 of the Technical Specifications requires that the procedures required by Section 6.8.1 of the Technical Specifications be reviewed by PORC and approved by the Station Superintendent prior to implementation. The inspector stated that the failure to have a reviewed and approved procedure for MCA calibrations was an item of noncompliance (277/81-01-01; 278/81-01-01). The inspector had no further questions in this area.

7. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on January 15, 1981. The inspector summarized the purpose and scope of the inspection and the inspector findings.

The licensee agreed to perform the analyses listed in Paragraph 5 and report the results to the NRC.

TABLE I

PEACH BOTTOM 2 and 3 - VERIFICATION TEST RESULTS

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>NRC VALUE</u>	<u>LICENSEE VALUE</u>	<u>COMPARISON</u>
			<u>RESULTS IN TOTAL MICROCURIES</u>	
Unit 2 Drywell Vent Particulate Filter 0955 hrs 1-13-81 licensee's detector #2	Na-24	(8.1+0.4)E-2	(1.18+1.3%)E-1	Possible Agreement
	Cr-51	(5.5+0.5)E-2	(6.66+4.3%)E-2	Agreement
	Co-58	(2.2+0.6)E-3	(3.37+13.8%)E-3	Agreement
	Co-60	(5.3+0.6)E-3	(6.39+9.0%)E-3	Agreement
	Zn-65	(5.1+0.3)E-2	(7.76+2.5%)E-2	Possible Agreement
	I-131	(4.0+0.6)E-3	(5.77+5.6%)E-3	Agreement
	Cs-134	(2.5+0.7)E-3	(3.67+13.4%)E-3	Agreement
	Cs-137	(3.4+0.4)E-3	(3.94+7.8%)E-3	Agreement
Unit 2 Drywell Vent Charcoal Cartridge 0955 hrs 1-13-81 licensee's detector #3	I-131	(8.26+0.02)E-1	(8.38+0.3%)E-1	Agreement
	I-133	(6.88+0.09)E-2	(7.42+1.0%)E-2	Agreement
	I-135	(3.1+0.2)E-2	(3.00+5.2%)E-2	Agreement

TABLE 1

PEACH BOTTOM 2 and 3 - VERIFICATION TEST RESULTS

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>NRC VALUE</u>	<u>LICENSEE VALUE</u>	<u>COMPARISON</u>
<u>RESULTS IN MICROCURIES PER MILLILITER</u>				
Unit 2 OFFGAS 0925 hrs 1-13-81 licensee's detector #1	Kr-85m	(1.30±0.02)E-3	(1.10±2.3%)E-3	Agreement
	Kr-87	(3.56±0.08)E-3	(3.52±2.3%)E-3	Agreement
	Kr-88	(3.36±0.06)E-3	(2.73±4.9%)E-3	Agreement
	Xe-133	(2.57±0.03)E-3	(2.53±3.0%)E-3	Agreement
	Xe-135	(4.98±0.03)E-3	(3.94±1.0%)E-3	Possible Agreement
Unit 2 Reactor Coolant 1550 hrs 1-12-81 licensee's detector #3	Na-24	(3.44±0.03)E-2	(4.31±1.8%)E-2	Agreement
	Cr-51	(1.48±0.11)E-3	(1.43±43.5%)E-3	Agreement
	Tc-99m	(1.16±0.02)E-2	(1.42±3.9%)E-2	Agreement
	Zn-65	(1.08±0.06)E-3	(1.75±15%)E-3	Possible Agreement
	I-131	(8.7±1.2)E-5	(7.62±82%)E-5	Agreement
	I-133	(1.09±0.03)E-3	(1.31±12%)E-3	Agreement

TABLE 1

PEACH BOTTOM 2 and 3 - VERIFICATION TEST RESULTS

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>NRC VALUE</u>	<u>LICENSEE VALUE</u>	<u>COMPARISON</u>
			<u>RESULTS IN MICROCURIES PER MILLILITER</u>	
FDST 1350 hrs 1-13-81	Cr-51	(2.7 <u>±</u> 0.2)E-5	(2.65 <u>±</u> 13.9%)E-5	Agreement
	Mn-54	(2.6 <u>±</u> 0.3)E-6	(1.92 <u>±</u> 21.5%)E-6	Agreement
	Co-58	(4.7 <u>±</u> 0.3)E-6	(3.32 <u>±</u> 9.3%)E-6	Possible Agreement
	Co-60	(3.23 <u>±</u> 0.06)E-5	(2.85 <u>±</u> 2.6%)E-5	Agreement
	Zn-65	(4.60 <u>±</u> 0.11)E-5	(4.12 <u>±</u> 3.4%)E-5	Agreement
	I-131	(1.40 <u>±</u> 0.04)E-5	(1.36 <u>±</u> 4.1%)E-5	Agreement
	Cs-134	(3.87 <u>±</u> 0.06)E-5	(3.86 <u>±</u> 1.8%)E-5	Agreement
	Cs-137	(6.21 <u>±</u> 0.07)E-5	(6.53 <u>±</u> 1.7%)E-5	Agreement
FDST 1600 hrs 12-18-78	H-3	(8.89 <u>±</u> 0.03)E-4	(1.00 <u>±</u> 0.10)E-3	Agreement
	Sr-89	(9 <u>±</u> 3)E-8	(3.44 <u>±</u> 1.06)E-7	No Comparison*
	Sr-90	(5 <u>±</u> 7)E-9	<1.91E-6	No Comparison*
	gross beta	(1.50 <u>±</u> 0.09)E-5	(1.18 <u>±</u> 0.12)E-5	Agreement
	gross alpha	(6 <u>±</u> 2)E-9	<2.93E-6	No Comparison*

*NOTE: These analyses could not be compared because of the less than values reported by the licensee for Sr-90 and gross alpha, and because the Sr-89 results had a large error. (See Attachment 1)

Attachment 1

Criteria for Comparing Analytical Measurements

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgement limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated uncertainty. As that ratio, referred to in this program as "Resolution", increases the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

<u>Resolution</u>	<u>Agreement</u>	<u>RATIO = $\frac{\text{LICENSEE VALUE}}{\text{NRC REFERENCE VALUE}}$</u>	
		<u>Possible Agreement A</u>	<u>Possible Agreement B</u>
<3	0.4 - 2.5	0.3 - 3.0	No Comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
>200	0.85 - 1.18	0.80 - 1.25	0.75 - 1.33

"A" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is greater than 250 Kev.

Tritium analyses of liquid samples.

Iodine on absorbers

"B" criteria are applied to the following analyses:

Gamma Spectrometry where principal gamma energy used for identification is less than 250 Kev.

89Sr and 90Sr Determinations.

Gross Beta where samples are counted on the same date using the same reference nuclide.