

May 16, 2000

EA 99-280

Mr. Charles H. Cruse  
Vice President - Nuclear Energy  
Baltimore Gas and Electric Company (BGE)  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
Lusby, MD 20657-4702

**SUBJECT: NRC REGION 1 INTEGRATED INSPECTION REPORT NOS.  
05000317/2000-003 and 05000318/2000-003**

Dear Mr. Cruse:

This report transmits the findings of the safety inspection conducted by NRC Inspectors at the Calvert Cliffs Nuclear Power Plant from February 27, 2000 to April 1, 2000. At the conclusion of the inspection, these findings were discussed with Mr. Katz and others of your staff.

Overall, the NRC has concluded that your facility was operated in a safe manner. The conduct of activities was generally characterized by safety-conscious operations, acceptable engineering, and effective maintenance and radiological controls. Your staff effectively prepared for and commenced a refueling outage on Unit 1. A specialist inspector observed that exposure reduction efforts, contamination controls, and internal and external exposure controls implemented during the outage were effectively applied. During this inspection, the inspectors were assisted by the Region I Office of Investigations. Based upon the findings, no further action by the Office of Investigations is planned.

Based on the results of this inspection, the NRC has determined that two Severity Level IV violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs), consistent with Section VII.B.1.a of the Enforcement Policy. The NCVs are described in the subject inspection report and involved the failure to correctly implement a valve line-up of the Unit 1 component cooling water system and the failure to adequately evaluate procedure changes per 10 CFR 50.59 related to 1A emergency diesel generator operability. If you contest these violations or their severity level, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region I, the Director, Office of Enforcement, and the NRC Resident Inspector at the Calvert Cliffs facility.

Charles H. Cruse

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We appreciate your cooperation. In accordance with 10 CFR 2.790 of the NRC "Rules of Practice", a copy of this letter and its enclosure will be made available to the public.

Sincerely,

/RA/

Michele G. Evans, Chief  
Projects Branch 1  
Division of Reactor Projects

Docket Nos. 05000317  
05000318

License Nos. DPR-53  
DPR-69

Enclosure: NRC Region 1 Integrated Inspection Report Nos. 05000317/2000-003  
and 05000318/2000-003

cc w/encl:

B. Montgomery, Director, Nuclear Regulatory Matters (CCNPP)

R. McLean, Administrator, Nuclear Evaluations

J. Walter, Engineering Division, Public Service Commission of Maryland

K. Burger, Esquire, Maryland People's Counsel

R. Ochs, Maryland Safe Energy Coalition

State of Maryland (2)

Distribution w/encl: **(VIA E-MAIL)**

H. Miller, RA/J. Wiggins, DRA (1)

J. Johnson, ADPR, NRR

D. Dambly, OGC (RIDSOGCMAILCENTER)

B. Sheron, NRR

R. Borchardt, OE (RIDSOEMAILCENTER)

D. Holody, ORA

T. Walker, ORA

J. Shea, RI EDO Coordinator

M. Evans, DRP

W. Cook, DRP

S. Stewart - Calvert Cliffs

E. Adensam, NRR (RIDSNNRDIPMLPDI)

A. Dromerick, NRR

W. Scott, NRR

J. Wilcox, NRR

B. Summers, OE

G. Matakas, ORA

R. Junod, DRP

Inspection Program Branch, NRR (IPAS)

Nuclear Safety Information Center (NSIC)

Region I Docket Room (with concurrences)

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Renewed License Nos: DPR-53; DPR-69

Docket Nos.: 50-317; 50-318

Report Nos: 05000317/2000-003; 05000318/2000-003

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

Facility: Calvert Cliffs Nuclear Power Plant  
Units 1 and 2

Location: Lusby, MD

Dates: February 27, 2000 to April 1, 2000

Inspectors: J. Scott Stewart, Senior Resident Inspector  
Fred L. Bower, Resident Inspector  
Tim L. Hoeg, Resident Inspector  
Ron L. Nimitz, Senior Radiation Safety Inspector  
Christopher G. Cahill, Reactor Inspector

Approved By: Michele G. Evans, Chief  
Projects Branch 1  
Division of Reactor Projects

**Executive Summary**  
**Calvert Cliffs Nuclear Power Plant, Units 1 and 2**  
**Inspection Report Nos. 05000317/2000-003 and 05000318/2000-003**

This integrated inspection report summarizes aspects of BGE operations, maintenance, engineering, and plant support. The report covers a five-week period of resident inspection, the results of an in-office specialist review related to the 1A emergency diesel generator, and the results of a specialist inspection in radiological controls.

**Plant Operations and Maintenance**

BGE effectively planned and executed entering and exiting from a reduced inventory condition on Unit 1. The evolution was performed in a safe and deliberate manner with no adverse conditions noted. (O1.2)

A plant operator mis-positioned a valve on the Unit 2 component cooling system while performing a valve lineup intended for the Unit 1 component cooling system. As a result, component cooling flow was isolated to the Unit 2 containment heat loads while at full power. The error was recognized and the valve re-opened prior to any reactor plant system operating limits being exceeded. The failure to properly implement the test procedure valve line-up was a non-cited violation. (O1.3)

**Engineering**

BGE's initial Unit 2 emergency core cooling system safety evaluation associated with the low pressure safety injection system check valve local leak rate test failure and compensatory administrative controls was satisfactory, but incomplete. An oversight was identified by the BGE staff and the safety evaluation was properly revised. (E1.1)

BGE made changes to procedures, that allowed the manual addition of safety and non-safety loads to the 1A emergency diesel generator (EDG) to maintain EDG operability under light loading conditions. BGE did not document a safety evaluation that appropriately provided the basis that the change was not an unreviewed safety question. This violation of 10 CFR 50.59 was non-cited. (Section E8.3).

**Plant Support**

BG&E effectively implemented its ALARA program. There was overall effective planning and preparation for outage radiological work activities. BG&E implemented good efforts to reduce personnel occupational exposure for work activities to as low as is reasonably achievable. (R1.2)

Radiological controls for ongoing work activities were effectively implemented. No significant unplanned personnel external or internal exposures occurred and no individuals sustained any significant airborne radioactivity intake. There were minimal instances of personnel contamination during the outage with no significant dose consequences. (R1.3)

## Executive Summary (cont'd)

BG&E implemented good oversight of ongoing radiological controls activities. Technical personnel, supervisors and managers conducted effective observations of ongoing work activities. (R7)

BG&E implemented generally acceptable housekeeping within radiological controlled areas. Some areas for improvement were observed involving industrial safety. (R8.1)

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### **ATTACHMENTS**

Attachment 1: Partial List of Persons Contacted  
Inspection Procedures Used  
List of Acronyms Used  
Items Opened and Closed



## Report Details

### Summary of Plant Status

During this inspection period, Unit 1 operated at full power until March 10 when it was shutdown for a planned refueling outage. Unit 2 remained at full power throughout this inspection period.

## I. Operations

### **O1 Conduct of Operations**

#### **O1.1 General Comments (71707)**

Plant operations were properly performed with a focus on nuclear safety. Unit 1 was safely shutdown and taken to cold shutdown to commence a refueling outage. Mode changes and fuel handling operations during the scheduled core offload were conducted without problems.

On the afternoon of March 24, a Unit 1 containment polar crane bridge drive gear brake assembly caught on fire. BGE electricians responded and de-energized the polar crane, resulting in extinguishing the fire and eliminating the need to apply a fire retardant. BGE operations staff appropriately entered the applicable Emergency Response Plan Implementation Procedure (ERPIP). The fire was extinguished within six minutes and the ERPIP was exited. The damaged equipment was tagged out and repaired in a timely manner. BGE's preliminary cause determination concluded the fire was due to an overheated brake solenoid coil. The brake assembly and solenoid were original equipment.

During the inspection period, the inspectors reviewed the June 1999, Institute of Nuclear Power Operations (INPO) Evaluation of Calvert Cliffs Nuclear Power Plant. The inspectors did not identify any significant plant performance problems in their review.

#### **O1.2 Unit 1 Preparations for Reduced Inventory**

##### **a. Inspection Scope (71707)**

The inspectors observed and reviewed BGE operations personnel in their preparation and execution of reduced inventory conditions on Unit 1. The observations included attending a pre-evolution briefing, procedural review, and verification of reduced inventory prerequisites.

##### **b. Observations and Findings**

On March 10, Unit 1 was shutdown for the scheduled refueling and maintenance outage. On March 17, the inspectors observed the Calvert Cliffs General Supervisor for Nuclear Operations conduct a pre-evolution brief for reduced inventory on Unit 1. The briefing was formal and included contingency planning in accordance with BGE procedures for higher risk evolutions. The briefing included discussions on necessary instrumentation, expected plant conditions and response, safety precautions, and past

experiences. The inspectors also verified that the BGE staff established the prescribed plant conditions for the reduced inventory evolution.

On March 18, the Unit 1 reactor coolant system (RCS) level was lowered to reduced inventory and the steam generator nozzle dams were installed. Operations personnel completed an extensive checklist prior to entering reduced inventory and verified that the required safety systems were properly aligned for operation. The reduced inventory evolution and nozzle dam installation were performed as planned, without problems. The inspectors observed that the time spent in the reduced inventory condition was minimized. The Unit 1 RCS inventory was later successfully returned to a level of just below the reactor vessel flange, in order to accommodate de-tensioning the reactor vessel flange bolts and entry into Mode 6.

c. Conclusions

BGE effectively planned and executed entering and exiting from a reduced inventory condition on Unit 1. The evolution was performed in a safe and deliberate manner with no adverse conditions noted.

O1.3 Unit 2 Component Cooling System Valve Mis-Positioning

a. Inspection Scope (71707)

The inspectors reviewed the circumstances and results of BGE inadvertently isolating component cooling flow to the Unit 2 reactor containment building.

b. Observations and Findings

On March 19, while establishing a valve lineup for a local leak rate test on Unit 1, a plant operator inadvertently isolated component cooling flow to the Unit 2 containment header vice Unit 1. Unit 2 was operating at full power and Unit 1 was in a refueling outage. The loss of component cooling water flow to Unit 2 containment header resulted in a number of control board alarms, including "Component Cooling Low Flow" for the Unit 2 reactor coolant pumps. Coolant pump bearing temperatures increased when cooling was isolated, as expected.

When control room operators announced the alarm, the responsible plant operator recognized the error and re-opened the Unit 2 valve, restoring proper cooling flow to containment. None of the Unit 2 component cooling heat loads in containment reached an alarm setpoint and temperatures quickly normalized. All activities were stopped on shift and staff awareness training was promptly conducted. Other operations shift personnel were made aware of the occurrence through briefings and written night orders. The inspectors noted that this event may be viewed as a precursor to a loss of reactor coolant system barrier integrity because the component cooling water provides reactor coolant pump seal cooling.

The inspectors discussed the event with operations personnel and noted that the valve lineup sheet being used for this Unit 1 test specified that valve "CC-287" be shut. The valve shut by the operator was the Unit 2 valve labeled "2-CC-287." Likewise, the Unit 1

valve is labeled "1-CC-287." The inspectors determined that the partial valve identification nomenclature (1 and 2 prefix missing) on the valve lineup sheet was generally true for all valves identified in the test procedure. From the inspectors' interviews, it was apparent that the operators involved in the local leak rate testing had accepted the shortened valve nomenclature in the test procedure and that this contributed to the valve being mis-positioned. Technical Specification 5.4.1.a requires that procedures be established and implemented per Regulatory Guide 1.33. The failure to properly implement the test procedure valve lineup is a violation of Technical Specifications. This Severity Level IV violation is being treated as a Non-Cited Violation (NCV) consistent with Section VII B.1.a of the NRC Enforcement Policy. **(NCV 05000317/2000-003-01)** This violation is in the BGE corrective action program as Issue Report No. IR3-040-205.

c. Conclusions

A plant operator mis-positioned a valve on the Unit 2 component cooling system while performing a valve lineup intended for the Unit 1 component cooling system. As a result, component cooling flow was isolated to the Unit 2 containment heat loads while at full power. The error was recognized and the valve re-opened prior to any reactor plant system operating limits being exceeded. The failure to properly implement the test procedure valve line-up was a non-cited violation.

## II. Maintenance

### **M1 Conduct of Maintenance**

#### **M1.1 Routine Maintenance Observations**

a. Inspection Scope (62707)

The inspectors reviewed maintenance activities and focused on the status of work that involved systems and components important to safety. Component failures or system problems that affected systems included in the BGE maintenance rule program were assessed to determine if the maintenance was effective. Also, the inspectors directly observed all or portions of the following work activities:

MO1199903520	1B Emergency Diesel Generator Inspection
MO1199804042	13 High Pressure Safety Injection Pump Motor Replacement
MO1199904097	Re-packing 13 High Pressure Safety Injection Minimum Flow Isolation Valve

b. Observations, Findings, and Conclusions

There were no problems identified in maintenance. During the selected maintenance activities, the inspectors observed that technicians were experienced and knowledgeable of their assigned duties. Maintenance personnel practiced peer-checking and self-verification while performing their activities. Planned activities were assessed for impact on plant risk and maintenance was coordinated to minimize safety system unavailability and risk impact. Supervisory oversight and involvement with the maintenance was appropriate. Minor administrative discrepancies identified by the inspectors were corrected by BGE in a timely manner.

M1.2 Routine Surveillance Observations

a. Inspection Scope (61726)

The inspectors observed or reviewed portions of the following surveillance tests:

STP-M-171-1	Unit 1 Containment PAL Pressure Test
STP-O-67H-1	Unit 1 Safety Injection Tank Check Valve Test

b. Observations, Findings, and Conclusions

The inspectors noted no problems with the surveillance tests observed or reviewed. The selected surveillance activities were performed safely and in accordance with written procedures. Test details were discussed at a pre-test briefing attended by all test participants. The test participants were knowledgeable of their assigned responsibilities. Supervisory and engineering personnel participation was clearly observed in the conduct of the surveillance tests. Surveillance testing was thorough and properly demonstrated system and component operability.

### **III. Engineering**

**E1 Conduct of Engineering**

E1.1 Low Pressure Safety Injection System Check Valve Operability Evaluation Review

a. Inspection Scope (37551)

The inspectors reviewed the operability determination and related engineering evaluations associated with the Unit 2 Low Pressure Safety Injection (LPSI) System header check valve No. 2-SI-134 local leak rate test failure.

b. Observations and Findings

On March 1, BGE identified that one of four LPSI system header check valves (No. 2-SI-134) exceeded the allowable local leak rate criteria. During the period of time valve 2-SI-134 was being investigated, BGE placed the upstream motor operated valve (No. 2-SI-635) in the pull-to-override position (ensures the valve remains closed). This action

ensured system integrity and prevented back-leakage while check valve 2-SI-134 was known to be degraded. BGE also declared the "B" train of the Emergency Core Cooling System (ECCS) inoperable and entered the applicable Technical Specification limiting condition of operation (LCO) action statement. BGE initiated Issue Report No. IR3-036-370 to address this degraded ECCS condition and further evaluate the operability of the ECCS train B.

BGE developed a safety evaluation (No. SE00423), operability determination, and 10CFR50.59 determination for compensatory measures which involved the closure of motor-operated valve (MOV) No. 2-SI-635 and administrative controls (caution tags and periodic verifications) to ensure that at least two of the three remaining LPSI header injection MOVs remain open. Safety Evaluation SE00423 was approved by the Plant Operational Safety Review Committee (POSRC) on March 2, 2000, and with the administrative controls in place, the ECCS LCO was exited.

A few days after exiting the LCO, the BGE staff identified that emergency operating procedures (EOPs) use MOV 2-SI-635 as an alternate means of core flush during post-loss of coolant accident operations. This function was overlooked in SE00423. Consequently, BGE initiated IR3-052-180 to address their incomplete safety evaluation. Safety evaluation SE00423 was revised to reflect this EOP function, but this information did not change the overall conclusion or administrative controls put in place. BGE also concluded that valve 2-SI-635 could be opened, as necessary, for core flushing with the known degraded check valve condition.

Prior to the conclusion of the inspection period, BGE re-performed the local leak rate test on check valve No. 2-SI-134 with satisfactory results (zero leakage). The inspectors determined that BGE plans to overhaul this check valve during the next Unit 2 outage.

c. Conclusions

BGE's initial Unit 2 emergency core cooling system safety evaluation associated with the low pressure safety injection system check valve local leak rate test failure and compensatory administrative controls was satisfactory, but incomplete. An oversight was identified by the BGE staff and the safety evaluation was properly revised.

## **E8 Miscellaneous Engineering Issues**

### **E8.1 (Closed) Inspector Follow-Up Items 05000317/1999-009-01 and 05000318/1999-009-01: Inspector Follow-up of Concerns Identified in the Review of the Administrative Actions for Maintaining Operability Determinations. (92903)**

This item was opened to follow-up BGE actions to improve the administrative processes associated with operability determinations (ODs). BGE initiated issue reports (IRs) IR3-012-490 and IR3-012-491 in the corrective action program to track this item.

The inspector reviewed the Shift Manager OD book and found that the book was maintained in accordance with the administrative controls in procedure NO-1-106,

Functional Evaluation/Operability Determination. The inspectors found that the computer-based OD status database was consistent with the Shift Manager OD book data sheets. The inspector also noted that a number of enhancements had been made to procedure NO-1-106. The inspector observed that IR3-012-491 remains open in the licensee's corrective action program and will address BGE's process for justifying extensions to corrective action due dates. The inspection concluded that BGE actions to address this follow-up were appropriate. This item is closed.

**E8.2 (Closed) Inspector Follow-Up Item 05000317/1000-008-02 and 05000318/1999-008-02: Inspector Follow-up of BGE Actions With Respect to Crediting the Swing Pumps for Providing Minimum Load to the 1A Emergency Diesel Generator (EDG). (92903)**

Previous inspector review of this item revealed that the initial load lists developed to ensure that the 1A EDG had 1620 kW of load available credited normally aligned pumps and also the swing pumps. The analysis assumptions did not account for the operational constraints placed on the Unit 1 swing pumps and the impact of these constraints on the ability to provide the assumed full load to the 1A EDG. BGE also identified that:

- (a) Two salt water pumps cannot be operated on the same header due to flow limitations (resulting from the heat exchanger replacements);
- (b) Running the No. 13 service water pump on the same header only adds 126 kW, not the 254 kW as previously assumed; and,
- (c) The Nos. 11 and 13 high pressure safety injection pumps cannot be powered from the same bus without entering a technical specification action statement.

BGE initiated IR3-000-448 to enter these issues into their corrective action system. To resolve these issues, BGE revised the load lists in procedure NO-1-207, Nuclear Operations Shift Turnover, to clarify when swing pumps could be used to satisfy 1A EDG minimum load. The inspectors reviewed the load lists (one list for modes 1-4 and a second list for modes 5 and 6) and noted that the following restrictions were added: (a) restrictions to the saltwater pumps permitted only single pump operation per header; (b) restrictions for the service water pumps only allow an addition of 126kW for the second pump in modes 1-4; (c) restrictions for the high pressure safety injection (HPSI) pumps only credit the 11 HPSI pump during modes 1-4; and, (d) restrictions for the HPSI pumps during modes 5 and 6 are determined by minimum flow kW ratings and low temperature over-pressure protection requirements, due to technical specification differences during shutdown.

The inspectors concluded that BGE took acceptable corrective actions to address these issues. This item is closed.

E8.3 (Closed) EEI 0500317/1999-008-01;10CFR 50.59 Violation for compensatory actions taken to solve the light load issue of EDG 1A

a. Background and Inspection Scope (92903)

During the October 1999 NRC engineering inspection, the team identified an apparent violation pertaining to procedure changes to maintain the operability of the emergency diesel generator (EDG) 1A under light load conditions. The team identified that BGE did not include a written safety evaluation which provided the basis for the determination that the changes did not involve an unreviewed safety question, as required per 10 CFR 50.59. In the fall of 1997, BGE received vendor clarifications that the 1A and OC EDGs had the potential to operate below the recommended low load limit as specified by the vendor technical manual (recommends not operating for > 8 hours with loads <30%). To address this issue in the short-term, the licensee provided the operators with a list of safety and non-safety related loads that could be added to the EDGs to increase loads to >30%.

In the spring 1998 outage, BGE determined that the loads on the load list may not be available to support the 1A EDG operability. To address this concern, the licensee used a temporary, non-safety related, load bank to ensure that adequate load would be available for the 1A EDG during the outages.

Upon exiting the outage, BGE initiated a change to procedure NO-1-207, Nuclear Shift Turnover. This change added steps to ensure that sufficient safety and non-safety loads were available to meet the 1A EDG minimum load requirement. This change to procedure NO-1-207, was used to support the continued operation of the 1A EDG per Generic Letter (GL) 91-18. The team was concerned that on or about April 9, 1998, and subsequently on April 28, 1998, BGE made changes to procedures that affect the way the plant responds during design basis events and did not document a safety evaluation that adequately provided the basis that the change was not an unreviewed safety question. The team considered this action to be an apparent violation of 10 CFR 50.59.

During this inspection period, the inspector conducted an in-office review of additional licensee information pertaining to the safety significance and the ongoing corrective actions to address this issue.

b. Observations and Findings

After reviewing the additional information provided by BGE on December 10, 1999, and the license amendment request, dated February 18, 2000, the inspector concluded that in this case, BGE did not adequately meet the requirement of 10 CFR 50.59. BGE implemented a change to procedures described in the Updated Final Safety Analysis Report (UFSAR) regarding how the plant might respond to accidents and transients when using EDG 1A. The change would have manually added safety and non-safety loads to the 1A EDG in the event of a design basis accident. The change was made without having documented a safety evaluation which would have provided the basis for the determination that the change would not have increased the probability of occurrence or the consequence of an accident, as previously described in the UFSAR. This severity level IV violation is being treated as a Non-Cited Violation, consistent with

Section VII.B.1.a of the NRC Enforcement Policy. **(NCV 05000317/2000-003-02)** This matter is in the licensee's corrective action program as described in a BGE license amendment request, dated February 18, 2000.

c. Conclusion

BGE made changes to procedures, that allowed the manual addition of safety and non-safety loads to the 1A emergency diesel generator (EDG) to maintain EDG operability under light loading conditions. BGE did not document a safety evaluation that appropriately provided the basis that the change was not an unreviewed safety question. This violation of 10 CFR 50.59 was non-cited. (Section E8.3).

#### **IV. Plant Support**

### **R1 Radiological Protection and Chemistry (RP&C) Controls**

#### **R1.1 Radiological Controls (Program Changes)**

a. Inspection Scope (83750)

The inspector reviewed selected radiological controls program changes since the previous inspection in this area. Areas reviewed included organization and staffing, facilities and equipment, and procedure and program changes. The inspector reviewed work in progress and applicable documentation, and interviewed cognizant personnel.

b. Observations and Findings

There were no program changes identified that adversely affected the radiation protection program. BGE was effectively implementing its new electronic dosimetry system during the outage to provide realtime monitoring of personnel radiation exposure. BGE established a defined radiological controls organization structure for the outage and was using appropriately trained and qualified personnel to provide oversight.

BGE effectively planned and prepared for outage work. Overall work planning and coordination was observed to be good. BGE conducted an extensive evaluation of its ALARA program in December 1999 using outside consultants. Areas for improvement were identified and entered into an action tracking system. A new ALARA Committee was implemented to enhance oversight and review of ALARA activities.



c. Conclusions

No radiological controls program changes were identified that adversely affected radiation protection program performance.

R1.2 Unit 1 Refueling Outage Radiological Controls (ALARA) Planning and Performance

a. Inspection Scope (83750)

The inspector selectively reviewed ALARA planning and preparation efforts for refueling outage work. The inspector reviewed radiological control records; interviewed licensee representatives relative to outage planning; and observed activities to determine the effectiveness of planning, preparation, and management oversight for radiologically challenging work activities. The inspector reviewed selected work activities that had the potential for creating radiological hazards (e.g, reactor vessel head removal, reactor internals upper guide structure removal, reactor coolant pump work, and steam generator work activities). The inspector toured radiological work areas to evaluate in-field implementation of ALARA measures.

b. Observations and Findings

BGE performed effective planning and preparation for outage radiological work activities and implemented good efforts to reduce personnel occupational exposure for work activities to as low as is reasonably achievable (ALARA). BGE used mock-up training for steam generator work activities and used an extensive array of remote cameras to monitor essentially all ongoing radiological risk significant work activities within the Unit 1 containment. Dose rates in selected areas were observed to be lower than previous outages. All risk significant work activities were controlled by specific radiation work permits with detailed ALARA reviews and clearly defined radiation exposure reduction methods.

BGE monitored ongoing radiological work activities to identify anomalous exposure accumulation and established additional in-field radiological controls work stations to control and monitor work. BGE tracked accrued radiation exposure for comparison to established daily goals. Current accrued exposure was within goals. However, there was a need to improve oversight of water movement activities that could impact local radiation dose rates. Some large volume water movements had increased ambient radiation dose rates requiring countermeasures to reduce aggregate exposure. BGE placed this matter into the corrective action system.

Planning and preparation for steam generator replacement was ongoing and appeared to be thorough. Lessons learned from other stations were being evaluated for implementation at Calvert Cliffs.

c. Conclusions

BGE effectively implemented its ALARA program. There was overall effective planning and preparation for outage radiological work activities. BGE implemented good efforts to reduce personnel occupational exposure for work activities to as low as is reasonably achievable.

R1.3 Unit 1 Refueling Outage Radiological Controls (Internal and External Exposure Controls)

a. Inspection Scope (83750)

The inspector reviewed records, interviewed cognizant personnel, and observed occupational exposure control practices during work activities and tours of the RCA. The inspector reviewed high radiation area controls, general radiological posting, implementation of the radiation work permit program, and implementation of the dosimetry program. The inspector toured the containment, auxiliary building, and fuel storage areas. The inspector selectively made independent radiation measurements to verify licensee results and reviewed selected work activities that had the potential for creating radiological hazards (e.g., reactor head removal). The inspector also selectively reviewed radioactive material and contamination control practices, including the adequacy of supply, maintenance, calibration and performance checks of survey and monitoring instruments; the use of personal contamination monitors and friskers; and application of hot particle contamination monitoring.

b. Observations and Findings

Overall, BGE made appropriate radiological surveys to support planning and preparation of work and made appropriate job-coverage surveys to monitor ongoing radiological work. BGE provided and used calibrated and checked survey instrumentation for radiological surveys. Personnel dosimetry was properly issued, worn, and moved to points of highest expected radiation exposure of the body. Multiple dosimetry was used as appropriate. Radiation work permit ALARA reviews provided acceptable guidance for workers and were properly implemented. Selective verification identified that workers were properly signed-in on their assigned RWPs. BGE used special turnstiles to control worker access to the radiological controlled area to ensure workers had proper dosimetry. No significant unplanned personnel external or internal exposures were identified. BGE effectively implemented its radiological controls program for declared pregnant females.

Engineering controls were effectively used to minimize airborne radioactivity. BGE evaluated low level intakes of radioactive materials using data from air samples and whole body counters, as appropriate. No significant airborne radioactivity was identified and no individuals sustained any significant airborne radioactivity intake.

Access points to areas of elevated radiation levels or areas exhibiting contamination were properly posted and barricaded. Appropriate access controls were implemented for High Radiation Areas including those areas meeting criteria to be locked. BGE

properly implemented its locked High Radiation Area access control program. High Radiation Area keys were inventoried and controlled.

Radioactive material was properly labeled, stored, and controlled. Contamination monitoring equipment was observed to be operable, within calibration, and properly used by personnel. Overall, radiation and contamination surveys were observed to be comprehensive and detailed.

There were minimal instances of personnel contamination during the outage and dose assessments were conducted as appropriate. There were no significant doses associated with personnel contamination.

c. Conclusions

Radiological controls for ongoing work activities were effectively implemented. No significant unplanned personnel external or internal exposures occurred and no individuals sustained any significant airborne radioactivity intake. There were minimal instances of personnel contamination during the outage with no significant dose consequences.

**R7 Quality Assurance in RP&C Activities**

a. Inspection Scope (83750)

The inspector selectively reviewed quality assurance activities including, audit, surveillance, and self-assessment activities. The inspector met with cognizant Quality Assurance personnel to discuss outage oversight activities.

b. Observations and Findings

BGE established an active surveillance program for outage radiological control activities. Quality Assurance (QA) personnel developed an assessment strategy and checklists to oversee outage radiological work activities. QA personnel monitored work schedules in advance to target oversight opportunities. In addition, supervisors and managers conducted tours to review ongoing activities. Issue Reports (IRs) were initiated, as appropriate, to enter findings into the corrective action program.

The Radiation and Chemistry Technical Services Group developed and implemented an outage observation plan that provided for seven-day coverage with planned back shift observations.

c. Conclusion

BGE implemented good oversight of ongoing radiological controls activities. Technical personnel, supervisors, and managers conducted effective observations of ongoing work activities.

**R8 Miscellaneous Issues**

### R8.1 Plant Tour Observations

#### a. Inspection Scope

During the inspection, the inspector made various tours of the radiological controlled areas including the reactor containment, auxiliary building, and fuel storage areas. The inspector reviewed general housekeeping, station material conditions, and observed general industrial safety.

#### b. Observations and Findings

Overall housekeeping in the areas toured was acceptable. Walkways were generally unobstructed and potentially contaminated materials were clearly marked and segregated. Housekeeping conditions in containment were generally good. No buildup of combustibles was observed.

Several observations were made relative to industrial safety. The entry points from the reactor containment 69 foot elevation to the reactor coolant pump bays were difficult to access. Also, one individual was observed not hooking his safety harness to a tie-line at the reactor cavity. BGE took actions on these matters including re-instructing personnel, discussing of the issue at outage planning meetings, evaluation of the access areas of the pump bays, and modification of pump bay access to improve personnel access.

#### c. Conclusions

BGE implemented generally acceptable housekeeping within radiological controlled areas. Some areas for improvement were observed involving industrial safety. BGE took action on these matters.

### R8.2 (Closed) Licensee Event Report (LER) No. 05000317/1999-002: Lost Radioactive Sources Due to Inadequate Control

#### a. Inspection Scope (92700)

The inspector reviewed the circumstances and evaluations associated with Licensee Event Report (LER) No.1999-002. The LER discussed the licensee's identification of four lost radioactive sources. The inspector discussed the loss of the sources with cognizant personnel, reviewed applicable procedures, and independently reviewed current source control practices. The inspector reviewed implementation of corrective actions delineated in the LER and conducted a selective inventory of sources at various source storage locations.

b. Observations and Findings

BGE determined that it was unlikely that the sources could have left the facility, except if inadvertently disposed of as normal radioactive waste. The aggregate activity of the four sources was about 288 microcuries of Cs-137, and consequently would not be expected to pose any significant radiological risk or impact. BGE placed this item into its corrective action system as issue report No. IR3-021-171.

BGE had established in Radiation Safety Procedure RSP 1-121, Radioactive Source Control, Section 6.5, that sources be signed-in upon return to their storage location. Notwithstanding, on March 20, 2000, the inspector identified that three individuals signed out a total of five sources and did not sign in the sources upon return to the source locker. In response, BGE initiated immediate actions, including conducting an inventory of all source storage locations and re-instructing personnel of the procedure requirements. No lost sources were identified. BGE placed this matter into its corrective action system as issue report No. IR3-051-725, on March 21, 2000. This failure constitutes a violation of minor significance and is not subject to formal enforcement action.

c. Conclusion

BGE initiated generally effective corrective actions relative to radioactive source control and accountability. This LER is closed.

## V. Management Meetings

### **X1 Exit Meeting Summary**

After the conclusion of the inspection, on April 19, 2000, the inspectors presented the inspection results to Mr. Katz and others of BGE management. BGE acknowledged the findings presented.

### **X2 Management Meeting Summary**

On March 10, 2000, NRC Chairman Meserve toured the Calvert Cliffs site with BGE staff and met with Mr. Cruse, BGE Vice President-Nuclear. The discussions were general in nature. Following the plant tour, Chairman Meserve held a routine press conference at the Calvert Cliffs Nuclear Power Plant Visitors Center. At the press conference, Chairman Meserve addressed the new inspection and oversight program and license renewal.

## Attachment 1

### PARTIAL LIST OF PERSONS CONTACTED

#### BGE

C. Cruse, Vice President, Nuclear Energy Division  
P. Katz, Plant General Manager  
T. Pritchett, Manager, Nuclear Engineering  
L. Wechbaugh, Superintendent, Nuclear Maintenance  
D. Holm, Superintendent, Nuclear Operations  
B. Montgomery, Director, Nuclear Regulatory Matters  
S. Sanders, General Supervisor, Radiation Safety  
T. Sydnor, General Supervisor, Plant Engineering  
K. Mills, General Supervisor, Plant Operations  
M. Navin, Superintendent, Technical Support  
C. Earls, General Supervisor, Chemistry  
T. Forgette, Director, Emergency Planning  
M. Finley, Engineer, Nuclear Engineering  
R. Baldwin, Engineer, Nuclear Engineering  
G. Detter, General Supervisor, Nuclear Engineering

### INSPECTION PROCEDURES USED

IP 71707	Plant Operations
IP 62707	Maintenance Observation
IP 61726	Surveillance Observation
IP 37551	Onsite Engineering
IP 71750	Plant Support Activities
IP 83750	Occupational Radiation Exposure
IP 92700	Onsite Follow-up of Written Reports of Non-routine Events at Power Reactor Facilities
IP 92903	Follow-up, Engineering

### LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
BG&E	Baltimore Gas and Electric
CFR	Code of Federal Regulations
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOP	Emergency Operating Plan
ERPIP	Emergency Response Plant Implementation Procedure
HPSI	High-Pressure Safety Injection
HRA	High Radiation Area
IFI	Inspector Follow-up Item
IR	Issue Report
LCO	Limiting Condition of Operation
LER	Licensee Event Report
LPSI	Low-Pressure Safety Injection

MOV	Motor Operated Valve
NCV	Non-cited Violation
NPO	Nuclear Plant Operator
OD	Operability Determination
POSRC	Plant Operational Safety Review Committee
QA	Quality Assurance
RCA	Radiological Controlled Area
RCS	Reactor Coolant System
RP&C	Radiological Protection and Chemistry
RSP	Radiation Safety Procedure
RWP	Radiation Work Permit
SM	Shift Manager

## ITEMS OPENED, CLOSED

Items Opened and Closed

05000317/2000-003-01	NCV	Failure to properly implement a valve line-up for the component cooling water system
05000317/2000-003-02	NCV	Failure to properly evaluate procedure changes per 10 CFR 50.59.

Items Closed

05000317/1999-009-01	IFI	Concerns Identified in the Review of the Administrative Actions for Maintaining Operability Determinations
05000318/1999-009-01	IFI	Concerns Identified in the Review of the Administrative Actions for Maintaining Operability Determinations
05000317/1999-008-02	IFI	BGE Actions With Respect to Crediting the Swing Pumps for Providing Minimum Load to the 1A EDG. (92903)
05000318/1999-008-02	IFI	BGE Actions With Respect to Crediting the Swing Pumps for Providing Minimum Load to the 1A EDG.
05000317/1999-002	LER	Lost Radioactive Sources Due to Inadequate Control
05000317/1999-008-03	EEL	Apparent 10 CFR 50.59 violation for compensatory measures taken to resolve a 1A EDG light load operability issue.