

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

Region I

Report No. 50-317/81-06
50-318/81-06
 Docket No. 50-317
50-318
 License No. DPR-53 Priority -- Category C
DPR-69 C

Licensee: Baltimore Gas and Electric Company
P. O. Box 1475
Baltimore, Maryland 21203

Facility Name: Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Inspection at: Lusby, Maryland

Inspection conducted: February 17-20, 1981

Inspectors: J. J. Kottar 3-13-81
 J. J. Kottar, Radiation Laboratory Specialist date signed
J. J. Kottar 3-13-81
for J. C. Jang, Radiation Specialist date signed

Approved by: Robert J. Bore 5-7-81
 R. J. Bore, Chief, Independent Measurements
 and Environmental Protection Section date signed

Inspection Summary:
Inspection on February 17-20, 1981 (Combined Report Nos. 50-317/81-06; 50-318/81-06)
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; performance on radiological analyses of split actual effluent samples; and effluent control records and procedures. The inspection involved 56 inspector-hours onsite by two NRC regionally based inspectors.
Results: Of the four areas inspected, four items of noncompliance were identified in one area (failure to follow procedures, paragraphs 4 and 5).

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DETAILS

1. Individuals Contacted

Principal Licensee Employees

- *L. B. Russell, Plant Superintendent
- *P. T. Crinigan, Senior Engineer
- S. E. Cherry, Principal Technician - Counting Room
- *G. E. Brobst, Chemistry Supervisor
- J. C. Speciale, Supervisor of Plant Chemistry

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

*denotes those present at the exit interview.

2. Licensee Action on Previous Inspection Findings

(Open) Infraction (317/78-13-01; 318/78-13-01): Failure to follow procedures-gaseous effluent totals. The inspector noted the licensee had not calculated his 12-month average gaseous effluent totals as required and, therefore, this was a recurrent item of noncompliance. The licensee did, however, calculate the 12-month gaseous effluent totals for the period January-December, 1980 prior to the inspector leaving the site. The totals were within the required limits of the Technical Specifications. (See Paragraph 5.)

3. Laboratory QC Program

The inspector reviewed the licensee's program for the quality control of analytical measurements. The licensee's procedure, RCP 1-103, Rad-Chem QC Procedure, covers quality control for both reactor coolant chemistry analyses and radiological analyses of effluent samples. The QC program includes monthly verification of chemical analytical instrumentation calibration curves, split sample analyses, recommended periodic inspections, and reagent control. Also, the operating procedures for the various individual counting instruments require daily source checks and for gamma spectroscopy systems, weekly efficiency checks and daily gain checks. The inspector reviewed the licensee's QC data for 1980 and 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. No items of noncompliance were identified in this area.

4. 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 the gamma isotopic measurement comparisons indicated that all of the measurements were in agreement or possible agreement under the criteria used for comparing results (see Attachment 1) with the exception of the gas sample analyses. The licensee used a 500 ml polybottle for sampling and analysis of waste gas decay tanks. However, the licensee used a 500 ml polybottle liquid calibration curve for the gas sample without making attenuation corrections. In addition, the inspector noted that the licensee's Procedure RCP 1-502, Sampling of Gases for Activity, requires that gas samples be taken and analyzed in gas vials. A temporary change to RCP 1-502 permitted sampling 40 ml of gas in a 500 ml polybottle, but the temporary change had expired in July, 1980. The present gas sampling method also involved sampling in the open atmosphere, as opposed to using a hooded enclosure or recirculating system, and therefore may present a radiological health hazard to personnel performing the sampling. The inspector stated that the failure to follow Procedure RCP 1-502 for gas sampling was an item of noncompliance (317/81-06-01; 318/81-06-01). During previous inspections, the licensee's gas measurements were in agreement or possible agreement with the NRC gas measurements when the licensee used a gas vial. The licensee's gas analyses results using the present system were higher than the NRC results. The licensee had not exceeded any technical specification release limits, however, since the error was in a conservative direction.

5. Records and Procedures

The inspector reviewed the licensee's procedures and records in the areas of plant chemistry and radiochemistry, and effluent radiochemistry. Procedure RCP 2-302, Liquid Scintillation System, requires the use of a quench curve for efficiency determinations. However, in reviewing the liquid scintillation counting data for 1981 to the date of inspection, the inspector noted that the licensee had not constructed a quench curve using the external standard channels ratio method and, therefore, was not determining the efficiency from the quench curve. Also in reviewing the

records and procedures the inspector noted that Procedure RCP 1-1001, Radiochemistry Analysis Determination of Gross Beta-Gamma (Alpha) Degassed Activity, requires the use of a self-absorption factor in determining the gross beta-gamma activity. The inspector reviewed the gross beta-gamma counting logs for 1981 to date and noted that the licensee was using a self-absorption factor of 1 for all samples. In discussing the matter with the licensee the inspector determined that, although the licensee had self-absorption curves, they were not being used. The inspector stated that the failure to calibrate the liquid scintillation system using a quench curve as required by Procedure RCP 2-302, and the failure to use the self-absorption factor in beta-gamma activity measurements as required by procedure RCP 1-1001, was an item of noncompliance (317/81-06-02; 318/81-06-02).

The inspector reviewed the calibration of the licensee's computer-based multichannel analyzer systems. Procedure RCP 2-301.4, Set Up and Calibration of the Gamma Ray Spectrometer with GE(Li) Detector, requires the use of three separate standards for each geometry for systematic error estimation, requires the determination of the overall standard deviation for the analysis; requires the use of specific log sheets with specific data; and specifies the geometries to be calibrated. The inspector noted that the licensee had not followed RCP 2-301.4 in calibrating his systems in that: three separate standards were not used for each geometry; the overall standard deviation for the analysis was not determined; the required log sheets were not used; and calibrations for required geometries, specifically, for the gas vial, were not calibrated. The inspector stated that this was an item of noncompliance (317/81-06-03; 318/81-06-03).

In Inspection Report 50-317/78-13, 50-318/78-08 an item of noncompliance was identified in which the licensee failed to follow Procedure RCP 1-207, Gaseous Waste Releases Specifications and Surveillance, with respect to calculating the 12 month release rate. The item recurred during Inspection 50-317/79-02, 50-318/79-02. During this inspection the inspector noted that the licensee again did not have the 12-Month Release Rate Calculation Sheet completed through December, 1980 as required by Procedure RCP 1-207. The inspector stated that this was again a recurring item of noncompliance (317/81-06-04; 318/81-06-04). The licensee did, however, calculate the 12-month gaseous effluent totals for the period January-December, 1980 prior to the inspector leaving the site.

The inspector determined that no release limits had been exceeded.

6. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on February 20, 1981. The inspector summarized the purpose and scope of the inspection and the inspection findings, including each item of noncompliance.

The licensee agreed to perform the analyses listed in paragraph 4 and report the results to the NRC.

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>LICENSEE VALUE</u>	
		RATIO= NRC 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.