

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

REGION I

Report No. 50-334/81-22
Docket No. 50-334
License No. DPR-66 Priority -- Category C
Licensee: Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Facility Name: Beaver Valley Power Station, Unit 1

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: August 25-27, 1981

Inspectors: J. C. Jang
J. C. Jang, Radiation Specialist

9-30-81
date

J. C. Jang
for C. D. Evans, Radiation Specialist

9-30-81
date

Approved by: J. J. Kottan
for R. J. Bores, Chief, Independent Measurements
and Environmental Protection Section,
EP&PS Branch

date
9-30-81
date

Inspection Summary:

Inspection on August 25-27, 1981 (Report No. 50-334/81-22)

Areas Inspected: Routine, unannounced inspection of the licensee's chemical and radiochemical measurements program using the NRC:I Mobile Radiological Measurements Laboratory and with laboratory assistance provided by DOE Radiological and Environmental Service 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 records and procedures. The inspection involved 48 inspector-hours onsite by two NRC regionally based inspectors.

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

Region I Form 12
(Rev. April 1977)

DETAILS

1. Individuals Contacted

Principal Licensee Employees

*H. P. Williams, Station Superintendent
*J. W. Wenkhous, Reactor Control Chemist
*J. A. Kosmal, Radiation Control Supervisor
*V. J. Linnenbom, Radiochemist
*A. T. Lonnett, Radiation Control Foreman
*F. J. Lipchick, Senior Compliance Engineer
W. J. Brady, Radiation Control Foreman
S. Lacey, Chemical Engineer
S. Sovick, Senior Compliance Engineer

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

*denotes those present at exit interview.

2. Laboratory QC Program

The inspector reviewed the licensee's program for the quality control of analytical measurements. The inspector noted that the licensee's Administrative Controls Part 4 covers quality control for both reactor coolant chemistry analyses and radiological analyses of effluent samples. The licensee's effluent radiological analysis QC program consists of inter-laboratory comparisons. The licensee participates in the EPA cross check program as a part of the laboratory QC program. Also, the operating 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 this general area with the licensee. The inspector had no further questions in this area.

No items of noncompliance were identified.

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. BV-1-81-03 dated January 28-30, 1981. The inspector had no further questions in this area.

No items of noncompliance were identified.

4. Confirmatory Measurements

During the inspection, actual liquid and airborne effluent samples were split between the licensee and NRC:I for the purpose of intercomparison. The effluent samples were analyzed by the licensee using the licensee's normal methods and equipment, and by the NRC using the NRC:I Mobile Radiological Measurements Laboratory. A measurements comparison of an airborne particulate sample was not made during the inspection due to low activity on the particulate filter sample. Therefore, a spiked airborne particulate filter was presented to the licensee for analysis. This spiked sample was prepared by the NRC reference laboratory, Department of Energy, Radiological and Environmental Services Laboratory (RESL). Joint analyses of actual effluent and spiked 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, 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 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 1.

5. Records and procedures

The inspector reviewed the licensee's records and procedures.

A. Records

- (1) Gaseous discharge release permits (Gas Nos. 402-507): December 16, 1980 to January 19, 1981.
- (2) Liquid discharge release permits (Liquid Nos. 1508-1634): April 11, 1981 to June 31, 1981
- (3) Daily background and Source check for Ge(Li): January 1980 to August 27, 1981
- (4) Daily background and Source check for LSC: January 1980 to August 27, 1981
- (5) Daily background and Source check for G-M: January 1981 to August 27, 1981

- (6) Gas Proportional Detectors, NMC PC-4 Calibration Log Book: December 1, 1980 to February 30, 1981
- (7) Ge(Li) Calibration Record for "CESCO" Charcoal filter: August 21, 1981.

B. Procedures

- (1) BVPS - CM: Administrative Control, Part 4 - Laboratory Quality Control
- (2) BVPS - CM: Chapter 5, Radiochemistry Procedures
 - a. Strontium-89 and Strontium-90
 - b. Tritium procedure
 - c. Tritium sampling
 - d. Gross alpha counting procedure
 - e. Liquid Scintillation counting procedure
 - f. ND 100 Multichannel analyzer procedure
 - g. Iodine
 - h. Radioactive and Chemical analysis of gas samples
- (3) BVPS - CM: Chapter 6, Analytical Methods, "Boron, Spectrophotometric", "Boron, Titrimetric".
- (4) BVPS - CM: Chapter 6, Part 3, Chemical Solutions, Carrier calibration
 - a. Solution No. 211 Iodine
 - b. Solution No. 223 Strontium
 - c. Solution No. 227 Yttrium
- (5) BVPS - RCM: Chapter 4, 5.7., Counting instrument calibration and maintenance
- (6) BVPS - RCM: Chapter 5, 5.8., General practice, Chi squared test and counter control checks
- (7) BVPS - RCM: Chapter 4, RIP 4.4, Multi-Channel Analyzer system for in-Vivo counting

The Eberline Sam-2 single-channel analyzers with real time counting capability were instituted by BVPS for measurement of I-131, which might result from releases of radioactive iodine during an accident condition. The inspector noticed that the Sam-2's were also routinely used for screening of I-131 in charcoal filters taken for an implant airborne survey. If the screening indicated activity was present, then an isotopic analysis is performed. The inspector observed that no daily quality control checks were being performed and that no

efficiency calibration had been performed on the Sam-2's since November, 1979. The inspector discussed these findings and the licensee agreed to take necessary corrective action. The inspector stated that this area would be reviewed during a subsequent inspection. (50-224/81-22-01).

The inspector determined from discussions with a licensee technician that the calculated pre-release activity for Waste Gas Authorization Nos. 487 (dated 5-8-81); 492 (dated 5-11-81); and 507 (dated 6-19-81) had been calculated by using the pressure indicated on Bourdon gauge D1-GW-105A (calibrated 11-13-75) upstream of the sample bomb. However, procedure RM 6.6 section 2.7 requires that the waste gas decay tank pressure be obtained through Operations, by reading the pressure transducer output in the control room. The Bourdon gauge D1-GW-105A read systematically low by 3 psig; this error resulted in underestimating the pre-release calculations. The inspector stated that the failure to follow procedure RM 6.6 was an item of noncompliance (50-334/81-22-02).

The inspector had no further questions in this area.

6. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on August 27, 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. THE RESULTS OF THE COMPARISONS

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>NRC VALUE</u>	<u>LICENSEE VALUE</u>	<u>COMPARISON</u>
<u>RESULTS IN MICROCURIES PER MILLILITER</u>				
Reactor Coolant 8-25-81 1425	Mn-54	$(2.2 \pm 0.2) E-3$	$(3.0 \pm 0.6) E-3$	Agreement
	Co-58	$(1.8 \pm 0.2) E-3$	$(1.6 \pm 0.4) E-3$	Agreement
	Na-24	$(1.42 \pm 0.04) E-2$	$(1.17 \pm 0.05) E-2$	Agreement
	I-131	$(1.6 \pm 0.2) E-3$	$(1.6 \pm 0.4) E-3$	Agreement
	I-135	$(2.16 \pm 0.09) E-2$	$(1.6 \pm 0.2) E-2$	Possible Agreement
Liquid Waste Tank 8-25-81 1430	Mn-54	$(2.5 \pm 0.3) E-6$	$(2.5 \pm 0.9) E-6$	Agreement
	Co-58	$(1.9 \pm 0.3) E-6$	$(1.7 \pm 0.9) E-6$	Agreement
	Co-60	$(5.71 \pm 0.10) E-5$	$(5.5 \pm 0.2) E-5$	Agreement
	Cs-137	$(1.7 \pm 0.3) E-6$	$(2.9 \pm 0.6) E-6$	Agreement
Waste Gas 8-26-81 1430	Xe-133	$(2.27 \pm 0.07) E-4$	$(2.36 \pm 0.13) E-4$	Agreement

TABLE I. THE RESULTS OF THE COMPARISONS

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>NRC VALUE</u>	<u>LICENSEE VALUE</u>	<u>COMPARISON</u>
<u>RESULTS IN MICROCUIRES PER MILLILITER</u>				
Charcoal 8-26-81 0800	I-131	$(4.78 \pm 0.02) E-1$	$(5.51 \pm 0.02) E-1$	Agreement
	I-133	$(5.17 \pm 0.09) E-2$	$(6.91 \pm 0.14) E-2$	Agreement
Filter STD - 62A	Cs-134	$(1.4 \pm 0.05) E-3$	$(1.4 \pm 0.2) E-3$	Agreement
	Cs-137	$(4.06 \pm 0.12) E-3$	$(3.5 \pm 0.2) E-3$	Possible Agreement
	Co-60	$(2.13 \pm 0.06) E-3$	$(1.4 \pm 0.2) E-3$	Possible Agreement

Attachment 1

Criteria for Comparing Analytical Measurements

This attachment provided 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 relations 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 acceptable of a licensee's measurements should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

<u>Resolution</u>	<u>Agreement</u>	RATIO=NRC $\frac{\text{LICENSEE VALUE}}{\text{REFERENCE VALUE}}$	
		<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.