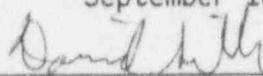


U. S. Nuclear Regulatory Commission
Region I

Docket/Report: 50-317/95-07, 50-318/95-07
Licenses: DPR-53, DPR-69
Licensee: Baltimore Gas and Electric Company
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
Facility Name: Calvert Cliffs Nuclear Power Plant Units 1 & 2
Dates: September 18-20, 1995

Inspectors:



D. Silk, Senior Emergency Preparedness Specialist
W. Maier, Emergency Preparedness Specialist
F. Laughlin, Emergency Preparedness Specialist
R. DePriest, Emergency Preparedness Specialist
P. Wilson, Senior Resident Inspector
F. Lyon, Resident Inspector
E. Hickey, Batelle, NRC Contractor

Approved:



R. Keimig, Chief, Emergency Preparedness Section
Division of Radiation Safety and Safeguards

SCOPE: Announced inspection of the annual, full-participation emergency preparedness exercise.

RESULTS: Overall, the on-site response during this exercise was good. Generally good control and communications were demonstrated within and among the Simulator Control Room, the Technical Support Center, the Operations Support Center, and the Emergency Operations Facility. Some announcements over the public address system were cryptic and the OSC Director could have made more announcements to inform OSC personnel of changing job priorities. There was good adherence to and use of procedures. The Radiation Protection Director did an excellent job of addressing radiological concerns as they potentially affected the damage repair teams. Dose assessment personnel at the EOF performed dose projections and developed protective action recommendations in a proficient manner. Declarations of emergency classifications and the associated offsite notifications were timely. However, performance at the media center was marginal. The scenario data could have been more realistic at times and the intervention of controllers could have been more consistent. Two issues developed during the exercise due to lack of clarity in procedures; they were the Emergency Action Level pertaining to fires in the diesel generator rooms and the transition from EOP-5 to EOP-8. They will be reviewed further by the resident inspectors. No particular exercise strengths or weaknesses were identified. Procedure changes were reviewed and it was concluded that no decrease in the emergency preparedness program resulted.

DETAILS

1.0 PERSONS CONTACTED

- *# T. Forgette, Emergency Preparedness Director
- # J. Lemons, Manager - Nuclear Support Services Department
- # M. Milbradt, Nuclear Regulatory Matters
- # M. Navin, General Supervisor - Nuclear Plant Operations

The inspectors also interviewed and observed other licensee personnel.

- * Indicates those who attended the September 18, 1995 entrance meeting
- # Indicates those who attended the September 20, 1995 exit meeting

2.0 SCENARIO PLANNING

The exercise objectives and scenario were submitted to the NRC in a timely manner. The objectives and the scenario were reviewed by the NRC and the final scenario adequately tested the major portions of the Emergency Response Plan (E-Plan) and Implementing Procedures (ERIPs).

On September 18, 1995, NRC observers attended a licensee briefing on the scenario. The licensee stated that certain emergency response activities would be simulated and that controllers would intercede in exercise activities at appropriate times to meet certain exercise objectives.

3.0 ACTIVITIES OBSERVED

The NRC inspection team observed the activation and augmentation of the Emergency Response Facilities (ERFs) and the actions of the Emergency Response Organization (ERO) staff. The following activities were observed:

1. Selection and use of control room procedures.
2. Detection, classification, and assessment of scenario events.
3. Direction and coordination of emergency response.
4. Notification of licensee personnel and off-site agencies.
5. Communications/information flow and record keeping.
6. Assessment and projection of off-site radiological doses.
7. Issuance of Protective Action Recommendations (PARs).
8. Provisions for in-plant radiation protection.
9. Provisions for communicating information to the public.
10. Accident analysis and mitigation.
11. Accountability of personnel.
12. Post-exercise critique by the licensee.

4.0 EXERCISE FINDING CLASSIFICATIONS

Inspection findings are classified, where appropriate, as follows:

Exercise Strength: a strong positive indicator of the licensee's ability to cope with abnormal plant conditions and implement the E-Plan.

Exercise Weakness: less than effective E-Plan implementation which did not, alone, constitute overall response inadequacy.

Area for Potential Improvement: an aspect which did not significantly detract from the licensee's response, but which merits licensee evaluation for possible corrective action.

5.0 SIMULATOR CONTROL ROOM (SCR)

5.1 PLAYER PERFORMANCE

The on-shift operations team performed its duties on the plant simulator in the Nuclear Training Facility. Exercise performance in the SCR was good except for two problems noted below. These problems were: 1) not classifying an Alert condition as expected (in the scenario) and 2) a questionable emergency operating procedure (EOP) transition.

The Shift Supervisor (SS) and the Supervisor-Nuclear Operations (SNO) both managed the SCR well and coordinated their subordinates' actions. The SNO briefed the operations team frequently and ordered frequent plant page announcements. These announcements generally gave plant and emergency condition status and important directions to in-plant personnel but some announcements were cryptic. The SNO frequently communicated with the Plant General Manager, coordinating the actions in their respective facilities well.

The communicator in the SCR made one offsite notification during the exercise. This occurred after the Alert declaration. The communicator notified the state and county officials within three minutes of the Alert declaration. This notification was made in accordance with the licensee's E-Plan and NRC requirements.

5.2 CONTROLLER PERFORMANCE

The SCR communicator failed to notify the NRC of the Alert declaration due to confusion over whether it was necessary during the exercise. The lead controller stated in the licensee's pre-exercise briefing that the NRC should be notified at least once during the exercise. However, during the exercise, when the communicator was told by the SCR evaluator that the NRC was not actively participating in the exercise, he interpreted this to mean that the NRC should not be called. The inspectors did not consider the failure to notify the NRC to be an exercise weakness since it was not an exercise objective, but they did consider the failure of the exercise control personnel to clearly convey the extent of play requirements to the players to be an example of a need for improvement in exercise control.

Operators in the SCR were analyzing radiation data throughout the exercise. The simulator was generating real-time radiation data based on the progression of simulated plant conditions. The controllers also had radiation data that was developed with the scenario and was to be used after the simulator was no longer useful in generating reliable

data. However, this data was posted alongside the radiation monitoring instrumentation indications while the simulator was still generating radiation readings due to the developing scenario conditions. The simulator radiation data and the posted radiation data did not agree. The SCR operators were unsure of which indication they should act upon. Some confusion developed as a result. After some discussion, the lead controller directed the operators to disregard the simulator radiation data and to follow the posted radiation data. This confusion did not have an adverse effect on the operators' actions during the exercise, but it could have been avoided if the expectations were clearly conveyed to the SCR team during the pre-exercise briefing. The confusion over which radiation data should be used is another example of a need for improvement in exercise control.

The SCR's dose assessment capability was demonstrated for a short time during the exercise. A dose assessment team reported to the SCR after the Alert declaration and attempted to perform a dose projection based on the conditions of the simulated plant at that time. The dose assessment technician had difficulty performing the dose assessment because the pre-developed meteorological data gave air temperatures in degrees Fahrenheit (F) and the computer-driven dose assessment model required temperature inputs in degrees Celsius (C). The technician could not convert from degrees F to degrees C and needed help from the individual who was both the dose assessment controller and evaluator. The controller/evaluator assisted the technician and the technician eventually was able to perform one dose assessment before that function was assumed by the EOF. The failure to provide the pre-developed meteorological data in the same format as the actual data used in the plant is a third example of a need for improvement in exercise development and control.

5.3 ALERT CLASSIFICATION

The scenario was designed to activate the licensee's ERO by the SS's declaration of an Alert condition. The scenario expected the SS to declare this Alert based on an explosion occurring at the 12 Diesel Generator while the 11 Diesel Generator was unavailable due to maintenance.

According to the scenario, the SS was supposed to declare the Alert based on Emergency Action Level (EAL) IA1 "Fire or Explosion Affecting the Ability to Achieve Or Maintain Safe Shutdown". However, he did not declare the Alert until the lead controller directed him to do so in order to preserve the scenario's time line. His rationale for not declaring the Alert was based on his assertion that with three offsite power sources available, the "ability to achieve or maintain safe shutdown" was not affected. The licensee validated the scenario before the exercise by running through it with another operation's crew. The validating crew did make the Alert declaration as the licensee intended.

5.4 EMERGENCY ACTION LEVEL BACKGROUND

The licensee's EALs were recently revised in accordance with the Methodology for Development of Emergency Action Levels of the National Environmental Studies Project of the Nuclear Management and Resources Council (NUMARC/NESP-007). This methodology was reviewed and approved by the NRC, and the licensee's plant-specific EAL scheme that was developed under this methodology was also reviewed and approved by the NRC.

The inspectors reviewed the licensee's original NUMARC EAL scheme as submitted to the NRC, the NRC's request for additional information (RAI), dated November 17, 1993, and the licensee's March 11, 1994 reply to the NRC's RAI. The NRC noted in their RAI that the licensee's EAL for fire affecting safe shutdown (Calvert Cliffs EAL IA1) deviated from the NUMARC guidance. The NUMARC EAL (HA2 - "Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown") did not require that the fire or explosion necessarily prevent the ability to establish or maintain a safe shutdown in order to declare an Alert. Rather, the NUMARC EAL stressed the recognition of a fire or explosion event that is of such a magnitude that damage to safe shutdown systems results. The licensee's EAL (IA1 - "Fire or Explosion Affecting the Ability to Achieve or Maintain Safe Shutdown") went one step further by requiring that the fire be shown to actually impair safe shutdown capability.

The licensee informed the inspectors after the exercise of its intent to revise the EAL and to conduct additional training for decision makers in the ERO. The inspectors agreed that some additional investigation into the EAL's intent and some additional training on the basis for the EAL were warranted. This issue will be re-evaluated by the NRC after the completion of the licensee's corrective actions (IFI 50-317,318/95-07-01).

5.5 EMERGENCY OPERATING PROCEDURE TRANSITION

The scenario included a loss of coolant accident (LOCA) that occurred with no high pressure safety injection (HPSI). Operators followed their EOPs to respond to the LOCA. They made the transition from the procedure for reactor trip (EOP-0) to the LOCA procedure (EOP-5). Safety function evaluation criteria in EOP-5 then provided for a transition to the functional recovery procedure (EOP-8).

Transition to EOP-8 under certain conditions is part of the criteria for satisfying an EAL for a Site Emergency declaration. However, the operators did not transition to EOP-8 while performing LOCA recovery with no HPSI flow. This resulted in questions on the part of the inspectors as to whether the failure to make the transition quickly to EOP-8 following the LOCA was proper, and whether the eventual Site Emergency declaration should have been made sooner. Preliminary review by the inspectors indicated that the operators were in compliance with

EOP-5. However, this issue will be reviewed further by the resident inspection staff and will be documented in a subsequent report.

6.0 TECHNICAL SUPPORT CENTER (TSC)

The E-Plan specifies that the TSC is staffed at the Alert level. The Alert was declared at 8:48 a.m. and the TSC was activated at 9:07 a.m. The Plant General Manager (PGM) displayed good command and control in the TSC. He supervised the effective flow of information among the ERFs and frequently briefed TSC staff on simulated emergency event status. He also conferred at length with the Site Emergency Coordinator (SEC) on key management decisions such as event classifications and PARs. The TSC Director and PGM utilized procedure checklists to ensure that all necessary actions were completed.

The Health Physics technician performed regular facility habitability surveys to ensure personnel safety from radiation hazards. He distributed thermoluminescent dosimeters (TLDs) and pocket dosimeters to TSC staff so that personnel radiation exposure could be effectively monitored. However, when the Radiation Protection Director (RPD) ordered the administration of potassium iodide (KI) to maintenance, radiation safety, and operations team members, the PGM misinterpreted this message and wrongly ordered KI administration to TSC personnel. The intent of the RPD order was to protect personnel who were conducting activities in the plant from radioactive iodine exposure. The order did not apply to TSC personnel who were in a closed ventilation area with air filtering systems. The KI administration was simulated, and not adequately demonstrated or documented in accordance with ERPIP 303. The procedure requires that the KI be attained from medical personnel, that personnel be briefed on the potential hazards of KI, and that persons taking KI be documented. The simulated administration of KI to TSC personnel, the inadequate discrepancies in adherence to ERPIP 203 and documentation of KI administration was assessed as an area for improvement.

The TSC communicators effectively handled messages coming into the TSC by documenting them on message forms and routing them to the PGM and TSC Director. Reactor fuel engineers performed core damage assessments and time estimates to core uncover, in accordance with licensee procedures, and kept the PGM informed. The TSC engineers formulated various success paths for recovering from the simulated emergency. For example, they devised a plan for maintaining a supply of water for the reactor coolant system (RCS) to avoid long term recirculation for reactor cooldown so that plant radiation levels could be minimized. The inspector assessed their initiatives as proactive and effective for personnel safety.

Overall, the TSC staff performed expected actions well. The inspectors noted no particular exercise strengths or weaknesses.

7.0 OPERATIONS SUPPORT CENTER (OSC)

7.1 OSC STAFF

The OSC was activated within 15 minutes of the Alert declaration. The inspectors noted that the changes in the OSC layout were an improvement over past exercises. The inspectors noted strong performance from the RPD, the mechanical team leaders, and the Engineering Director.

Command and control in the OSC was adequate. The inspectors noted that the initial page announcement regarding the Alert was not specific, thus, members of the OSC were initially unsure of the basis for the Alert. Additionally, the 12 Diesel Generator fire was never announced as being extinguished. The OSC Director made eight announcements to his staff within the first hour; however, he made few announcements during the remainder of the exercise. This resulted in some confusion regarding the changing of job priorities.

At 1:17 p.m., the RPD directed that all teams entering the plant should be administered KI. This was based on the RPD's knowledge that the core had been uncovered with the expectation that radioiodine would subsequently increase throughout the plant. Licensee procedure ERPIP-303 established action levels of either a radioiodine concentration of $4.89E-5 \mu\text{Ci/cc}$ or an adult thyroid committed dose equivalent (CDE) of 25 rem. The inspectors noted that the scenario data indicated an I-131 concentration of $4.95 E-6 \mu\text{Ci/cc}$ at 1:00 p.m. and $3.05 E-5 \mu\text{Ci/cc}$ at 1:15 p.m. on the 69 foot elevation of the auxiliary building. The 69 foot elevation of the auxiliary building is one of the primary locations where emergency-dedicated self-contained breathing apparatus were stored. Therefore, the inspectors considered the directive for the administration of KI to in-plant teams an appropriate example of management discretion in anticipation of increasing I-131 concentration. However, the licensee may need to reconsider locating or dispersing these breathing apparatus to areas less prone to potential radioactive sources.

Overall, the radiation protection staff's performance was assessed by the inspectors as excellent. This was evidenced by very good RPD oversight of KI administration to damage control teams and in-plant survey teams, oversight of OSC habitability, OSC accountability, oversight of the special work permits and emergency work permits issued during the exercise, and handling of emergency dose authorizations. The inspectors assessed the OSC radiation protection staff to be proactive in anticipating changing radiation levels and maintained good control of radiation exposure to damage control teams. Additionally, the inspectors noted excellent focus on personal safety in regard to electrical precautions.

7.2 THERMOLUMINESCENT DOSIMETERS

The inspectors noted that TLD issuance to OSC members could have been improved to minimize delays for OSC personnel. At about 9:10 a.m., the

RPD directed a staff member to check on the status of dosimeters for all OSC members. As of about 10:00 a.m., the RPD was informed that some security guards still had not been provided TLDs. At 10:07 a.m., the RPD was informed that members of the 11 HPSI electrical team did not have their TLDs; as a result, the RPD directed that these individuals be provided with other TLDs.

7.3 RPD DIRECTION

The inspectors noted two instances in which direction for action regarding the protection of site personnel was not implemented as intended by the licensee's E-Plan and ERPIPs. The first instance noted was the plant page at 12:55 p.m. which ordered that site personnel wear protective gear and remain sheltered. The RPD was not involved in that decision. The second instance was when all personnel within the TSC were directed to take KI. The RPD directed that KI should be taken by individuals entering the plant.

8.0 EMERGENCY OPERATIONS FACILITY

8.1 EOF STAFF

The performance by the EOF staff during the exercise was good. The EOF was manned and activated in a timely manner. The SEC declared the EOF activated 48 minutes after the initial Alert declaration. The SEC's escalation of the emergency classification to Site Emergency and then to General Emergency was timely and correct. The Radiological Assessment Director (RAD) proactively provided the SEC the initial PAR shortly after the SEC declared the Site Emergency. The initial PAR was correct based on plant conditions and prevailing meteorological data.

Communications among the EOF staff and among the EOF staff and the various outside emergency organizations were strong. The EOF director frequently briefed his staff regarding plant conditions, EALs, PARs, priorities, etc. The EOF staff maintained the various status boards with current information. The inspectors observed good communication between the EOF staff and the Maryland State officials. The noise level in the EOF was always kept at minimum without any direction needed from EOF managers.

8.2 EAL FOR SITE EMERGENCY

One EAL for a Site Emergency is QS2.2 which provides criteria of "Zero (0) indicated Subcooling Margin Using CET Temperatures AND Valid RVLMS Level Indication of LESS THAN 50 Inches." The RVLMS (reactor vessel water level indicator) reads out incrementally by lights that actuate at specific levels and then remain illuminated. One of the lights actuates at 50 inches. Therefore, with the level decreasing, operators do not know for certain when the reactor water level is less than 50 inches until the next light, indicative of further decreasing level, (at 29 inches) actuates. The EALs are intended to have parameters that can be readily determined by instrumentation. Therefore, this EAL should

specify at which RVLMS level (or light) the criterion is met. The inspectors informed the licensee of this observation and the licensee agreed to review the EAL.

8.3 DOSE ASSESSMENT

Dose assessment capability at the EOF was available approximately thirty minutes after declaration of the Alert. The RAD demonstrated effective command and control of the dose assessment staff. Within fifty minutes of declaration of an Alert, the RAD took over dose assessment capability from the TSC. The dose assessment staff effectively used procedures and resources in the dose assessment room. The status boards were maintained and updated frequently.

The RADDPOSE model was run in the EOF both for projected long term and current conditions. Two separate computers were used by two RAD specialists. A third computer was used to run the RASCAL model as a comparison to the RADDPOSE calculations and because RASCAL was used by the State to perform dose projections. There was good comparison between the EOF's dose assessment results and the State's dose assessment results, which was being performed in a second floor room in the EOF.

Initially, there was a slight delay in obtaining meteorological data. The RAD specialist called the first two numbers in procedure ERPIP-825 to obtain meteorological data but was not successful in reaching the numbers. The meteorological data was obtained after calling the National Weather Service, which was the third number listed in the procedure. The licensee was informed of this and stated that it would review and resolve this issue.

The PARs were actively pursued, discussed and were ready to be given to the SEC when they were required for the General Emergency declaration. The correct PAR and PAR updates were provided to the SEC in timely manner which were passed on to the offsite agencies.

The field teams were promptly dispatched and ready to perform offsite monitoring. Control of these teams was maintained and well coordinated with the State teams. When the decision to provide KI to field teams was appropriately considered and made, the field teams were dispatched to the EOF to obtain KI. However, two air samplers used by Team A were found to be inoperable and had to be replaced. This caused a slight delay in obtaining an initial air sample after the release began.

Habitability of the EOF was not a consideration during this exercise since the plume was not headed towards the EOF and it is outside of the 10 mile EPZ. An RM-14 was available in the EOF; however, the inspectors noted that there was no procedure that requires the consideration of monitoring personnel coming into the EOF after there has been a release at the site. The licensee was informed of this issue for its consideration.

The licensee's overall performance in the EOF was good. No particular strengths, weaknesses, or areas for potential improvement were noted.

9.0 MEDIA CENTER

The licensee's performance at the media center was marginal. The accuracy and timeliness of the information provided to the news media players was lacking at times but was ultimately corrected. At 11:45 a.m., a licensee spokesperson stated that a General Emergency had been declared but that no radioactive release was in progress. He further stated that only one barrier (the RCS) had been breached but because of the potential to lose the other two barriers (the fuel cladding and containment), the licensee decided to be conservative and declare a General Emergency. In actuality, a release was known to be in progress because all three barriers had been breached. This information was provided by the spokesperson to the news media players at the following briefing. Additionally, during the 11:45 a.m. briefing, another spokesperson, in response to a media question about the NRC, stated that the NRC has personnel on site 24 hours a day. He was promptly corrected by the other spokesperson. Between media briefings, the inspectors observed the process by which the spokespersons acquired their information. One method was to listen to the EOF communicator as he made offsite notifications. During one of those notifications as the spokespersons were listening, the line was disconnected and the remainder of the message was not heard. None of the licensee's spokespersons took the initiative to re-establish the line or attempt to determine the remainder of the message. These examples demonstrate poor communications with the ERFs and weak understanding of licensee EALs and the NRC's role and responsibility by the licensee's representatives at the Media Center. However, the individuals acting as news media persons were asking pointed and practical questions in a somewhat hostile tone which the inspectors considered to be very realistic. Their performance was excellent.

10.0 LICENSEE CRITIQUE

On September 20, 1995, the NRC inspection team attended the licensee's exercise critique. The licensee's critique emphasized major observations and comments and assigned a rating to issues. The licensee's critique covered the majority of issues noted by the NRC inspection team. The inspection team considered that the scenario data could have been more realistic at times and that the intervention of controllers could have been more consistent. Since the licensee did not address the controller issues, the team assessed the licensee's critique as being adequate. However, the rating of the exercise issues during the critique was unique and demonstrated good management practice to prioritize and address issues.

11.0 REVIEW OF EMERGENCY RESPONSE PLAN IMPLEMENTING PROCEDURES (ERPIPS)

A Regional in-office review of revisions to the ERPIPs was completed. The list of the procedures and revisions that were reviewed are included

below. The inspector concluded that changes made were acceptable and did not decrease the effectiveness of the emergency preparedness program.

ERPIPs REVIEWED

No.	Procedure Title	Revision
3.0	Immediate Action Attachment 2	18 Change 4
	Attachment 3	18 Changes 3, 4
	Attachment 9	18
	Attachment 12	18 Changes 3, 4
	Attachment 19	18 Change 2
102	Superintendent-Nuclear Operations Attachment 4	1 Change 3
105	Control Room Communicator Attachment 1	2 Change 3
	Attachment 5	2
	Attachment 6	2 Change 3
	Attachment 7	2 Change 4
	Attachment 8	2 Change 3
	Attachment 10	2 Change 3
202	Plant General Manager Attachment 9	2
208	Plant Parameters Communications, TSC Attachment 5	0 Change 3
209	Technical Support Center Communicator Attachment 8	2 Change 2
301	Operational Support Center Director	3
302	Engineering Director	1
304	Operational Support Center Engineers	1
307	Operations Team Leader	1
308	Onsite Monitoring Team Leader	0
309	Dosimetry Team Leader	1
310	Maintenance Team Leaders	1
311	Chemistry Team Leader	1
312	First Aid Team Leader	1
314	Operational Support Center Communicator	1
318	Onsite Monitoring Team Members	0 Change 1
319	Dosimetry Team Members	1
501	Site Emergency Coordinator Attachment 1	2 Change 4
	Attachment 8	2 Change 4
	Attachment 11	2 Change 4
506	Offsite Monitoring Team Leader	0
506	Offsite Monitoring Team Leader Attachment 1	0 Change 1
507	Offsite Monitoring Team	0
507	Offsite Monitoring Team Attachment 2	0 Change 1

509	Emergency Operations Facility Communicator	
	Attachment 2	2 Change 3
	Attachment 7	2 Change 3
750	Security	3
832	Emergency Worker Permits	1 Change 1
900	Preparation of Emergency Response Plan and Implementation Procedures	3 Change 1
901	Communications Equipment	
	Attachment 10	1 Change 1
	Attachment 11	1 Change 1
	Attachment 12	1 Change 1
	Attachment 13	1 Change 1
B.1	Equipment Checklist	18

12.0 CONCLUSIONS

Overall, the team assessed the licensee's performance during the exercise as good. All licensee exercise objectives were met. The licensee successfully demonstrated its ability to implement its E-Plan and ERPIPs.

13.0 EXIT MEETING

The inspectors met with the licensee personnel listed in Detail 1.0 at the conclusion of the inspection to discuss the scope and findings of the inspection as mentioned above. The licensee acknowledged the findings and stated that they would be reviewed for appropriate corrective action.