

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 50-317/91-27  
50-318/91-27

Docket Nos. 50-317  
50-318

License Nos. DPR-53  
DPR-69


Licensee: Baltimore Gas and Electric Company  
Post Office Box 1475  
Baltimore, Maryland 21203

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

Inspection At: Lusby, Maryland

Inspection Conducted: October 28 - November 1, 1991

Inspectors:

  
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J. Furia, Senior Radiation Specialist,  
Facilities Radiological Protection Section  
(FRPS), Facilities Radiological Safety and  
Safeguards Branch (FRSSB), Division of  
Radiation safety and Safeguards (DRSS)

11/3/91  
date

Approved by:

RL Nurney for WP  
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W. Pasciak, Chief, FRPS, FRSSB, DRSS

11/19/91  
date

Inspection Summary: Inspection on October 28 - November 1, 1991 (Combined Inspection Report Nos. 50-317/91-27; 50-318/91-27)

Areas Inspected: The inspection was an unannounced inspection of the radiation protection program including: management organization, ALARA, radiation control during a mid-cycle outage, and implementation of the above programs.

Results: Within the areas inspected, no violations or deviations were noted.

## DETAILS

### 1. Personnel Contacted

#### 1.1 Licensee Personnel

- J. Carlson, Supervisor, Technical Training
- R. Franke, Compliance Engineer
- S. Hutson, Supervisor, Radiological Control - Operations
- \* P. Katz, Superintendent - Technical Support
- J. Lenhart, Supervisor - Materials Processing
- M. Milbrandt, Nuclear Regulatory Analysis
- \* D. Muth, Compliance Engineer
- \* G. Phair, Assistant General Supervisor, Radiological Control and Support
- L. Smialek, Senior Plant Health Physicist
- \* B. Watson, General Supervisor - Radiation Safety
- J. Wood, Senior Engineer - Quality Audits
- P. Wright, Supervisor, Radiological Control - ALARA

#### 1.2 NRC Personnel

- A. Howe, Resident Inspector
- C. Lyon, Resident Inspector

\* Denotes those present at the exit interview on November 1, 1991.

### 2. Purpose

The purpose of this inspection was to review the licensee's programs for radiation safety during the Unit 2 mid-cycle maintenance outage, including radcon operations during the outage and ALARA.

### 3. Previously Identified Items

- 3.1 (Closed) Violation (50-317/91-19-01; 50-318/91-19-01): Improper shipment of reconstituted fuel. The licensee has filed amended manifests and material accountability records to account for the extra fuel rod being included in this shipment. In addition, the licensee had conducted a review of its assurance of quality program for this type of activity, and made corrections in this program area. This item is closed.
- 3.2 (Closed) NRC Concerns. In September, 1991, the licensee responded to the NRC, in writing, regarding concerns the NRC had expressed regarding activities conducted in February, 1991. Specifically, the NRC was concerned that: (1) Personnel were allowed access to the Unit 1 Containment, which was posted as a High Radiation Area, without Radcon Technician coverage, an

alarming dosimeter, or a rate meter, as required by Plant Technical Specifications; (2) Access to the Containment was made via the emergency air lock, without first taking an atmospheric sample, and thus creating a potential unmonitored release path; (3) Personnel exited the access control point on the 69' elevation of the Auxiliary Building and were allowed to leave the plant despite their alarming the half body counters at the access point and the portal monitors at the Security Gatehouse; (4) Personnel entered the plant and alarmed half body monitors prior to entering the radiologically controlled area (RCA); and (5) Personnel went between the two containments without frisking. The inspector reviewed the details of these events, and the licensee's actions taken in response to their investigation of the events.

In regard to item (1), the licensee failed to remove the High Radiation Area postings located at the Unit 1 Containment air lock, after determining that the entire containment did not require such posting, and placing the necessary postings inside the containment nearer to the sources of such radiation fields. The licensee's radcon personnel failed to properly communicate with one another during this event, which further exacerbated the situation. The licensee addressed this situation at a radcon unit meeting, and no similar events have subsequently occurred.

In regard to item (2), the licensee subsequently determined that due to a negative pressure maintained in the containment, no unmonitored releases occurred. The licensee revised Special Work Permit 91-011 for containment access to require consultation with the Chemistry Department, which is tasked with taking atmospheric samples of this type, prior to any future entries.

In regard to items (3) and (4), several individuals were exposed to radiogas and had difficulties passing the half body monitors at the access control point. Two individuals were unable to clear the monitors even after waiting some period of time, and it was determined appropriate by the licensee to escort these individuals to the whole body counter for analysis of their contamination. Since the whole body counter is located outside the protected area, a radcon escort took these two people through the Security Access. After the whole body counter results confirmed that the source of the radiation was radiogas, the General Supervisor-Radiation Protection authorized these personnel to leave the site for the evening. The next day, those personnel who had trouble clearing the half body counters the previous afternoon were required to pass through these counters again before entering the RCA. Several employees did in fact alarm these monitors again. The inspector reviewed licensee documentation which supported the conclusion that this was due to entrained residual radiogas on the individuals skin, and that the dose consequences of this were not significant.

In regard to item (5), no evidence could be found to substantiate the concern that personnel had moved between the containments without frisking first.

As a result of this review, no open items or items of significant safety interest remain.

#### 4. Radiation Safety

Management of the radiation safety program at Calvert Cliffs remained the same since the last inspection. The General Supervisor - Radiation Safety, reported through the Technical Support Manager to the Plant Manager. All supervisory positions within the Radiation Safety Department remained filled. In addition, the Radiation Controls (Radcon) Operations staff were augmented with 18 contractors for the mid-cycle maintenance outage at Unit 2.

##### 4.1 Programmatic Goals

For 1991, the licensee had established an ALARA goal of not more than 260 Person-Rem for both units. As of this inspection, the licensee's total exposure was 110 person-Rem, and it now appeared that the licensee would finish the year below 150 Person-Rem. Reasons for this lower than expected dose included: lower source term for the plant, due in part to the extended outage both units were in during the two previous years; significant reduction in the scope of the Unit 2 mid-cycle outage, reducing the outage from 11 weeks to a now estimated 32 days; and improved worker practices. This performance was occurring despite the fact that Unit 2 was shut down until April, 1991, whereas the goal was established expecting the plant to be on line at the start of the year. Additional ALARA gains were anticipated in future years once the neutron shielding modifications at both units were installed. Current schedules call for installation in Unit 1 in 1993, and in Unit 2 in 1994.

Personnel Contamination Incidents (PCIs) for 1991 continued to show a marked reduction from previous years. As of this inspection, year-to-date PCIs were at 217, with an annual goal of not more than 300. Early in the year, it appeared that the licensee would be unable to meet its goal. The licensee then undertook to replace all protective clothing in stock with new issue, and the plant restoration project continued to clean significant portions of the Auxiliary Building. The licensee was now developing ways to correct the new leading cause of PCIs, poor worker practices. The success of this latest licensee initiative will be reviewed during future inspections.

##### 4.2 Outage Control

The licensee's mid-cycle maintenance outage at unit 2 commenced on October

18, 1991, and was anticipated to last 32 days. Although there were no major dose intensive jobs to be performed during the outage, a number of small maintenance activities and surveillances kept the level of staff working in the Unit 2 Containment considerable. As part of this inspection, observations of three jobs in progress were made.

The licensee's Special Work Permit (SWP) 91-4030 was issued to cover work involved in cleaning the Containment Coolers at Unit 2. These units, two each located on the 45' and 69' elevations, had not been cleaned inside and out in a number of years. Work being performed during this inspection included sealing up the units with plastic to prevent the spread of dirt and water in the containment during the cleaning operation, and the utilization of a hydrolazer to remove dirt both from within the coolers and from the outside of the units. Work was performed while Radcon maintained constant technician coverage of the hydrolazing operation. The radcon technicians were observed taking air samples of the work area, including inside the cooler unit and in the general area of the coolers, and in providing guidance and assistance with regard to protective measures of the workers.

In general, the work was performed in a professional manner, and the radcon support was good. Two weaknesses were observed, however, involving a safety issue, and a leakage of water. The safety issue involved the use of a step ladder too small for the job to be performed at the coolers. Licensee personnel accessing the inside of the cooler units had to step all the way up the ladder, including the top rung, in order to get on top of the cooler unit, where the access hatch was located. Twice the inspector noted workers nearly tipping over the ladder while attempting to get off of the cooler unit. The inspector discussed this issue with the senior radcon technician in charge of containment work, and a longer ladder was brought over to the work site. The second weakness involved the actions taken to contain a leaking valve on the 45' elevation, near the Containment Cooler work. The inspector noted that some cloth rags were placed on the floor grating under the leaking valve, but the leak rate was too great to be absorbed by the rags, and the drip was falling through the grating, down to the 10' elevation. The radcon technician supporting the Containment Cooler work was aware of the leak, but his only apparent concern was that the area on the 10' elevation where the water was falling be posted with a sign indicating that the floor was wet. Subsequently the senior radcon technician noticed the leak during his general area tour, and promptly directed that the valve be repaired or that a catch containment be installed. The catch containment was installed shortly thereafter.

Work associated with SWP 91-4403 issued for ISI work in the Reactor Coolant Pump (RCP) Bays, and SWP 91-4407 issued for a piping replacement modification also in the RCP Bays, was also observed during this inspection.

In both instances, continuous job coverage by a radcon technician was provided. Both jobs were performed in a High Radiation Area, and the technicians in both instances were observed taking air samples of the work area, and in assisting in the positioning of the workers in such a way as to minimize dose.

Inspector tours of the Auxiliary Building revealed that the area was generally well kept, with work being appropriately controlled by the assigned level radcon technicians, augmented as needed with roving radcon technicians. All areas were determined to be appropriately posted, with the exception of a small area in the Unit 1 Fan Room, located on the 5' elevation of the Auxiliary Building. The posting discrepancy was brought to the attention of the level radcon technician who took immediate corrective actions.

#### 4.4 Transportation/Radwaste Activities

As part of this inspection, observations of the licensee preparing a shipment of spent resin for transport and disposal were made. This evolution included the closing of a dewatered liner; decontamination of the process shield containing the liner; movement of the liner and process shield from the solid waste processing area to the Auxiliary Building 45' truck bay; and transfer of the liner to an NRC approved shipping cask. Due to other activities being conducted at the plant, this evolution was performed during the evening. Loading of the shipping cask was a two step operation, due to the limitations of the licensee's solid waste processing area. Liners were filled in the pit area located below the 45' elevation, under the spent resin tank, and dewatered, while in a licensee owned process shield (a modified HN-100 shipping cask). Once dewatered, the shield and liner were positioned so that the liner lid could be put in place, and the shield and liner raised up to the 45' elevation for surface decontamination of the shield. Once decontaminated, the shield and liner were transported over to the Auxiliary Building Truck Bay, where the liner was removed and held suspended above the floor using the New Fuel Crane, while the shield was removed from the Truck Bay, and the shipping cask brought under the liner. The liner was then lowered into the shipping cask, and the cask secured for transport. This evolution was carried out in a professional manner by representatives of the Materials Processing Group, and were supported by representatives of Radcon Operations, Security, and Quality verification. One poor work practice observed, however, was the decontamination of the shield cask by a technician wearing street clothes and only rubber gloves and booties as protective clothing. Removable contamination on the shield was measured by taking wipes, some of which read as high as 30,000 counts per minute. Licensee procedures allow the radcon technicians to make in the field determinations on appropriate protective clothing when performing this type of work.

#### 4.5 Training

The licensee's Technical Training Group was in the process of assessing and fine tuning the training program for Radiation Safety Department technicians at the time of this inspection. Based upon preliminary analysis of this review, and in consultation with the Radiation Safety Department, some changes for the upcoming third training year cycle were already being implemented. Chief among these changes was the continuing training for Radcon, ALARA and Materials Processing technicians, which was being compressed into a 7-8 week program, from what had been a three month program. The amount of material to be covered would remain essentially the same. This would allow for there to be five training sessions per year, instead of the current four, and thus reduce the number of technicians in training at any given time.

Additionally, the Training Department was evaluating ways to help new technicians meet their initial training objectives. Special classes in the basics of radiation science, and greater one-on-one interaction between the technicians and instructors had already been initiated, and other training methodologies were being evaluated. The success of these programs will be evaluated during a future inspection.

#### 5. Exit Interview

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the inspection on November 1, 1991. The inspector summarized the purpose, scope and findings of the inspection.