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REGION I

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Report Nos.: 50-317/92-06 and 50-318/92-06

Licensee: Baltimore Gas and Electric Company (BG&E)  
P. O. Box 1535  
Lusby, Maryland 20657

Facility: Calvert Cliffs Nuclear Power Plant, Lusby, Maryland

Inspection Conducted: March 3-6, 1992

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4/2/92  
date

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4/7/92  
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Areas Inspected: Announced inspection of the Calvert Cliffs emergency preparedness (EP) program. The inspection included: changes to the emergency preparedness program, emergency facilities, equipment, instrumentation, and supplies; organization and management control; emergency response organization (ERO) training; staff knowledge and performance of duties; and independent program reviews.

Results: The EP program was appropriately administered and maintained in a state of operational readiness. A concern was identified relative to the adequacy of the interfaces with state and local authorities, and appropriate corrective actions were initiated by the licensee. Similarly, a concern relative to the ability of shift crews to implement the Emergency Response Plan (ERP) during walk-through drills was identified. Specifically, the comprehensiveness of the Emergency Action Level scheme was questioned, as was the consequent apparent difficulty of implementing the ERP for fast-breaking accident scenarios. A management meeting with the licensee will be conducted to further explore this matter.

## DETAILS

### 1.0 Persons Contacted

The following licensee representatives were contacted.

- S. Crowne, Senior Engineer, Quality Assurance Department
  - \* G. Detter, Director, Nuclear Regulatory Matters
  - \* R. Franke, Regulatory Compliance Engineer
  - \* T. Forgette, Supervisor, EP Unit
  - \* F. Kramme, EP Analyst
  - \* J. Hardison, Instructor, Training Unit
  - \* J. McHale, Engineer, Quality Assurance Unit
  - W. Lippold, General Supervisor, Technical Services Engineering
  - \* L. Russell, Manager, Nuclear Safety and Planning
  - \* S. Sanders, Superintendent, Plant Chemistry
  - W. Sullivan, Auditor, Quality Assurance Department
  - \* R. Wenderlich, Superintendent, Operations
- \* Attended exit meeting on March 6, 1992.

The inspectors also held discussions with other licensee personnel.

### 2.0 Operational Status of the Emergency Preparedness Program

#### 2.1 Changes to the Emergency Preparedness Program

Since the last inspection, there have been two significant EP program changes. The inspectors reviewed the status of these changes and discussed their details with the Supervisor, EP Unit (EPU).

A modification to the licensee's emergency notification and communication system was made during 1991. That change involved installation of a new computer-based system for primary notification of Emergency Response Organization (ERO) members. The inspectors observed a demonstration of the new "Quickcall" system and noted that it appears to improve notification speed. An adequate safety evaluation was performed prior to implementation, and the system was acceptably demonstrated during the 1991 annual exercise.

The second major EP program change was in progress and involved revision of all Emergency Response Plan Implementing Procedures (ERPIPs). In 1989, to facilitate program implementation, BG&E decided to upgrade the ERPIPs through reformatting, consolidation, and revision to reflect a shift toward performance-based EP training. Since the last inspection, changes were made to the Emergency Operations Facility (EOF) procedures manual and to several key ERPIPs, including

the RADDOSSE IV dose assessment code, and off-site assembly and accountability. This NRC inspection concluded that the ERPIP changes did not decrease the effectiveness of the Emergency Response Plan.

Emergency Action Level (EAL) revisions were reviewed and found to meet the intent of NUREG-0654. However, concerns were identified with regard to content and use of revised EALs during walk-through scenario evaluations of operations staff (see Detail 2.5.1).

To expedite implementation of the revised ERPIPs, the licensee was issuing groups of procedures in separate phases. New procedures reflecting minor changes were provided to affected parties as information-only copies for review and acknowledgement, with formal training on revisions to be performed when requalification is due. The Supervisor, EPU determined whether revisions were to be included in requalification classes or issued on a read-and-sign basis. In either case, formal training on ERPIP revisions was not always provided prior to implementation. The inspectors expressed concern over this approach because, until all newly revised ERPIPs are issued and training completed, ERO personnel are expected to understand and use new procedures without the benefit of formal training. Further, combining new and existing procedures might cause confusion in carrying out response actions. Use of the revised ERPIP will be further reviewed during future routine inspections. Licensee assurance that ERPIPs can be appropriately implemented during the transition to new ERPIPs is an unresolved item (UNR 50-317/92-06-01 and 50-318/92-06-01).

Other changes to the licensee's emergency preparedness program since the last inspection were minor and did not adversely affect the overall state of emergency preparedness. Emergency Response Plan and ERPIP updates were issued through controlled distribution and there were up-to-date copies in the emergency response facilities.

## 2.2 Emergency Facilities, Equipment, Instrumentation and Supplies

Incident to reviewing the licensee's program for maintaining emergency equipment, supplies, and facilities operationally ready the inspectors toured the control room, Technical Support Center (TSC), Operations Support Center (OSC), Emergency Operations Facility (EOF), and Nuclear Engineering Facility, and reviewed inventory lists for designated emergency response equipment.

These facilities were found adequate to support emergency response and were as identified in the Emergency Plan. ERPIPs containing inventories disclosed a sufficient amount of designated equipment and supplies to support response activities. Checks of equipment and supply lockers revealed that surveillances of equipment

were performed at the prescribed frequencies, instrumentation was calibrated as required, and equipment and instruments were operable. Some radiation detection instrumentation and respiratory equipment designated for emergencies were missing from inventories, but were readily available from other site departments. Lockers and kits contained all other necessary emergency equipment.

Communications equipment including telephones, public address systems, and portable radios were inspected in on-site emergency response facilities (ERFs) and were found consistent with ERPIPs. A licensee engineering study on the off-site siren alerting system was performed in 1991 and concluded that the entire population within the EPZ could be notified, but that system upgrades could improve coverage in some areas. The licensee indicated that authorization has been obtained for installation of additional sirens.

### 2.3 Organization and Management Control

The inspectors reviewed the normal staffing organization as it pertains to implementation of emergency preparedness. The Supervisor, Emergency Preparedness Unit, had overall responsibility for maintenance of the Emergency Response Plan and was assisted by a full-time staff of five EP Analysts and two EP Assistants for on-site and off-site emergency planning and for implementation of the EP program. This level of staffing has been effective in maintaining the Emergency Response Plan and ERPIPs, conducting drills and exercises, ensuring readiness of response facilities, maintaining the siren system and interfacing with State, local and off-site support groups. All positions in the EP Unit were filled. There has been turnover in staff and changes in designation of assignments. As a result, the EPU lost a full-time member with background and experience in operations. The EPU Supervisor stated that the Technical Training Unit (TTU) and operations department would continue to assist in developing scenarios and supporting operations-related needs. The impact on this staff change will be further evaluated during a future routine inspection.

The inspectors held independent discussions with the Plant General Manager, Manager, Nuclear Safety and Planning Department, and Supervisor, EPU. Licensee management support for emergency preparedness was expressed and a commitment to allocate resources to the EP Unit was clear. Periodic licensee management meetings had been held between upper-level corporate staff and the Supervisor, EPU to discuss EP program status. To provide a close working relationship with the State of Maryland, the licensee assigned one staff member each to provide liaison with the Maryland Department of the Environment (MDE) and Maryland Emergency Management Agency (MEMA).

Meetings with county officials were also held to discuss items of mutual interest regarding off-site emergency preparedness. The Supervisor, EPU stated that the annual meeting was held with local officials in December 1991 to review emergency action levels as required by 10 CFR 50, Appendix E, section IV.B. At the time of the inspection, EPU staff were unable to provide documentation of the meeting. Certification letters from EPZ counties were later submitted to the NRC and found acceptable to document the meeting and review. The initial unavailability of documentation on this matter was assessed as a minor administrative weakness.

Discussions were held with EPU and TTU representatives regarding the staffing depth in each ERO functional position. Review of the Emergency Response Organization (ERO) indicated that staffing levels and personnel had not changed since the previous inspection. Database files of ERO personnel showed an ample number of qualified individuals available to support staffing of on-site and off-site emergency response facilities. With the exception of the Supervisor, EP Unit, however, the role of the EP Unit in support of emergency response was not clear. Such role definition was identified as a potential area for improvement.

#### 2.4 Training

The inspectors reviewed the licensee's program for administering emergency response training. ERO training was required by Section 6 of the Emergency Response Plan and was administered primarily by the Supervisors of the EPU and Technical Training Unit (TTU). Attachment 1 to ERPIP 904, "Training," outlines a training matrix for ERO personnel and the required courses needed for qualification. Training of corporate personnel and off-site support groups was provided by the EPU, supplemented by consultants for medical training.

The inspectors held discussions with EP training instructors, who provided lesson plans, examination material, examination results, and attendance records of ERO training for site personnel. Composite and historical records for each individual were maintained on a computer database and identified in ERPIP A.1, "Emergency Response Organization."

Training of ERO personnel was performed in accordance with the training responsibilities identified in ERPIP 904 and was up to date. Program changes were appropriately factored into ERPIPs. Lesson plans (LPs) used to instruct designated ERO personnel were available but were not revised to reflect ERPIP changes and updated format. Although training needs differ between initial and requalification training for each ERO position, the same LP was used. Discussions with training instructors indicated that LPs were expected to be reviewed and revised to reflect current ERPIPs. The present condition was assessed as a minor weakness.

Licensee practical and walk-through training was given after classroom lectures were completed so that personnel could demonstrate ability in their respective response functions. Although this mix of lecture and walk-through training satisfied the requirements of the training program for assignment of qualified staff to the ERO, personnel were not required to demonstrate proficiency through participation in scheduled drills and exercises. This was discussed with EPU staff who provided a 1992 drill and exercise schedule, generated so that shift crews who had not participated in previous exercises were given that opportunity. TTU staff indicated that training goals were to include other key response members in drills and exercises when possible. Inclusion of ERO personnel will be further evaluated during a future routine inspection.

## 2.5 Knowledge and Performance of Duties

In order to determine the effectiveness of response training administered to shift operating crews, walk-through scenarios testing severe accident conditions were conducted with selected shift members. Four shifts from Unit 1 were tested, one using the control room simulator and three in a table-top format. Crew makeup included, as a minimum, a Shift Supervisor (SS), Control Room Supervisor/Shift Technical Advisor, a control room communicator, and a chemistry technician. The shift observed in the simulator also included reactor operators to allow delegation of responsibility by the SS and overall shift integration to be observed.

The scenarios were designed to test the ability of each shift to recognize and classify degraded plant conditions, make timely notifications to off-site authorities, perform assessment of radiological dose, and develop recommendations for protective actions. The scenarios involved fast-breaking events postulated to occur when additional ERO personnel were unavailable to assist. Two scenario themes were developed. The first involved a loss of main and auxiliary feedwater, while the second included a loss-of-coolant accident with containment failure. Each shift was given one scenario. Individual scenarios were dissimilar in that different events, such as fire, loss of 4KV vital bus, and an Anticipated Transient Without Scram (ATWS), were hypothesized prior to the main accident sequence.

The NRC scenarios were reviewed with the licensee for validity before being run as a crew test; licensee comments were incorporated. In addition, several members of the licensee's staff monitored the scenarios as they were conducted.

During the walk-throughs, the inspectors identified the following concerns associated with the response of shift crews.

### 2.5.1 Classification of Events

When provided with degraded plant conditions requiring SS evaluation of emergency action levels, three Shift Supervisors did not readily make an appropriate classification. This was found to be due to the lack of specific instrument parameter values -- equipment status in certain emergency action levels. Fission Product Barrier Degradation, General Emergency (EAL 11) and Site Emergency (EAL 21); and General Safety, General Emergency (EAL 13) did not provide indications, instrument readings or plant specific parameters sufficient for timely classification. Without such explicit EALs, crews had difficulty correctly classifying a total loss of feedwater as a General Emergency and a loss-of-coolant accident (LOCA) as a Site Emergency or General Emergency.

Specific observations with regard to emergency classification were:

2.5.1.1 EAL 13, General Emergency. Initiating condition: total loss of feedwater and auxiliary feedwater leading to severe core degradation or melt within minutes or hours.

The Shift Supervisor did not appear to understand how this EAL could be appropriately implemented due to the phrase "within minutes to hours" when evaluating severe core degradation. Additional plant specific indications could clarify when this condition has been reached.

2.5.1.2 EAL 21, Site Emergency. Initiating condition: EOP-8, "Functional Recovery Procedure," implemented AND one or more EOP-8 safety functions not met.

The licensee developed this EAL to address example initiating condition #1 of NUREG-0654, Appendix 1, Site Area Emergency, "LOCA greater than makeup capacity." EOP-8 indicates that all safety functions are intact as long as one train of ECCS is operating. Thus, classification as a Site Emergency under this EAL could be delayed while operators implement EOP-8 because the 'and' statement cannot be realized. This variance with NUREG-0654 was confirmed during one of the walk-through drills. While in an Alert emergency with ECCS operational, a large break LOCA (greater than charging pump capacity) was postulated. The shift supervisor followed the EAL criteria, but no action was taken to classify a Site Emergency.

2.5.1.3 EAL 11, General Emergency. Initiating condition: Any two of the following three conditions AND potential for occurrence of the third:

- RCS activity > 300 uCi/cc I-131 dose equivalent
- EOP-5 LOCA implemented
- Containment degradation (any of the below)

- Equipment hatch not closed sealed
- Either airlock inoperable
- Containment pressure > 25 psig
- All penetrations not closed or capable of being closed remotely by automatic signal or manual initiation

Scenario conditions were provided to the crew which related to loss of coolant and containment failure, with no indicator of a fuel clad breach provided in the scenario. The inspectors identified a concern for potential overly conservative classification through use of this EAL when one Shift Supervisor classified a General Emergency without specifying a potential for clad failure. (Note: SS training in EALs and drill conduct may have been a significant factor here.)

#### 2.5.1.4 EAL 34, Fire, "Implementation of any AOP-9 series procedure (10CFR 50 App. R)"

Although the EAL is clear and unambiguous, the Shift Supervisor did not enter AOP-9 when provided with clear indications of a fire alarm in a vital switchgear room and a visual (drill) confirmation of fire in this room. Review of the alarm response procedure for this annunciator requires implementation of AOP-9. However, AOP-9 was not implemented, and the EAL was not recognized.

#### 2.5.2 Protective Action Recommendations (PARs)

The inspectors noted that all shifts demonstrated good familiarity with ERPIP 3.0, Attachment 12, "Protective Action Recommendations," at the General Emergency classification. The following observation was made.

In three scenarios, Shift Supervisors correctly determined the initial set of protective actions based on plant conditions. Also, each SS recognized the need for and made revisions to initial PARs when initial dose projection information became available or when plant conditions changed. However, in one case, the SS did not thoroughly evaluate such information and compare it with the initial PAR. As a result, a revised PAR was made based upon a single dose projection which called for an unwarranted evacuation of the entire ten mile EPZ during adverse weather conditions. In this scenario, the inspectors noted that the dose projection was several orders of magnitude too high when compared with confirmed instrument and field monitor readings. Inasmuch as additional support should be available to the SS in an actual event, the drill environment presented an artificiality that contributed to this error. Nonetheless, SS general awareness of typical off-site consequences for specific readings is an area for improvement.



### 2.5.3 Other Observations

2.5.3.1 All shifts demonstrated the ability to complete timely off-site notifications of state and local authorities within 15 minutes of the declaration of the events. Two potential improvement areas in off-site notifications were noted.

All four shifts tested did not provide timely follow-up notification to off-site authorities that a radioactive release had commenced. The follow-up message form was not used to update off-site authorities on the status of the release. In such a case, State technical personnel could be hindered in making independent evaluations for comparison with the licensee's assessment. This was assessed as a weakness in EP response implementation.

One shift used the Follow-up Communications Short Form/Protective Action Recommendation Update (Attachment 5) form instead of properly using the Initial Notification (Attachment 3) form to provide initial notification to off-site authorities that an emergency had been escalated to the General Emergency classification. This was a minor weakness.

The response of shift crews to walk-through scenarios is identified as an unresolved item (UNR 50-317/92-06-02 and 50-318/92-06-02).

2.5.3.2 In preparation for the walk-through scenarios, the simulator scenario bank for the Licensed Operator Requalification Training (LORT) program was reviewed. The inspectors identified classification errors in the LORT scenario bank. These were brought to the licensee's attention. It did not appear that the LORT scenario bank has been reviewed for classification accuracy by licensee personnel with sufficient EP expertise. The inspectors noted that SS response actions might need better training coordination between the operations and EP staffs. The adequacy of coordination between licensee Operations and Emergency Planning staffs is identified as an unresolved item (UNR 50-317/92-06-03 and 50-318/92-06-03) pending licensee demonstration of the validity of the LORT program classifications.

## 2.6 Independent and Internal Reviews and Audits

To assess 10 CFR 50.54(t) implementation, the inspectors reviewed Quality Assurance Audit reports performed since the last inspection. A meeting was held with the auditors to discuss their planning and preparation for conducting audits, in addition to the scope, contents, and findings contained in each report.

EP program reviews were conducted annually by the Nuclear Quality Assurance (NQA) Department staff. An audit plan checklist was used for the review each year and included the Emergency Response Plan and ERPIPs, emergency plan program

and emergency response organizations, training and drills, notification and communications, facilities and equipment, public education, and coordination with off-site support groups. An emergency drill was also observed as part of the audit.

The inspectors reviewed reports from 1990 and 1991 and determined that the 1990 audit was thorough and comprehensive. For 1991, the audit appropriately covered subject areas identified in the audit plan with the following exception. To determine the adequacy of interfaces with State and local governments, the audit checklist only directed the auditors to review administrative provisions describing the licensee's relationship with each entity. Procedure review, alone, does not assure adequate implementation. Consequently, it did not appear that 10 CFR 50.54(t) was fully met. This lack of detail associated with evaluating the adequacy of interface with State and local authorities was classified as a non-cited violation. This was found to be a severity V violation with minor safety or environmental significance. Before the inspection ended, the licensee agreed to take appropriate corrective action. Therefore, the violation was not cited because the criteria specified in Section V.A of the revised NRC Enforcement Policy were satisfied. On March 8, 1992, at the licensee's request, the inspectors held a discussion via telephone with senior licensee NQA staff who provided additional information on how the adequacy requirement was addressed in 1991. The inspectors then described examples of evaluations that fully address this requirement. The NQA representatives stated that they plan to consider these examples and provide better documentation in future reports.

Two corrective action systems were in place and used by the Supervisor, EPU to track items to completion. One system was used site-wide while the other was internal to the EPU. The inspectors reviewed the status of findings identified in audit reports and EP open items in both tracking systems since the last inspection. Those items were found to have received proper attention and be resolved in a reasonable time. In accordance with Quality Assurance Procedure-21, reports of findings were formally distributed to senior plant and corporate management and required a written response to each finding within 30 days.

### 3.0 Licensee Action on Previous Inspection Findings

During the inspection, the inspectors reviewed the licensee's progress on previously identified NRC concerns and discussed the following item with the Supervisor, EPU.

(Closed) 50-317/90-19-04 and 50-318/90-18-04: Maintaining status of qualified personnel within the Emergency Response Organization.

The licensee revised the training qualification lists and ERPIP A.1, so that unqualified personnel can now be clearly identified. Review of the lists and procedure indicated that they are complete and up to date. This item is closed.

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#### 4.0 Exit Meeting

The inspector met with the licensee personnel denoted in Detail 1 at the conclusion of the inspection to discuss the scope and findings of this inspection.

The licensee was informed of the concerns identified during the inspection in the audits and training areas. In follow-up telephone calls with the licensee, the areas of concern associated with walk-through exercises were discussed. The licensee acknowledged these findings and agreed to evaluate them prior to the management meeting.