

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

Region I

Report No. 50-317/79-04
50-318/79-04
Docket No. 50-317
50-318
License No. DPR-53 Priority - Category C
DPR-69
Licensee: Baltimore Gas and Electric Company (BG&E)
Charles Center
Baltimore, Maryland 21203

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

Inspection at: Calvert Cliffs site at Lusby, Maryland, and at the
BG&E Corporate Offices in Baltimore, Maryland

Inspection conducted: February 12-16, 1979

Inspectors: M. Shanbaky 3/24/1979
M. M. Shanbaky, Radiation Specialist date signed

date signed

date signed

Approved by: Robert J. Boes 3/27/79
J. P. Stohr, Chief, Environmental and date signed
for Special Projects Section, FF&MS Branch

Inspection Summary:

Inspection on February 12-16, 1979 (Combined Report No. 50-317/79-04 and 50-318/79-04)
Areas Inspected: Routine, unannounced inspection of environmental monitoring programs for operations, including: the management controls for these programs; the program for quality control of analytical measurements; implementation of the environmental monitoring programs-radiological; implementation of the environmental monitoring programs-biological/ecological; nonradioactive effluent release rates and limits; and a followup on the licensee's action on previous environmental inspection findings. The inspection involved 40 onsite inspector-hours by one NRC inspector.
Results: Of the five areas inspected, no items of noncompliance were found in three areas. Four apparent items of noncompliance (Infraction - failure to review required procedures - Detail 6.d; Deficiency - failure to meet required analytical sensitivity for Sr-90 and Sr-89 in fish samples - Detail 6.a; Deficiency - failure to collect and analyze food crops as required - Detail 6.e; and, Deficiency - exceeding the discharge pH limits - Detail 8.c) were identified in two areas.

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DETAILS

1. Persons Contacted

Baltimore Gas and Electric Company - Calvert Cliffs Site

- *L. B. Russell, Chief Engineer
- *A. J. Kaupa, Radiation Safety and Chemistry Engineer
- *J. T. Carroll, Performance Engineer
- *R. F. Eherts, Performance Engineer
- P. T. Crinigan, Engineer
- S. Davis, Performance Engineer
- P. Rizzo, Assistant General Foreman - I&C
- J. Carlson, Radiation Safety and Chemistry Foreman
- S. K. Koranek, Radiation and Chemistry Control Technician
- W. Herring, I&C Technician
- P. McGreevy, I&C Technician

Baltimore Gas and Electric Company - Corporate Offices

- *J. W. Stout, Jr., Chief Environmental Engineer
- *A. Rafi, Senior Chemist
- *N. G. Lassahn, Engineer
- W. D. Gunter, Field Technician

* denotes those present at the exit interview.

2. Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (317-77-27-01; 318/77-24-01): Failure to follow procedures. The inspector determined through discussion with the licensee and review of procedures and audit results, that the fish impingement study procedures were revised, approved and implemented as required. This item is closed.

(Open) Noncompliance (317/77-27-02; 318/77-24-02): Failure to have reviewed/approved procedures. The inspector reviewed a sample of the licensee's radiochemical analytical and calibration procedures. The inspector noted that these procedures were not approved by the Chief Environmental Engineer prior to implementation as required. The inspector stated that this was an uncorrected item of noncompliance (Details, 6.d).

(Closed) Noncompliance (317/77-27-03; 318/77-24-04): Failure to determine plankton diversity indices. The licensee stated that the required plankton diversity indices were calculated. The inspector reviewed a sample of the collected plankton data during 1978 and noted that the plankton diversity indices calculations were performed as required. This item is closed.

(Closed) Noncompliance (318/77-24-03): Failure to meet Cs-134, Cs-137 and I-131 sensitivity levels in vegetation. The inspector examined a sample of the analytical results for vegetation and noted that the required analytical sensitivities were met. This item is closed. (Details, Paragraph 6.e)

(Closed) Unresolved (317/77-27-04; 318/77-24-05): Clarification of requirements for plankton biomass determination. The inspector noted that the plankton biomass was determined by using the chlorophyll "A" method. The acceptability of the use of this method was discussed with the licensee and NRR staff. The method is acceptable to be used for biomass estimation. This item is closed.

(Closed) Noncompliance (318/77-24-07): Failure to report use of chlorine in salt water system prior to use. The inspector discussed with the licensee the chlorination operations of the salt water system and noted that system chlorination continued during 1978. The licensee stated that the special chlorination study was conducted in accordance with the State of Maryland permit and was reported to the NRC as required in a letter dated March 20, 1978. This item is closed (Detail, Paragraph 8.b).

3. Management Controls

a. Assignment of Responsibility

The inspector reviewed the organization and administration of the environmental monitoring programs with respect to changes made since the last inspection of this area. The inspector noted that this area remained essentially the same as previously described in the IE Inspection Reports Nos. 317/76-18, 317/77-27 and 318/77-24. One change was noted, in that Mr. R. Eherts, Performance Engineer, is now responsible for coordination between the CC site and the environmental group at BG&E corporate offices in Baltimore. In addition, Mr. Eherts is responsible for submitting to the NRC all nonroutine reports related to

environmental matters. Mr. Eherts reports to Mr. L. Russell, Chief Engineer, through Mr. A. Kaupa, Radiation Safety and Chemistry Engineer. With regard to environmental sample analyses all the required radiological analyses of environmental media with the exception of Sr-89, 90, are now performed by the Test Department Laboratory of BG&E in Baltimore.

b. Program Review and Audits

The inspector reviewed the environmental monitoring program audits and noted that audits were performed by the BG&E QA Group during 1978. The inspector noted that the program review function and procedures remains essentially the same as previously reported (IE reports 317/77-27; 318/77-24 and 317/76-18). The inspector reviewed the environmental audit results (Audit No. QAP-19) and discussed with the licensee the followup on the audit results and procedures for taking corrective action on identified audit inadequacies. The inspector noted that the audit results were reported to licensee management and corrective actions were initiated or completed at the time of the inspection.

No items of noncompliance were identified in this area.

4. Licensee Program for Quality Control of Analytical Measurements

The inspector discussed with the licensee the quality control (QC) of analytical measurements as related to the radiological analyses of environmental media. The licensee stated that there is no formal QC program since there is no specific ETS requirements in this area, however, analytical QC measures are implemented at the Test Department Laboratory. The licensee stated that the Test Department Laboratory is now participating in the U. S. Environmental Protection Agency (EPA) QC intercomparison program. The inspector noted that analytical contractor (RMC) services were used as an additional verification method of the QC of analytical measurements.

The inspector examined a sample of the QC analytical results for gross beta, I-131 and gamma spectroscopic analyses in water. The inspector noted that the Test Laboratory results were in general agreement with the EPA spiked values for the above listed analyses. One discrepancy between the EPA and the Test Laboratory was noted by the inspector during his review of the gamma spectroscopic analyses of water results. An EPA known spike of Cr-51 was 117

pCi/l and the Test Laboratory analytical result showed less than 39 pCi/l of Cr-51. The inspector discussed this discrepancy with the licensee and noted that the licensee had performed an investigation to identify the cause of this apparent analytical problem. The licensee stated that this discrepancy resulted from a sample contamination with Sn-114. The licensee stated this problem was corrected and action was taken to prevent recurrence. The inspector had no further questions in this area. No items of noncompliance were identified.

5. Routine and Nonroutine Reports

a. Annual Radiological Report

The inspector reviewed the licensee's annual report on the radiological environmental monitoring program for the period from January 1 to December 31, 1977. The inspector observed no missing data, obvious mistakes, anomalous measurements or bias in the data other than discussed in the report. The inspector verified that the report was submitted to the NRC at the required time and included the required environmental radiation monitoring program results.

b. Annual Biological/Ecological Report

The inspector reviewed the licensee's annual report on biological and ecological monitoring program for the period from January 1 to December 31, 1977. The inspector observed no missing data, obvious mistakes, anomalous measurements or bias in the submitted data other than discussed in the report. The inspector verified that the report was submitted in compliance with Section 5.6.1 of the CC, ETS and included the required biological and ecological monitoring results.

c. Nonroutine Reports

The inspector reviewed the licensee event reports (LERs 77-01, 78-10, 78-32, 78-43, 78-56 and 78-57). These reports discussed and evaluated fish impingement, anomalous measurements and inadvertent thermal or chemical release events exceeding the ETS limits. These events are discussed in Paragraphs 6 and 8. The inspector noted through reports review and discussion with the licensee that the LERs were submitted to the NRC as required.

6. Implementation of the Environmental Monitoring Program - Radiological

a. Direct Observations

The inspector examined a number of the air sampling and direct radiation monitoring stations. The inspector examined the operability and the location of the monitoring stations and noted that all the examined stations were in an operable condition and located at the required locations. The inspector had no further questions in this area.

b. Aquatic Sampling and Analyses

The inspector reviewed the licensee analytical results of the aquatic samples which were collected during 1977 and 1978, including oyster samples. The inspector noted that Ag-110m continued to be observed in oyster samples collected from Camp Conoy location. Camp Conoy is located at about 200 yards southeast of the plant outfall (Location No. 5). The inspector examined the plant discharges of Ag-110m and noted that the quarterly discharge levels of Ag-110m were declining. The following were the licensee recorded Ag-110m discharges:

<u>Discharge Period</u>	<u>Total Activity (Ci)</u>
Third Quarter of 1977	7.65×10^{-2}
Fourth Quarter of 1977	2.53×10^{-2}
First Quarter of 1978	1.06×10^{-2}
Second Quarter of 1978	5.45×10^{-3}
Third Quarter of 1978	2.26×10^{-2}
Fourth Quarter of 1978	5.38×10^{-3}

The inspector determined through review of discharge records and discussion with the licensee that the oyster Ag-110m levels were related to the plant operations. The inspector reviewed the licensee dose calculations and verified by independent calculations that the dose to individuals was a small fraction of the regulatory limits (40 CFR Part 190). The licensee estimated doses to the general public consuming the Camp Conoy oysters (81 pCi/Kg of Ag-110m) were 3×10^{-2} mrem to the GI tract and 4×10^{-5} mrem to the whole body. The inspector's calculation yielded a dose equivalent of 5.0×10^{-3} mrem and 7.1×10^{-6} mrem to the GI and whole body, respectively. (The 10 CFR, Part 50, Appendix I design criteria are based on an annual projected dose of 3 mrem/unit.) The inspector had no further questions in this area at this time.

The inspector reviewed the 1977-1978 fish sampling and analyses results. The inspector noted that the collected fish were analyzed as required, however, the required analytical sensitivities for Sr-89 and Sr-90 were not met. Table 3.2-2 of Section 3.2 of the CC, ETS requires that the Lower Limit of Detection, (LLD) for Sr-89 and Sr-90 shall be 40 and 8 pCi/Kg-wet, respectively. The inspector verified by calculation that the LLD for Sr-89 and Sr-90 were not met. The inspector stated that failure to achieve the required LLDs was an item of noncompliance (317/79-04-01 and 318/79-04-01). The licensee discussed with the analytical contractor the apparent Sr-89 and Sr-90 LLD problem. The analytical contractor stated that the required LLDs for Sr-89 and Sr-90 in fish are unrealistic since the required sample size to meet these LLDs is impractically large.

c. Milk Sampling and Analyses

The inspector reviewed the licensee's semiannual cow surveys. The licensee stated that the cow surveys were performed as required during May and November, 1978. The May 1978 survey results showed that a cow was found at location 16. The licensee's documentation showed that the cow had just calved at that time and the milk was used to feed the calf therefore no milk was available for analyses at that time. Section 3.2, Table 3.2-1 of the CC, ETS requires that pasture and forage are to be sampled from Location 16, monthly, when the cows are on pasture and analyzed for gamma spectrum and Sr-89-90. The licensee stated that pasture and forage samples were not collected and analyzed because the cow was on stored dry feed. The inspector discussed with the licensee the potential pathway to man and stated that, as required by the ETS, pasture and forage samples are to be collected and analyzed once a potential pathway to man exists. The licensee stated that the required forage sampling and analyses will be performed when the cows are found on pasture.

The inspector discussed with the licensee the November 1978 cow survey. The licensee stated that cows were documented to exist at one of the nearby locations. The results of the November 1978 cow survey were not available at the time of the inspection. The licensee stated that the survey results were in a draft form and would be finalized in the near future. The inspector stated that this area would be considered unresolved pending documentation of the cow survey and the feeding regime of the existing cows in the area (317/79-04-02; 318/79-04-02).

d. Radiochemical and Analytical Procedures

The inspector reviewed a sample of the licensee's environmental monitoring procedures. The inspector noted that these procedures including, radioanalytical and instrument calibration procedures were not reviewed by the Environmental Engineering Group and approved by the Chief Environmental Engineer prior to implementation. The licensee stated that the analyses of environmental samples is now the responsibility of the Chemical Engineering and Test Section and all the required procedures were reviewed by the Chemical Engineering and Test Section and approved by the Chief Chemical Engineer. The licensee stated that procedures for portions of the program, including TLD and Sr-89, 90 analysis, which are still being conducted by RMC were reviewed and approved by the Environmental Engineering Group and an approval letter was sent to RMC in July 1976. The inspector stated that this was previously (IE Report 317/77-27 and 318/77-24) identified as an item of noncompliance and in reply to this item in a letter dated February 3, 1978 from BG&E to the NRC, assurances were given to the NRC that the procedures would be reviewed and approved as required. This action was to be completed by March 31, 1978. The inspector stated that failure to review and approve the environmental operating procedures and changes thereto was an uncorrected item of noncompliance (317/79-04-03; 318/79-04-03).

e. Vegetation Sampling and Analyses

The inspector discussed with the licensee the vegetation sampling and reviewed a sample of the vegetation analytical results for 1977-1978. The inspector verified that the vegetation samples were collected, when available, analyzed and the LLD for Cs-134, Cs-137 and I-131 were met with the exception of the lettuce, spinach and kale samples which were collected in June 1977. The June 1977 vegetation samples analytical results showed that the required LLD for Cs-134, Cs-137 and I-131 were not met. In reply to this item, in a letter dated February 3, 1978, BG&E stated that the vegetation sampled in June 1977, was not collected as part of the CC ETS program. The inspector verified, through discussion with the licensee and review of sampling and analytical records, that these food crop samples were collected from an experimental garden at one of the required sampling locations (Location 14). This failure to meet the required LLD was a correctly identified item of noncompliance (318/77-24-03). The inspector examined several of the analytical data for the food crop samples which were

collected and analyzed during 1978. The inspector noted that the required LLD for Cs-134, Cs-137 and I-131 were met. The licensee stated the vegetation samples were analyzed at the BG&E analytical laboratory. The inspector stated that since corrective actions and actions to prevent recurrence of this item, including the QC measures taken at the BG&E laboratory were completed, no additional reply to this item is required.

The inspector noted through review of sampling records, discussion with the licensee and review of the Annual Radiological Environmental Monitoring Report that the food crop samples were not collected at the time of harvest as required. Soybean and corn samples were collected during November 1978 and December 1977. The inspector stated that failure to collect the food crop samples at the time of harvest as required, was an item of noncompliance (317/79-04-04; 318/79-04-04).

The inspector noted, through review of reports and discussion with the licensee, that the required food crops were not collected from locations No. 15 and 16 during 1977. The inspector stated that failure to collect and analyze food crops from these locations as required was an item of noncompliance (317/79-04-04; 318/79-04-04). The licensee stated that no food crops were available at the program-specified sampling farms at these locations. The inspector stated that the ETS did not require sampling from specific farms and that locations 14, 15 and 16 applied to farms in the general proximity to these locations as required by Table 3.2-1 and Figure 3.2-1 of Section 3.2 of the Environmental Technical Specifications.

f. Meteorology

The inspector examined the onsite meteorological instrumentation and the readout system at the control room. The examined meteorological instruments appeared in an operable condition at the time of the inspection. The inspector discussed with the licensee the meteorological data recovery. The licensee stated that the overall recovery of meteorological data during 1978 was better than 90%. The licensee stated that the system was calibrated and the calibration results were documented. The calibration results were maintained at the BG&E Performance and Test Group in Baltimore. The inspector stated that this item will remain as unresolved until the system calibration results and the reduced meteorological data for 1978 are available and reviewed during an inspection (317/79-04-05, 318/79-04-05).

7. Implementation of the Environmental Monitoring Program - Biological/ Ecological

The inspector reviewed by discussion with the licensee and examination of reported biological data (1977 report), the implementation status of the biological/ecological monitoring program. The licensee stated that the 1978 biological studies were completed as required by the ETS. The inspector reviewed a draft of the 1978 annual biological monitoring program. The licensee stated that the 1978 biological studies were completed as required by the ETS. The inspector reviewed a draft of the 1978 annual biological monitoring report. The inspector also examined a selective portions of the biological program including the fish impingement, oyster, blue crab and fish trawl studies. The inspector noted that these studies were performed in accordance with Section 3.1.2 of the ETS. The inspector had no further questions in this area at this time.

8. Nonradioactive Effluent Release Rates and Limits

a. Thermal Releases

The inspector determined through review of the plant thermal discharge records and examination of the thermal monitoring equipment and the associated readout systems, that the plant thermal discharges were in compliance with the current NRC regulatory limits during 1978 and up to the time of this inspection with the following exception. The condenser ΔT Limiting Condition for Operation was exceeded on July 14, 1978. This item of noncompliance was identified in IE Report No. 317/78-24 and 318/78-18 and reported by the licensee to the NRC (LER 78-35/4T). No reply to this item was required since the licensee's corrective action was completed. No items of noncompliance were identified.

The inspector discussed with the licensee the thermal discharge monitoring system accuracy and calibration. The licensee stated that the system Resistance Temperature Detectors (RTDs) are calibrated in accordance with procedure No. FTI-123. The inspector examined a copy of the RTD calibration procedures and noted that the procedures did not establish frequency for system calibration and system accuracy verification. The licensee stated that establishing of calibration frequencies for all RTDs is undergoing a plant management review, however, the non-safety related RTDs, including the condenser RTDs, are currently calibrated every two refueling (approximately 2 years). The inspector stated that until the RTD calibration frequency and accuracy verification are evaluated, established, and incorporated in the plant procedures, this item would be considered unresolved (317/79-04-06; 318/79-04-06).

b. Chlorination and Chlorine Monitoring

The inspector noted that the licensee continued the salt water system special chlorination study during 1978. The inspector determined, through records review and discussion with the licensee, that the special salt water chlorination study was approved by the State of Maryland and reported to the NRC in a letter dated March 20, 1978. The inspector noted that the chlorination and chlorine discharge monitoring operations were conducted in accordance with plant approved procedures (OI-29). No items of noncompliance were identified in this area.

c. Discharges pH

The inspector reviewed a sample of the neutralizing tanks pH records for 1978. The inspector determined that, other than for the reported event, the discharge pH limits were not exceeded. The inspector noted, through review of the Licensee Event Report (LER-78-57) that the neutralizing tank discharge pH was out of the ETS limits (6.0-9.0) during tank discharges on December 16, 1978. The licensee reported that 172 gallons of caustic solution and 15 gallons of acid were inadvertently discharged to the bay. The inspector noted that the caustic solution was diluted with the circulating water flow prior to reaching the bay. The inspector discussed with the licensee the cause of this event and actions taken to prevent recurrence. The licensee stated that the cause of this event was determined to be an inadvertent operator action. The licensee stated that the discharge was stopped and all the involved operators were re-instructed in proper operation of the system. In addition, to prevent recurrence, valve position check prior to regeneration operations was incorporated in the system operating procedures. The inspector stated that since the reported event resulted in an actual release from the site exceeding the ETS regulatory limits, this would be cited as an item of noncompliance (317/79-04-07; 318/79-04-07). The inspector stated that since corrective actions to prevent recurrence were completed and adequate management controls were implemented in this area, no further reply to this item is required.

9. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance or deviations. Three unresolved items were disclosed during this inspection as described in Details 6.c, 6.f and 8.a.

10. Exit Interview

On February 14 and 16, 1979, the inspector met at the Calvert Cliffs Nuclear Power Plant and at the corporate offices of Baltimore Gas and Electric Company, respectively, with the individuals noted in Detail 1. On March 8, 1979, the inspector contacted Dr. A Rafi of BG&E by telephone. During these meetings/contacts, the inspector discussed with the licensee the scope and findings of this inspection, including each item of noncompliance and the unresolved items.