

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-317/94-08  
50-318/94-08

Docket No. 50-317  
50-318

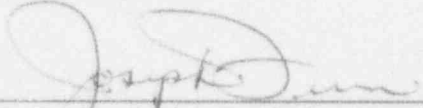
License No. DPR-53  
DPR-69

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: February 14-18, 1994

Inspector:   
J. Furra, Senior Radiation Specialist,  
Facilities Radiation Protection Section (FRPS),  
Facilities Radiological Safety and Safeguards  
Branch (FRSSB), Division of Radiation Safety  
and Safeguards (DRSS) 2/21/94  
date

Approved by:   
R. Bores, Chief, FRPS, FRSSB, DRSS 03/04/94  
date

Areas Inspected: Areas inspected include your programs for: maintaining occupational exposure to ionizing radiation as low as reasonably achievable (ALARA), radiation safety during a refueling outage, radiological work control and housekeeping. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Results: ALARA initiatives and planning for the Unit 1 11th refueling outage (RF-11) appear to be more successful than those taken during the past two years. Significant improvement has been observed in the decontamination of the Containment general areas and in the clean-up of the Containment Air Coolers. Work needs to be done on specifying the level of control required of Radiological Controls - Operations Technicians providing job coverage, especially in High

Radiation Areas. An industrial safety concern was noted, but no violations of regulatory requirements were identified.

## DETAILS

### 1.0 Personnel Contacted

#### 1.1 Licensee Personnel

- \* P. Chabot, Superintendent, Technical Support
- \* C. Cruse, Plant General Manager
- \* C. Gradle, Compliance Engineer
- R. Holland, Containment Work Leader
- \* S. Hutson, Supervisor, Radiation Control - Operations
- G. Moist, Containment Work Leader
- T. Parry, Radiological Controls Shift Supervisor
- \* G. Phair, Assistant General Supervisor, Radiation Control and Support
- \* M. Rigsby, Assistant General Supervisor, Radiation Services
- \* B. Watson, General Supervisor - Radiation Safety
- \* R. Wyvill, Supervisor, Radiation Control - ALARA

#### 1.2 NRC Personnel

- \* K. Lathrop, Resident Inspector
- \* P. Wilson, Senior Resident Inspector

\* Denotes those present at the exit interview on February 18, 1994.

### 2.0 Previously Identified Items

(Closed) Inspector Follow-Up Item (50-317/94-01-01; 50-318/94-01-01) License posted all of Radiologically Restricted Area in the Auxiliary Building and Materials Processing Facility at a minimum as a Radiation Area, regardless of radiation levels, and proceduralized this practice in Radiation Safety Procedure (RSP) 1-104. The licensee has subsequently revised RSP 1-104 to require Radiologically Restricted Areas to be posted as Radiation Areas only if they meet the definition of a Radiation Area as specified in Title 10, Code of Federal Regulations, Part 20.1003 (10 CFR 20.1003). In addition, the licensee reevaluated general area survey data for the Auxiliary Building and the Materials Processing Facility, and posted Radiation Areas only where appropriate. This item is closed.

### 3.0 Radiation Safety

The licensee entered Unit 1 Refueling Outage #11 (RF-11) on February 8, 1994. This was four days later than originally scheduled, due to needs for power throughout the mid-Atlantic power grid. Subsequent to the last inspection in this area conducted January 3-7, 1994, Unit 1 had experienced a short duration forced shutdown, during which some of the containment decontamination, scheduled for the beginning of RF-11 was

accomplished, thus reducing the number of critical path days devoted to containment decontamination at the beginning of the outage.

During the forced shutdown, all four of the Containment Air Coolers (CACs) were decontaminated using high flow rate water sprays (fire hoses). During previous refueling outages at Unit 1 (RF-10) in 1992 and at Unit 2 (RF-09) in 1993, cleaning of the CACs typically took in excess of 30 days, at a total exposure of approximately 23 person-rem. Use of the fire hoses, which was suggested following RF-09 at Unit 2, was successful in completing the cleaning of the CACs in less than a day, with a total exposure of only 0.340 person-rem.

Additional containment decontamination was accomplished at the start of RF-11, which reduced the general area walkways and work stations to less than 5000 disintegrations per minute per 100 square centimeters (5000 dpm/100 cm<sup>2</sup>). With these lower contamination levels, the use of respirators was also significantly reduced, thus saving total personnel exposure, and reducing the amount of radwaste generated. High initial contamination levels were found throughout the containment due to the leakage around the In-Core Instrumentation (ICI) flanges. This type of leakage was first identified during RF-09 at Unit 2, when seven of the eight flanges were determined to be leaking. The licensee estimated that clean-up of the flanges and the containment resulted in a minimum of 80 additional person-rem of exposure during that outage. Since the same flange seals were utilized in Unit 1, the licensee anticipated a similar problem during RF-11, and thus scheduled critical path time at the start of the outage to decontaminate the containment. This effort included over 100 people, including contractor decontamination technicians and plant staff volunteers.

As of the end of this inspection, total exposure for the outage was approximately 25 person-rem, which tracked very well with licensee estimates for this stage of the outage. Much of the higher exposure work was just commencing at the conclusion of this inspection, including the removal of the reactor head shroud, to allow for cleaning of the leaking ICI flanges, and removal of the hot side steam generator manways, so that the nozzle dams could be installed and non-destructive evaluation of the steam generator tubes could commence. Additionally, the licensee had begun removal of insulation from around the pressurizer, in order to prepare for the nickel plating project, which while budgeted for 40 person-rem of exposure, if successful, would result in an overall net savings of 80 person-rem, by eliminating the need to resleeve the pressurizer heaters, as had to be previously done at Unit 2.

As part of an improving effort to maintain occupational exposure ALARA during refueling outages, the Radiological Controls - ALARA Supervisor conducted an "ALARA Training for Project Managers and Supervisors", prior to the start of RF-11. Topics included project manager's ALARA responsibilities, project manager to ALARA Section interfaces, and field ALARA techniques. Prior to the start of the outage, 79 of the 84 supervisors targeted for this training had been trained.

The inspector noted that although large numbers of people were in the containment throughout this inspection, each person appeared to have a purpose while in the containment. The inspector also noted that workers in the containment were not waiting around for a supervisor or work leader, and that a number of people who were waiting, were doing so outside the Radiologically Restricted Area. This is a significant improvement from previous outages. The inspector also noted during each containment entry the inspector made that Radiological Controls - ALARA technicians were conducting in-process work reviews and assisting workers in maintaining their exposures ALARA. In addition, the licensee had made significant progress in reducing the number of unnecessary respirators being utilized during the outage. A number of work activities, especially involving the reactor and refueling cavity were being successfully done with the use of engineering controls in lieu of respirators.

As part of this inspection, various tours of the Radiologically Restricted Area, especially the containment, were conducted. As in previous outages, the licensee had established a process for containment entry, whereby personnel checked in and obtained their direct reading dosimeters (DRDs) at the 72' elevation access desk, having first checked in at the 69' elevation access point, and been instructed as to which Special Work Permit (SWP) they were to use for entry into the Radiologically Restricted Area. All active SWPs were posted outside the men's and women's locker rooms on the 72' elevation. Upon entry to the containment, all personnel were instructed to check-in at the containment access desk on the 69' elevation. The Radiological Controls - Operations staff was scheduled on two twelve-hour shifts, with each shift being assigned a Radiological Controls Shift Supervisor (RCSS), a SWP Coordinator (SWPC) and two Containment Work Leaders, with at least two of these four individuals on site at all times. All key positions were filled by fully qualified Radiological Controls - Operations technicians, augmented by over seventy contractor technicians.

All work observed by the inspector was well controlled by the Radiological Controls - Operations technicians, and all workers questioned were aware of the exposure rates in their work area, and of the SWP on which that they had signed in. Early in the outage, the licensee had identified a concern that a number of workers questioned in the containment did not know this information, and the licensee undertook to counsel the workers, and notify their supervisors of this deficiency. All workers, when issued their DRDs sign a log book indicating that they have read and understand their SWP. All workers are briefed on the exposure rates in their work area when checking in at the containment access desk on the 69' elevation. During this inspection, the licensee changed its policy towards workers found in the containment who did not have this information, requiring them to leave the containment immediately.

During the inspection, while observing the preparation for and work taking place in the south lower refueling cavity, the inspector raised the concern that Radiological Controls - Operations technicians had significantly divergent views as to the requirements for "continuous coverage". Continuous coverage was required for workers when in High

Radiation Areas, such as the refueling cavity (which was, in fact, posted as a Locked High Radiation Area). Many technicians interpreted this requirement to mean constant line-of-sight and communications with the workers. Supervisors and managers within the Radiation safety department had divergent views as to this requirement. Based upon the inspector's concern in this area, the licensee initiated an incident report, so as to track its progress in developing a single definition for this type of job coverage, and to set an unambiguous standard to be entered on the SWP. The inspector will review the licensee's progress in this area during a future inspection.

In general, the containment was congested due to the large amount of equipment being placed in it, and the large number of people at work with this equipment, but radiological housekeeping issues were minimal. All postings were appropriate for the radiological conditions, and entrances to High and Locked High Radiation Areas were appropriately barricaded and secured. The inspector noted that Low Dose Waiting Areas were identified for each level of the containment, including the pump bays, and that Radiological Controls - Operations technicians had instructed workers to use these areas. Only one industrial safety concern was identified, involving access around the reactor when the annulus was open, and the licensee indicated that a representative from the industrial safety staff would be looking into the issue.

#### 4.0 Exit Interview

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the inspection on February 18, 1994. The inspector summarized the purpose, scope and findings of the inspection. The licensee acknowledged the findings of the inspection.