

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

POOR ORIGINAL

Inspection Report No: 50-317/75-17 Docket No: 50-317
 Licensee: Baltimore Gas and Electric Company License No: DPR-53
Gas and Electric Building Priority: _____
Charles Center Category: C
Baltimore, Maryland 21203 Safeguards Group: _____
 Location: Calvert Cliffs 1, Lusby, Maryland
 Type of Licensee: PWR, 2560 Mw (CE)
 Type of Inspection: Special Inspection
 Dates of Inspection: July 1-2, 1975
 Dates of Previous Inspection: _____
 Reporting Inspector: R. J. Meyer 8/6/75
R. J. Meyer, Radiation Specialist DATE
 Accompanying Inspectors: None _____ DATE
 _____ DATE
 _____ DATE
 Other Accompanying Personnel: None _____ DATE
 Reviewed By: P. J. Knapp 8-6-75
P. J. Knapp, Chief, Facilities Radiological DATE
Protection Section

Enclosure 3
Attachment 2

8002 190 911

SUMMARY OF FINDINGS

Enforcement Action

A. Items of Noncompliance

1. Violations

None

2. Infractions

None

3. Deficiencies

None

B. Deviations

None

Licensee Action on Previously Identified Enforcement Action

Not applicable

Other Significant Findings

A. Current Findings

1. General

The inspection was specific to a review of circumstances relating to an unplanned release of radioactive gas to the Auxiliary Building, with subsequent release via the plant vent. Inspection findings showed that the release resulted from excessive leakage of degassing primary coolant through the piston rod packings on charging pumps Nos. 11 and 13. The licensee initiated investigative actions upon receipt of radiation monitor alarms and other indicators and took corrective actions to terminate the release upon identification of the leak. Maximum personnel contamination, resulting from the gas permeating the hair and clothing, was 4,000 disintegrations per minute (dpm)

per probe area. No personnel overexposures occurred. Release rate from the plant vent was approximately 4% of the technical specification limit. Licensee reported the event in accordance with technical specification requirements.

2. Unresolved Item

Licensee's program to review and resolve air balance problems in the Auxiliary Building. (Details, Paragraphs 5a & b)

3. Infractions and Deficiencies Identified by Licensee

Not applicable

4. Status of Previously Reported Unresolved Items

Resolution of waste gas system problem remains unresolved. (Ref: IE Inspection Reports 50-317/75-10 and 50-317/75-15)

Management Interview

The following individuals attended the management interview at the conclusion of the inspection on July 2, 1975.

R. Douglass, Chief Engineer

J. Tiernan, Radiation Safety and Chemistry Engineer

The following subjects were discussed:

- A. The inspector stated that the inspection was limited to a review of the circumstances relating to the unplanned gaseous release occurring on July 1, 1975 and that no items of noncompliance had been noted in the areas of review. (Details, Paragraphs 2-5)
- B. The inspector discussed the air balance problems he had noted during the inspection. The licensee stated that the air balance would be evaluated and corrective measures accomplished. Tentative completion schedule was established as one month, that is, about August 1, 1975. The inspector identified this as an unresolved item pending completion of program. (Details, Paragraphs 5.a & b)

DETAILS

1. Persons Contacted

R. Douglass, Chief Engineer
J. Tiernan, Radiation Safety and Chemistry Engineer
A. Kaupa, Staff Engineer, Chemistry
J. Speciale, Rad-Chem Foreman
J. Schlag, Principal, Rad-Chem Technician
P. Steinbach, Resident Engineer, BG&E, Unit 2
J. Hill, Shift Supervisor, Operations

2. Event Chronology

Sequential aspects of the event, as determined from the Health Physics Log and survey records, Control Room and Shift Supervisor's Log and discussions with licensee representatives, were as follows:

- 0900 hours - Two individuals exiting from the Auxiliary Building, Unit 1 side, with personal clothing contamination (4,000 dpm).

Received a control room alarm on the fuel handling area ventilation radiation monitor.
- 0915 hours - Auxiliary Building evacuated; other radiation monitor readouts reviewed.

Twelve individuals exiting from the auxiliary building, Unit 1, with contamination on their person and clothing (1,500 to 4,000 dpm).
- 0930 hours - Initiated investigation which included general and specific air sampling and contamination surveys in the Auxiliary Building.

Continued the above to 1540; termination of event.
- 0945 hours - Sampled plant vent exhaust.
- 1000 hours - Evacuated construction workers, Unit 2 side - Precautionary action - All individuals received personal survey - No personal contamination experienced.

- 1018 hours - Leak source identified as charging pumps; No. 11 charging pump stopped - leak at piston rod packing.
- 1025 hours - No. 13 charging pump stopped and isolated for maintenance - leak at piston rod packing.
- 1100 hours - Plant vent monitor trend turned down.
- 1205 hours - Started fuel handling area ventilation system.
- 1210 hours - No. 11 charging pump isolated.
- 1415 hours - Plant vent monitor returned to normal.
- 1445 hours - Unit 2 released to normal status.
- 1530 hours - Sampled plant vent, normal background.
- 1555 hours - Stopped fuel handling area ventilation system.
- 2200 hours - Charging pumps returned to service.

3. Release Statistics

<u>Release Rate</u>	<u>Release Rate Limit (T/S)</u>	<u>Total Release</u>
$1.8 \times 10^4 \text{ m}^3/\text{sec.}$	$3.85 \times 10^5 \text{ m}^3/\text{sec.}$	100 Ci (Xenon-133 & 135)
<0.002 uCi/sec.	2.0 uCi/sec.	30 uCi (Iodine-131)
Particulates (>8 day $T_{1/2}$)	Not detected	

4. Summary Description

- a. On July 1, 1975 at approximately 0900 hours, two individuals, exiting from the controlled access area had detectable contamination (4,000 dpm) on their person and clothing. At approximately the same time the fuel handling area gaseous monitor alarmed. Various other monitoring systems were showing higher than normal radiation levels. Personnel contamination events and radiation monitors indicated that airborne radioactivity was present in the Auxiliary Building. Evacuation of the building was initiated. At 0915 hours fourteen individuals exited from the area. These individuals were also contaminated to comparable levels.

- b. An investigation to determine the cause was initiated. This included general and specific air samples and surveys of the Unit 1 and Unit 2 sides of the Auxiliary Building. Airborne radioactivity above the normally experienced activities were found to be generally present on the Unit 1 side. At approximately 1000 hours, the Unit 2 side, occupied by construction workers, was evacuated through established check points. No personal contamination was detected on these individuals. These individuals were evacuated as a precautionary measure, in that the Auxiliary Building is common to both units and separated only by a security fence with Unit 2 being maintained as an unrestricted area.
- c. Through continuing surveys, the source of the gaseous leakage was determined to be the charging pumps. Specifically, pumps No. 11 and 13 were leaking primary coolant through the packing on the piston rods. Degassing of the primary coolant occurred in the charging pump room and the Auxiliary Building sump, located outside the room and immediately adjacent to the separating fence between Unit 1 and Unit 2. This is an open sump and collects water from the floor drain in the charging pump room. This sump is at the minus 10 foot level immediately adjacent to the separating fence between Units 1 and 2. Some gaseous activity exfiltrated to the Unit 2 side but was limited to a small area. The area was not occupied and air concentrations did not exceed applicable limits.
- d. Upon determination that the charging pumps were the source of leakage, pump No. 11 was shut down at 1018 hours followed by shutdown and isolation of pump No. 13 at 1025 hours. The pump packings were subsequently replaced and the pumps were returned to service at 2200 hours. Subsequent to the determination that off-gassing was occurring at the auxiliary sump, the sump was equipped with an exhaustor that exhausts back to the charging pump room. This eliminated distribution of gaseous activity to the building proper.
- e. By 1230 hours air concentrations were returning to normal (10^{-10} uCi/ml). The Unit 2 side was returned to unrestricted access status at 1445 hours. During the course of event no individuals were exposed to excessive air concentrations of radioactivity. Isotopic analysis showed the predominant isotope to be Xenon-133. Other identified isotopes included Xenon-135 and the particulates, Cesium-138 and Rubidium-88. Iodine and long lived particulates were not identified in general grab

samples; however, Iodine-131 was collected on the charcoal filter in the main vent sampling system.

- f. The licensee issued a press release on July 1, following the event. On July 2, the day following the event, licensee representatives participated in a construction employee safety meeting to describe the event and answer employee questions. The inspector attended this meeting as an observer. Specific concerns were not raised by attending employees.

5. Inspection Findings

- a. During the course of the inspector's review of the event, survey results suggested that air balance in the Auxiliary Building was less than desirable. It was noted that elevated air concentrations existed in areas far removed from the source of leakage, specifically the fuel handling area which is several elevations removed. The inspector conducted smoke tests to determine existing air flow direction. The tests were conducted on July 2, 1975. Test results are noted below:

-15' Elevation - At the fence separating Units 1 and 2 flow was from Unit 1 to Unit 2.

-10' Elevation (Source of leakage elevation) - Flow was from the corridor to the charging pump room. At the separating fence near the Auxiliary Building sump area, flow was stagnant with slow drift from Unit 1 to Unit 2. At the elevator vestibule near the Auxiliary Building sump, flow was generally to and into the elevator.

+5' Elevation - Flow was from the elevator to the vestibule. At the degassifier room flow was from the corridor to the room. At the VCT room flow was to the room. At the separating fence near the VCT room flow was from Unit 1 to Unit 2. Near the boric acid storage tanks at the separating fence, flow was from Unit 1 to Unit 2. Near the waste gas room at the separating fence flow was from Unit 2 to Unit 1.

+27' Elevation - Flow was from the elevator to the vestibule to the corridor. Flow at the heat exchanger room was marginally from the corridor to the room. At the separating fence flow was from Unit 2 to Unit 1. Along the valveway flow was from the rooms to the corridor. At the letdown filter room entrance, flow was stagnant.

+45' Elevation - Flow was from the elevator to the vestibule and the general area. At the separating fence in the cask loading area flow was from Unit 1 to Unit 2.

+69' Elevation - Flow was from the elevator to the vestibule to the fuel handling area to the passageway connecting the access control point.

- b. The inspector reviewed the results of the smoke tests with the licensee. The licensee agreed that air balance problems existed in the Auxiliary Building and stated that a program to evaluate and correct these problems would be initiated. The licensee established a tentative completion date for this program as one month from the date of the inspection. The inspector stated this would be considered as an unresolved item and reviewed during subsequent inspections.

Evaluation and Clarification of Incident

Personnel were exposed to low levels of airborne radioactive materials (less than 2% of the Maximum Permissible Concentration).

The concentrations of airborne radioactive material in Units 1 and 2 were measured and the times that persons were present in these concentrations were determined. Based on this information it was determined that personnel in Units 1 and 2 were exposed to approximately 0.9% and 1.7% of the applicable limits, respectively.

The reactor coolant pumps were not involved in this incident in any way. The leaking packing was on the pistons of the positive displacement coolant charging pumps. This packing has a design leakage at all times and the auxiliary building is designed to contain radioactive materials released from this leakage.

Enclosure 3
Attachment 3

OFFICE ➤						
SURNAME ➤						
DATE ➤						