

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos. 50-317/83-01
50-318/83-01

Docket Nos. 50-317
50-318

License Nos. DPR-53 Priority -- Category C
DPR-69

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: January 17-21, 1983

Inspectors: M. H. McBride 2/24/83
M. H. McBride, FhD, Radiation Specialist date

Approved by: M. Shanbaky 2/24/83
M. Shanbaky, PhD, Chief, Facilities date
Radiation Protection Section

Inspection Summary: Inspection on January 17-21, 1983 (Inspection Report No. 50-317/83-01 and 50-318/83-01)

Areas Inspected: Routine, unannounced safety inspection by a regionally based inspector of the radiation protection program, including followup on previously identified items and followup on two incidents in 1982 involving resin transfer to shipping cask liners. This inspection involved 43 inspector-hours onsite by one inspector.

Results: One violation was identified, failure to establish adequate procedures for respiratory protective equipment (Paragraph 4.2). Four open items were reviewed and closed.

DETAILS

1. Individuals Contacted

- * J. Carlson, Supervisor, Radiation Control
- J. Lenhart, Radiological Support Supervisor
- * N. Millis, General Supervisor, Radiation Safety
- * J. Tiernan, Manager, Nuclear Power
- * R. Wenderlich, Senior Engineer, Operations
- C. Zapp, Senior Control Room Operator

*denotes those present at the exit interview on January 21, 1983. Other individuals were also contacted.

2. Licensee Action on Previous Inspection Findings

- 2.1 (Closed) Violation (317/82-06-01): Failure to have written procedures for control of radiological conditions associated with repair of the Incore Flux Monitoring System in the spent fuel pool. The licensee's response, dated October 13, 1982, stated that a new procedure, RV-68, "Incore Instrument Removal," was issued, which provided for worker briefings, use of Special Work Permits (SWPs), added radiological precautions, and appropriate hold points for notification of the Radiological Controls Unit. The inspector reviewed this procedure and verified the adequacy of the radiological control measures.
- 2.2 (Closed) Violation (317/82-06-02): Improper use of a general Radiation Work Permit (RWP) for work in the spent fuel pool. The licensee response, dated October 13, 1982, stated that job-specific SWP's will be used to control all maintenance work in the spent fuel pool, regardless of work scope. The inspector verified through a review of documentation of current fuel pool work, review of licensee procedures and through discussions with licensee personnel that spent fuel pool work is being controlled with job-specific SWP's. This corrective action appeared adequate.
- 2.3 (Closed) Violation (317/82-06-03): Failure to adequately survey the radiological conditions associated with manipulation of In-Core Instrument wire in the spent fuel pool. The licensee response, dated October 13, 1982, stated that all maintenance work in the spent fuel pool will be continuously monitored by a Health Physics Technician. The implementation of this corrective action was verified by observations of current fuel pool work and review of licensee procedures.
- 2.4 (Closed) Inspector Followup Item (317/82-06-04): Verify audibility of local alarms of the area radiation monitors near the spent fuel pool. The inspector verified that the local alarms for the area radiation monitors near the spent fuel pool were audible.

3. Resin Transfer Incidents

On April 13 and July 13, 1982, shipping cask liners were inadvertently overfilled with a mixture of water and radioactive spent resin. The first incident involved low level radioactive resin, and contamination was largely limited to the top of the shipping cask liner. The second incident resulted in contamination of both the shipping cask and the surrounding area. The licensee conducted investigations of both incidents and issued reports (Event Report 82-05, dated May 13, 1982 for the first incident and Event Report 82-07, dated August 13, 1982 for the second incident).

3.1 April 13, 1982 Incident

On April 13, 1982 a shipping cask with a 170 cu. ft. liner was prepared to receive low-level radioactive resin. Approximately 90 cu. ft. of resin was to be transferred from a metering tank to the liner and then solidified with cement, prior to shipment offsite.

At approximately 1 p.m., the resin transfer from the metering tank to the liner was initiated. The metering tank was thought to contain approximately 90 cu. ft. of resin and was pressurized to aid in transferring the resin. The filling port at the top of the liner was monitored by a television system during the transfer. A level indicator was installed in the liner and was set to alarm when the liner was filled with approximately 90 cu. ft. of material.

At approximately 3 p.m. a continuous air monitor (CAM) located in the solid waste area near the resin transfer operation alarmed and personnel were evacuated from the transfer area. The licensee stated the airborne activity appeared to be noble gases of uncertain origin. The transfer line from the resin metering tank to the liner was thought to be secured at the time of the CAM alarm and liner dewatering was in progress. A small amount of resin was observed on the top of the liner, just prior to the evacuation.

When personnel returned to the transfer area at 5 p.m., the television system showed resin on the top of the cask. The resin metering tank was found pressurized to 30 psig. It was subsequently determined that an excess of 50 cu. ft. of resin had been transferred to the liner.

The following factors appear to have contributed to this incident:

1. The liner probe system used to determine liner resin content was probably not fully functional during the transfer. The licensee stated that the probe was found partially disconnected during an inspection immediately after the incident.
2. The valves used to control the flow of resin from the metering tank to the liner (SWP-101 and SWP-102) did not have stops at

the time of the incident and may have been left partially open during dewatering. The licensee identified this problem during the inspection and promptly issued a maintenance request to have valve stops installed.

3. The licensee had no way of physically determining the amount of resin contained in the spent resin metering tank. The licensee relied on records of resin transfers into and out of the metering tank to determine tank content. In this case, the records did not accurately reflect the contents of the metering tank. A bubbler level detection system had been installed in the metering tank, but was not routinely operable. Without an accurate method of determining the resin level in the metering tank, the licensee operators had to guess how much water to add to the metering tank to make the resin flow properly.

3.2 July 13, 1982 Incident

On July 13, 1982, a shipping cask with an 80 cu. ft. liner was prepared to receive radioactive resin. The liner was to be filled approximately half full with resin and then solidified with cement. A level probe had been installed in the liner and the probe connections (but not the probe) were tested prior to the transfer. The television system which views the cask filling area was not functional during the transfer. The spent resin metering tank was pressurized during the transfer.

A few minutes after the transfer was initiated, the operators conducting the transfer noted noises which indicated the spent resin metering tank had emptied and was venting through the discharge line into the liner. The operators promptly terminated the transfer. At about the same time, a health physics technician observed liquid on the floor of the transfer bay, apparently coming from the liner. The liner was subsequently found to be completely filled with resin and water. The radioactive resin contaminated the liner, cask, and transfer bay.

The licensee subsequently decontaminated the liner, cask, and general area, expending approximately 40 man-rem in the clean up.

The following factors appeared to have caused this event.

1. The use of air pressure in the spent resin metering tank to force resin into the liner apparently caused an overly rapid resin transfer to the liner. When the empty metering tank unexpectedly vented into the overfilled liner, resin was apparently splashed out of the filled liner and onto the floor of the transfer bay.
2. The liner probe system did not alarm when the liner was half full.

3. The responsibility for the resin transfer was divided between the plant operations and health physics departments. Operations personnel conducted the transfer while health physics personnel prepared the liners and installed and tested the liner probes.

3.3 Licensee Corrective Actions

The licensee stated that the following corrective actions were taken to prevent recurrence of resin spills:

1. The total responsibility for the resin transfer has been given to the health physics department. The licensee stated that two resin transfers had been made since the July 13 incident, under the control of the health physics department.
2. The licensee will no longer pressurize the spent resin metering tank during resin transfers. Instead, the licensee will backflush transfer piping with water to aid resin flow.
3. The licensee will test each liner level detection system in place by filling the liners with water and draining before a resin transfer is initiated.
4. The resin will be transferred to the liners for no more than two minutes at any one time. The liners will be dewatered between each transfer.
5. The licensee is evaluating level detection systems which could be installed in the spent resin metering tank.

Items two through four have been incorporated into licensee procedure RSP 2-220, "Solid Waste Processing Resin Transfer." Based on this review, the licensee's corrective actions appeared adequate to prevent recurrence of the resin spills.

4. Exposure Control

4.1 External Exposure Control Program

The licensee personnel external exposure control records were reviewed against the criteria in 10 CFR 20.101, 20.102, and 20.405. Licensee posting was reviewed against the criteria in 10 CFR 20.203. No violations were noted.

4.2 Respiratory Protection

The licensee respiratory protection program was reviewed against the criteria in 10 CFR 20.103 and Technical Specification 6.11, "Radiation Protection Program". The licensee respiratory protection procedures, equipment, and facilities were reviewed and selected

staff members interviewed. The program was found consistent with the requirements of 10 CFR 20.103 and Technical Specification 6.11, except for the following program area.

Licensee procedures for use of airline hoods were inadequate at the time of the inspection in that Procedure RSP 2-305, "Respirator Selection, Issuance, Field Testing, and Wearing" specified that a protection factor of 2000 be used in calculations of exposures to airborne radioactivity for workers using hoods, even though the licensee was not insuring that the hoods were operated at the manufacturer's maximum recommended flow rate. Licensee records indicated that a protection factor of 2000 for hoods had in fact been used in connection with steam generator nozzle dam work conducted on October 27 and 29, 1982. The licensee stated that the airborne radioactivity levels encountered in this job were relatively low (less than 10 times the values in 10 CFR 20 Appendix B, Table I, Column I). In addition, the licensee stated that minimum manifold pressures required to maintain hood air flow rates greater than 6 cfm were not contained in the procedures.

This is a violation of Technical Specification 6.11, "Radiation Protection Program", which requires that procedures consistent with the requirements of 10 CFR 20 be prepared and maintained for all operations involving personnel radiation exposure. 10 CFR 20.103 (a)(3) requires a licensee to assess individual intakes of airborne radioactivity using ambient concentrations of airborne radioactivity, unless respiratory protective equipment is used as specified in 10 CFR 20.103 (c). 10 CFR 20.103 (c) requires that protection factor be assigned in accordance with 10 CFR 20 Appendix A. 10 CFR 20 Appendix A states that a protection factor of 2000 for hoods may be used only if the air flow is maintained at the manufacturer's recommended maximum rate. Appendix A further states that a protection factor may be used for hoods only when a minimum air flow of 6 cfm is maintained. The inspector stated this constitutes an apparent violation (50-318/83-01-01).

In response to the inspection findings, the licensee stated that an evaluation of hood use since the incorporation of Appendix A into 10 CFR 20 in 1982 would be conducted. The licensee promptly modified procedure RSP 2-305 to specify a protection factor of 1000 for air-supplied hoods. In addition, the licensee stated that studies of airline pressure versus hood air flow had been conducted in the past and that only personnel in the respiratory protection group who were aware of those studies and the required airline pressures had been allowed to install airline hoods in the plant and set manifold pressures.

5. Advance Planning, Preparation, and Review of Major Tasks

Licensee preparations for upcoming fuel rack installation in the spent fuel pool were reviewed against the criteria contained in 10 CFR 20.201 and Regulatory Guide 8.8, "Information Relevant to Ensuring that

Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable (ALARA)."

The licensee is surveying and decontaminating underwater surfaces in the Unit 2 spent fuel pool in preparation for installation of high density fuel racks in February 1983. Current plans call for transferring all radioactive materials into the adjacent Unit 1 spent fuel pool and draining the Unit 2 pool prior to installation. These preparations appeared well coordinated and extensive.

The licensee is also conducting post-job ALARA reviews of major jobs conducted during the recent Unit 2 refueling. The job package for the steam generator nozzle "dam" work was reviewed during the inspection. No violations were identified.

6. Radiation Worker Training

The radiation worker training program was reviewed against the requirements of 10 CFR 19.12 "Instructions to Workers" and found acceptable. The licensee program includes practical factor demonstrations and a mechanism for alerting the training department to current plant health physics concerns. No violations were identified.

7. Exit Interview

The inspector met with licensee representatives denoted in paragraph 1 at the conclusion of the inspection on January 21, 1983. The purpose, scope, and findings of the inspection were summarized at that time.

The licensee stated that all cases where airline hoods were used from the date Appendix A was incorporated into 10 CFR 20 to the present would be reviewed to insure that the appropriate protection factor had been used. Further, the licensee stated that pending a review of manufacturer's recommendations, licensee procedures would be modified so that appropriate protection factor would be used for air-supplied hoods.