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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, Maryland

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EXECUTIVE SUMMARY
Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Inspection Report Nos. 50-317/98-12 and 50-318/98-12

This integrated inspection report includes aspects of BGE operations, maintenance, engineering and plant support. The report covers a seven week period of resident inspection and a review of emergency response plan procedures by a regional specialist.

Plant Operations

An inspector review of operator workarounds found that each issue was scheduled to be resolved within a reasonable time period and there was no significant or cumulative affect on the quality of normal or emergency operations from the issues.

A reporting decision was made incorrectly by a contractor supervisor when a fire watch was conducted twenty minutes after the technical specification allowed time. The problem was identified by BGE during an annual fire protection audit. (F8.1)

Maintenance

A station transformer was replaced in a safe, methodical, and professional manner with good risk management and supervisory oversight.

Preventive maintenance checks identified a degrading steam generator pressure instrument power supply prior to failure of the instrument. The power supply was replaced without problems. The preventive checks were established in the maintenance rule goal setting for the 10 CFR 50.65 a(1) instrument power supplies and were successful in preventing repeat instrument failure.

The inspectors identified that bolting was incompletely installed following work on a service water heat exchanger strainer. The work package for the task was poor because multiple action steps and quality verifications were specified within one step and there was no verification that the bolting was installed correctly. Checks of the bolting by BGE personnel were incomplete and the strainer was returned to service with loose bolting. When identified, BGE took prompt and comprehensive corrective actions.

BGE identified that a spare reactor trip breaker had on multiple occasions been placed in service during maintenance without having completed technical specification testing requirements. BGE stated that the event resulted in no significant consequences to public health and safety.

Engineering

BGE identified and reported that two battery chargers had been in service without having seismic positioners. A seismic event would have made the chargers inoperable.

Plant Support

BGE radiation protection technicians working in containment acted appropriately when a neutron monitoring instrument showed higher than expected neutron levels. The high readings resulted from the poor material condition of the instrument.

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ATTACHMENTS

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Inspection Procedures Used

Items Opened, Closed and Discussed

List of Acronyms Used

Attachment 2: Emergency Response Plan and Implementing Procedures Reviewed

Report Details

Summary of Plant Status

Both reactors operated at full power throughout the inspection period except for minor power reductions for routine condenser waterbox cleaning and turbine valve testing.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Plant operations were conducted safely with a proper focus on nuclear safety. The inspectors conducted daily reviews of ongoing plant operations and observed that the overall conduct was professional and safety-conscious. Operators were aware of plant conditions and the status of plant equipment. The operators used effective communications to ensure that evolutions were conducted safely and in accordance with BGE procedures. Supervisory oversight was appropriate.

On December 14, while completing Technical Specification Surveillance 3.3.1.1, for thermal margin low pressure protection, operators noted that the Unit 1, Channel A reactor trip pressure setpoint was less than the calculated variable trip setpoint. The surveillance required operators to check the trip pressure twice daily to ensure that the setpoint was greater than the calculated value. The variation showed that there was a problem with the low pressure protection calculator in channel A of the reactor protective system. The plant was operating normally at the time and no protective actions were necessary. The channel was declared inoperable and the appropriate technical specification action was initiated. Following discovery of the problem, instrument and controls (I&C) maintenance personnel were informed and troubleshooting commenced. The problem was later determined to be an intermittently failed amplifier and the amplifier was replaced. A review of logs by BGE prior to December 14 determined that the setpoint had been lower than the calculated value on December 13, but the discrepancy had been missed. Technical specifications required that operators verify that the calculated pressure be less than the observed setpoint, or the channel must be placed in either the bypass or trip condition within one hour. BGE later determined this missed action on December 13, to be a violation of technical specifications. An issue report was written and actions were initiated to document the problem in a licensee event report. Because the LER had not been issued at the end of the inspection period disposition of the apparent violation remained open pending review of the LER by the inspectors. **(EEI 50-317&318/98-12-01)**

On January 15, the inspectors reviewed the status of operator compensatory actions (workarounds). BGE maintained a list of outstanding workarounds in the control room and documented the age of each item and plans for correction. BGE operations personnel periodically reviewed the issues and assessed their cumulative affect on the quality of normal and emergency operations. There were no issues that affected plant safety and each issue was prioritized for repair based on safety significance and plant condition needed for repair. Corrective action priority was also assigned based on the significance of each item. The inspector found that BGE was active in identifying and dispositioning operator workarounds in a timely manner. Each issue was scheduled to be resolved

within a reasonable time period and there was no significant cumulative affect on the quality of normal or emergency operations from the issues.

O1.2 Auxiliary Feedwater System Walkdown

a. Inspection Scope (71707)

The inspectors performed a walkdown inspection of the accessible portions of the Unit 1 auxiliary feedwater (AFW) system.

b. Observations and Findings

On January 4, the inspectors walked down various portions of the Unit 1 auxiliary feedwater system including the pumps, piping, air operated valves, condensate storage tanks, instrumentation, manual valves, hangers, and piping supports. No visible signs of leakage were noted during the inspection. Piping supports and hangers were inspected for loose bolting and deformation and no deficiencies were found. All of the hangers and supports inspected appeared to be at full strength. Control room indications for the system and local instrumentation appeared to be in good working order. The assigned system engineer maintained a list of open deficiencies for the system with each material issue being dispositioned as a maintenance work order. The inspectors reviewed the list of open maintenance orders (MO) for the system and found no safety significant issues.

The inspectors compared the system piping and instrument drawing (P&ID) to the field configuration and several discrepancies were noted. Two non-safety discharge header drain line pipe caps were missing. Also, the P&ID incorrectly identified three pump pressure gage isolation valves. The inspectors informed BGE of these findings and an issue report (IR) was written to resolve the discrepancies, including replacing the caps and correcting the drawing. The inspectors concluded that these issues were minor and had no safety impact.

c. Conclusions

The auxiliary feedwater system was found in good material condition and in the correct operational lineup. A few minor discrepancies were identified and BGE responded by placing these issues in their corrective action system.

II. Maintenance

M1 **Conduct of Maintenance**

M1.1 General Comments

a. Inspection Scope (62707)

The inspectors reviewed maintenance activities for systems and components that were important to safety. Component failures or system problems that affected systems within the scope of the BGE maintenance rule program were assessed to determine if

maintenance was effective. Also, the inspectors directly observed all or portions of the following work activities:

MO2199705788	Replace 4kV breaker 152-2113 on Bus 21
MO0199800409	Acceptance test on new 4 kV breakers
MO2199804036	Repair 21B safety injection tank level indication
MO2199603982	Replace tubing test connection on 2B EDG jacket water cooling
MO2199900081	Number 23 saltwater pump clean and inspect
MO1199703391	Remove and replace 13A 480 volt transformer
MO1199900071	Replaced power supply card in U1 ESFAS loss of voltage relay
MO1199900304	Replace power supply for 11 steam generator pressure instrument

b. Findings and Observations

During the inspection period, maintenance was conducted safely in accordance with BGE procedures and processes. (One exception is noted below in Section M1.2.) The inspectors observed that work packages were used for safety related work. Quality assurance inspectors were observed at work sites making independent verifications, when appropriate. Good briefings and communications were observed between the work groups, engineering, and operations personnel.

On January 12, the inspectors observed the removal and replacement of a 480 volt transformer in a Unit 2 vital switchgear room. As part of a BGE plant improvement project, some of the older transformers containing polychlorinated-biphenyls (PCBs) were replaced with newer units with no PCBs. The inspectors verified proper electrical tag out boundaries and work document requirements being followed by BGE personnel. The hot work and security permits were reviewed by the inspector and no discrepancies were noted. Equipment was re-aligned during the maintenance to minimize plant risk. The transformer replacement was performed in a safe, methodical, and professional manner with good risk management and supervisory oversight.

On January 21, the inspectors identified several fasteners on the 2A EDG service water heat exchangers supply and return header flanges having less than the BGE specified thread engagement. There was no leakage from the system and system integrity was maintained. The inspectors notified BGE maintenance and an issue report was written to address the condition. In addition, while the maintenance group was evaluating the inspector findings, BGE identified several nuts that were loose and turned freely on the 2A EDG air cooler heat exchanger end bell assembly. BGE wrote another issue report for this issue and the 2A EDG was taken out of service while BGE maintenance corrected the condition. The inspectors considered the BGE response to be prompt with the proper focus on safety. Due to recent bolting issues, BGE initiated a review of bolting to determine what actions may be implemented to prevent future fastener concerns.

During preventive maintenance monitoring of instrument power supplies, BGE identified degrading voltage on the power supply for the 11B steam generator pressure transmitter. The power supply was declared inoperable, the applicable technical specification limiting condition of operation was implemented, and the power supply was replaced without problems. The activity was observed by the inspectors and discussions were held with the system engineer and instrument maintenance personnel. The inspectors noted that

instrument power supplies had been declared a(1) under the Calvert Cliffs maintenance rule program. Goal setting had included establishing a threshold of no instrument failures due to power supply failures and a preventive maintenance program had been implemented to monitor power supply performance. In this case, the power supply was identified as having degrading voltage output prior to failure of the instrument. The preventive maintenance was therefore successful in detecting the problem prior to instrument failure.

M1.2 U1 Salt Water Strainer Guide Ring Installation

a. Scope (62707)

The inspectors observed installation of the 11A and 11B saltwater strainer guide rings and later conducted a system walkdown. Discussions were held with maintenance workers, mechanical assessment personnel, and supervisors.

b. Observations and Findings

On December 2, 1998, BGE engineering personnel identified that strainer guide rings were missing from all four U1 salt water strainers. The omission of strainer guide rings increased the probability of macroscopic fouling. This issue was discussed in NRC Inspection Report 50-317&318/98-11.

On December 21, the inspectors observed BGE mobile maintenance personnel installing flow guide rings on the 11A and 11B salt water strainers. The maintenance procedure was documented in a BGE maintenance order. The inspectors reviewed portions of the saltwater header tag out for adequate strainer isolation and found the tag out was appropriate. The inspectors observed that cleanliness and foreign material exclusion were implemented during the work. The maintenance was performed in a controlled and safe manner and the salt water headers were returned to service later that day.

On December 28, 1998, the inspectors conducted a walkdown of the saltwater system and found that 2 of the 16 flange bolts on the 11A SW strainer inlet flange were loose and less than hand tight. One of the two bolts had approximately 3/4 inch of bolt threads exposed between the nut and the outside flange face. The inspectors informed the work control center of the finding and BGE confirmed the finding and wrote an issue report. There was no leakage from the system. The loose bolts were tightened and the other strainers were inspected by BGE to verify similar conditions did not exist.

The maintenance order provided instructions for reassembly of the strainer housing. The specific step installed the guide ring, ensured the guide ring was seated properly, lowered the strainer into place, reinstalled the flange bolting, and tightened the bolts. There were two quality verification hold points associated with the step, including verifying that the controlled drawing was used and that the guide ring was installed in accordance with the drawing. Installation and tightening of the flange bolts was not verified by quality control personnel and a supervisory walkdown of the flange installation was not specified. The inspectors considered that the procedure was poor with one procedure step containing so many actions and multiple verifications. Also, there was no evidence of quality verification or supervisory review of the bolting.

The inspectors considered that the loose bolting was more than a minor problem for the following reasons: The group that missed the bolting had not installed the strainer guide ring during the 1998 work. In addition, the procedure did not provide a barrier to ensure that the bolting was done satisfactorily prior to placing the system into service, and oversight of the work provided no second check by either supervisors or quality verification to ensure that the bolting was done correctly.

After the NRC inspectors identified the loose bolting, BGE initiated a root cause review to establish the cause of the problem. BGE halted work by the mobile maintenance group until training on the event was conducted. Also, BGE mechanical maintenance requested additional quality assurance oversight of bolting practices. BGE informed the inspectors that additional actions could be identified from the root cause review. The inspectors also identified a number of minor bolting discrepancies on the 2A emergency diesel generator (See M1.1). As a result of these findings, BGE established a protocol for system engineering, maintenance, and operations personnel to conduct walkdowns of plant systems to identify, assess, and correct bolting deficiencies.

Calvert Cliffs Maintenance Procedure MN-1-101, "Control of Maintenance Activities," Section 5.8 required maintenance activities to be performed in accordance with the applicable maintenance order. Calvert Cliffs Maintenance Order 1199805606 Step 70 required flange bolting on the 11A strainer to be tightened wrench tight. Failure to tighten the flange bolting on the 11 A strainer was a violation of Calvert Cliffs Technical Specification 5.4.1, which required that maintenance activities be completed in accordance with procedures. (VIO 50-317&318/98-12-02). However, because BGE corrected the loose bolting when it was identified, placed the issue in their corrective action program, initiated a review to determine the cause, and initiated other corrective actions, no response to the Notice of Violation was required.

c. Maintenance Conclusions

A station transformer was replaced in a safe, methodical, and professional manner with good supervisory oversight.

Preventive maintenance checks identified a degrading steam generator pressure instrument power supply prior to failure of the instrument. The power supply was replaced without problems. The preventive checks were established in the maintenance rule goal setting for the A(1) instrument power supplies and were successful in preventing a repeat instrument failure.

The inspectors identified that bolting was incompletely installed following work on a service water heat exchanger strainer. The work package for the task was poor because multiple action steps and quality verifications were specified within one step and there was no verification that the bolting was installed correctly. Checks of the bolting by BGE personnel were incomplete and the strainer was returned to service with loose bolting. When identified, BGE took prompt and comprehensive corrective actions.

M1.2 Routine Surveillance Observations

a. Inspection Scope (61726)

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

STP-M-200-1	Reactor Trip Circuit Breaker Test Unit 1
STP-O-64-2	Safety Injection Tank Operability Verification
STP-M-200-2	Reactor Trip Circuit Breaker Test Unit 2
STP-O-47B-1	Unit 1 Main Steam Isolation Valve Partial Stroke Test
STP-M-171-2	Unit 2 Containment Personnel Air Lock Test
STP-O-5A-2	Auxiliary Feed Water Pump Operability Test
STP-O-73I-1	High Pressure Safety Injection Pump Operability Test
STP-O-33-2	Containment Radiation Monitor Monthly Test

b. Observations and Findings

The inspectors found that the selected surveillance activities were performed safely and in accordance with approved procedures. Test details were discussed at a pre-test briefing that typically included a question and answer session attended by all test participants. The inspector found that test participants were knowledgeable of their assigned responsibilities. Supervisory and system engineering participation was observed in the conduct of the surveillance tests.

The inspectors observed that minor discrepancies noted during the tests were properly entered into the BGE corrective action system and promptly resolved.

c. Conclusions

Surveillance testing was done in accordance with BGE procedures. Supervisory and system engineering personnel participated in surveillance testing.

M1.3 (Closed) LER 50-317/98-05: Installed Spare Reactor Trip Circuit Breaker (RTCB) Inoperable

a. Inspection Scope

The inspectors conducted an onsite review of a Licensee Event Report (LER).

b. Findings and Observations

BGE identified that a spare reactor trip circuit breaker installed during maintenance on the normal breaker, did not meet the surveillance requirements of Technical Specification 3.3.1.1. Reactor trip breakers were required to undergo a channel functional test monthly and a time response test each refueling interval. The spare breaker met only the time response requirement. The monthly functional test was not performed. The occurrence resulted in no consequences to public health and safety and was of low risk because the installed spare remained backed up by a fully tested breaker.

The BGE root cause concluded that incomplete guidance was provided to maintenance personnel and technical specifications were not properly assessed when using the spare breaker. Corrective included training of maintenance personnel and procedure changes establishing the required testing for use of spare RTCBs. The inspector verified that BGE procedure FTE-57 "RTCB Maintenance" was revised to include functional testing of the spare breaker. The use of the spare reactor trip breaker without meeting technical specification testing requirements was a violation of Technical Specification 3.3.1.1. However, because the issue was identified by BGE, was not willful, was corrected in a timely manner, and was not repetitive, the violation was not cited in accordance with VII.B.1 of NUREG-1600, NRC Enforcement Policy. (NCV 50-317&318/98-12-03) The LER was closed.

c. Conclusions

BGE identified that a spare reactor trip breaker had on multiple occasions been placed in service during maintenance without having completed technical specification testing requirements. BGE stated that the event resulted in no significant consequences to public health and safety.

M1.4 (Closed) Violation 50-317&318/97-08-01 and 97-08-02; and Licensee Event Report 50-317/98-001, Control Element Assembly Position Indication Out of Service

On January 4 and 5, 1998, following reactor moderator temperature coefficient testing on Unit 1, following questioning by the inspectors, BGE identified that a condition prohibited by technical specifications had occurred. The details of the occurrence were described in NRC Inspection Report 50-317&318/97-08 and Licensee Event Report (LER) 50-317/98-001. Two NRC Notices of Violation were issued to BGE in the 1997 inspection report. BGE responded to the violations in a letter to the NRC, dated June 10, 1998. During onsite inspection, the inspector reviewed the BGE root cause evaluation of the occurrence which found that the power supply voltage had drifted and changed the control element assembly (CEA) position indication. The drift had been aggravated by an initial high voltage setting and was not recognized because of numerous problems with position indication. The inspector verified the BGE corrective actions which included replacing the primary CEA position computer cards on both units, and revising the appropriate maintenance and surveillance procedures to periodically calibrate and monitor the power supply voltage. The risk significance of the occurrence was low due to the rods remaining in the correct position throughout the occurrence. The violations and the LER were closed.

III. Engineering

E8 Miscellaneous Engineering Issues

E8.1 (Closed) LER 50-317/98-004-00 Battery Charger Breakers Missing Seismic Positioner

a. Scope (92700)

The inspectors conducted an on-site review of a Licensee Event Report (LER).

b. Observations and Findings

On March 3, 1998, BGE determined that the No. 13 Battery Charger 480-volt supply breaker was missing a seismic positioner. On March 9, 1998, BGE found that the No. 14 Battery Charger 480-volt supply breaker was also installed without the required seismic positioner. BGE informed the inspectors that the seismic positioners were provided to give lateral support to the breakers during a seismic event. As stated in the LER, the vendor stated that the breaker would be susceptible to damage in a seismic event without the positioner being installed. At the time of discovery both units were operating at 100 percent power.

BGE personnel conducted an event investigation and concluded that the seismic positioner had never been installed on either breaker. BGE also concluded that the breaker position indication and high voltage trip would probably be inoperable after a design basis seismic event.

Technical Specifications (TS) required that all DC busses be operable, including the associated battery and one battery charger, in operational modes 1 through 4. A similar requirement existed in modes 5 and 6. Since the 13 and 14 battery chargers were not seismically qualified since installation, the redundant 21 and 22 battery chargers could not be removed from service for more than two hours without violating technical specifications. The BGE event investigation did not perform an exhaustive search to identify all occasions when the redundant chargers were out of service; however, the investigation report did document that technical specification violations had occurred.

The BGE corrective actions included: (1) inspecting all safety-related Westinghouse 480-volt circuit breakers to ensure that the seismic positioners were installed; and, (2) changing the preventive maintenance procedure for the Westinghouse 'DS' style circuit breakers to verify that these seismic positioners were always installed on the circuit breakers. The event investigation report documented that BGE completed the inspection of the breakers and determined that no other seismic positioners were missing. The inspectors reviewed electrical maintenance technical procedures, FTE-52, 480V Load Center Circuit Breaker and Cubicle Inspection for DS-416 Breakers, and FTE-53, 480V Load Center Circuit Breaker and Cubicle Inspection for DS-206 Breakers. The inspectors noted that these procedures had been revised to verify that the seismic restraints were installed on the applicable breakers.

The inspectors noted that the affected DC busses could be affected only if a seismic event occurred and the redundant battery chargers failed or were out of service. Therefore, the inspectors considered this event to be of low risk significance. Additionally, a regional Senior Reactor Analyst performed a risk assessment of this event and concluded that this event was not risk significant due to the time available to replace the inoperable breaker, the low frequency of an earthquake, and the low probability of damage or unavailability of the redundant breaker. Therefore, this non-repetitive, licensee-identified and corrected violation was treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. (NCV 50-317&318/98-12-04) The LER was closed.

c. Conclusions

BGE identified and reported that two battery chargers had been in service without having seismic positioners. A seismic event would have made the chargers inoperable.

E8.1 (Closed) LER 50-318/93-001-00 Inoperable Emergency Diesel Generator

a. Scope (92700)

The inspectors conducted an on-site review of a Licensee Event Report (LER).

b. Observations and Findings

On January 13, 1998, BGE identified that the 2B emergency diesel generator had been inoperable for 15 days. BGE determined that a speed switch adapter failed during a surveillance run on December 29, 1997. For this condition, BGE concluded that the diesel probably would not have achieved voltage and automatically closed the output breaker within 10 seconds as designed had a loss of power occurred. During the surveillance test, operators noticed a loss of speed signal. As stated in the LER, BGE initially suspected a failed tachometer generator and took no immediate corrective action. Subsequently, a surveillance test failed on January 12, 1998, and BGE identified that the speed switch adapter had failed, causing loss of local speed indication. Both Units were operating at 100 percent power when the discovery was made.

For corrective actions BGE (1) inspected and replaced the other diesel speed switch adapters to ensure spring clips were not degraded; (2) implemented preventive maintenance inspection of diesel generator speed switch adapter spring clips; (3) performed a root cause on the depth of analysis and communicated the results to other engineering personnel; (4) evaluated alternate speed switch adapter designs which did not require the use of a spring clip; and, (5) supplemented the existing information on the speed switch adapter in the diesel technical manual.

The inspector reviewed BGE records and concluded that the speed adapter switches were replaced on the 1B and 2A diesels. The inspectors also reviewed a selected sample of training records and verified that the training was provided to plant engineering and maintenance personnel.

Plant engineering personnel evaluated alternate speed switch adapter designs and recommended replacing the current mechanical speed switch adapter, speed switch, and tach generator units with electronic speed pickup units that did not require the use of a spring clip. This modification was scheduled for installation during the 2002 and 2003 outages. BGE also updated the vendor technical manual with additional information available from the vendor to supplement the existing information on the speed switch adapter. At the time of the inspection, BGE had not implemented preventive maintenance inspection of diesel generator speed switch adapter spring clips. The system engineer stated that this preventive inspection was not needed for two years from the prior inspection. An inspector follow-up item (**IFI 50-317&318/98-12-05**) was opened to verify implementation of the spring clip preventive inspection.

An NRC safety system engineering inspection team was onsite in January 1998 and reviewed this event. The details of this review were documented in NRC Inspection Report 50-317&318/98-80. The team concluded that BGE troubleshooting efforts were not detailed enough to properly identify a failed speed switch which was identified by the unsuccessful post-maintenance test. The NRC team also concluded that BGE actions represented instances of inadequate corrective actions that were cited as a violation of NRC requirements (**VIO 50-317&318/98-80-05**). BGE responded to the Notice in a letter dated May 14, 1998. The inspector found that the corrective actions identified for the violation were the same as those for the LER and the violation is closed.

A regional Senior Reactor Analyst (SRA) performed a risk assessment, calculated a conditional core damage frequency and concluded that this event was of low risk significance. The SRA noted that if the other EDG or equipment that the 2A EDG powered had been out of service during the 15 days, or had an offsite power source been out of service, then the risk could have been significantly increased. Through a review of control room logs, the inspectors verified that the offsite power remained in-service during the 15 day period. The inspectors noted that the 2A diesel and some associated redundant safety equipment were removed from service for surveillance testing. However, the inspectors confirmed that the 2A EDG and the associated safety equipment remained functional and could have been aligned to perform their safety function. As noted in the LER, the 2B emergency diesel output breaker could have been manually closed or the station blackout diesel generator could have been used. The inspectors concluded that the risk significance of this event was low. The LER was closed.

c. Conclusions

BGE found that the 2B Emergency Diesel Generator had been inoperable for 15 days after the speed adapter switch failed during a surveillance run. The associated LER was closed.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 General Comments

On January 11, the inspectors reviewed BGE's chemistry records associated with receipt of safety related grade fuel oil. The inspectors determined that the receipt analysis was performed in accordance with BGE procedures and documented accordingly. The fuel oil received met the BGE specifications.

The inspectors observed portions of the high radiological risk evolution, spent fuel pool diving for refueling equipment maintenance. In these observations, the inspectors confirmed that the special work permit requirements were fully implemented and workers were knowledgeable of their responsibilities. The inspectors observed good supervisory oversight of the tasks. No problems were identified by the inspectors.

R1.2 Neutron Dose Monitoring

a. Inspection Scope (83750)

A review was performed of radiological controls employed for a December 29, 1998 entry into containment during power operations. Information was gathered by observations of activities associated with the December 29, 1998 entry into the Unit 1 containment, review of calibration records, and interviews with cognizant personnel.

b. Findings and Observations

On December 29, 1998, a chemistry technician and a health physics (HP) technician made a routine entry into the Unit 1 containment during power operations to obtain a sample from the safety injection tanks (SITs). Historical survey records showed that neutron dose rates in the work area were approximately 40 mrem/hr neutrons, gamma dose rates in the area were 10 mrem/hr gamma, the typical job duration to perform this task was 10-12 minutes, and typical accrued dose to perform this task was about 10-15 mrem per individual. The radiological survey instrument selected to measure neutron dose rates was a Ludlum-12/Remball. Pre-operational checks performed on the survey instrument including a visual inspection to determine if there were any obvious signs of physical damage, a battery check, and a source check with a Pu-Be source indicated that the instrument was in generally good condition and operating properly prior to use. During the containment entry the health physics (HP) technician noted erratic readings on the neutron survey instrument including neutron dose rates in excess of the 600 mrem per hour limit as authorized by the special (radiation) work permit. The HP technician terminated the entry and both workers immediately exited containment. BGE performed a post event critique to evaluate the circumstances of the event, reasons for the erratic instrument readings, and radiation dose received by the individuals involved. Radiologically controlled area access authorization was suspended for the individuals involved during processing of personal radiation monitoring devices (thermoluminescent dosimeters (TLDs)). Results from TLD processing showed that doses received by the

individuals were low and within the expected range. An internal examination of the survey instrument revealed some problems with screws that secured the instrument electronics: one screw was missing, another screw was broken, and several screws were loose. BGE concluded that the cause of the erratic readings was due to problems with the screws that secured the electronics within the instrument.

The inspector discussed remball calibration with the Radiation Protection Manager. Licensee staff had data that indicated the readings of both the TLDs and the remball were conservative (greater than actual) at low neutron energies (e.g., 1-5 KeV). The radiation protection manager stated that a TLD and remball neutron response study was performed in December and the results were documented in a written standing order. That study showed that the TLD response was greater than the remball response by a factor of about 1.8 to 1.9. Consequently, a correction factor (CF) of two was established to modify the remball response to match the response of TLDs at low neutron energies. The RPM also stated that prior to December of 1998, a neutron response CF of 1.5 had been used with the remball, but the technical basis for the CF was not formally documented. The radiation protection manager stated that issue reports were initiated to investigate 1) the circumstances associated with the termination of the December 29, 1998 containment entry, 2) the faulty condition of the neutron survey instrument, and 3) the response of TLDs and the PNR-4 remball to neutron radiation. An inspector followup item was opened to review the use of correction factors used to modify the readings of portable neutron radiation survey instruments and to review policies and practices for the performance of pre-operational checks of radiological survey instruments. (IFI 50-317&318/98-12-06)

c. Conclusions

BGE radiation protection technicians acted appropriately to terminate a December 29, 1998 containment entry during power operations when a neutron radiation survey instrument showed erratic readings. Licensee staff determined that erratic readings of the neutron radiation survey instrument resulted because of poor material conditions of the survey instrument.

P3 EP Procedures and Documentation

The inspectors reviewed, in the NRC Region I office, recent changes BGE made to their emergency plan and associated implementing procedures. Based on BGE's determination that the changes did not decrease the overall effectiveness of its emergency plan, no prior NRC approval was required in accordance with 10 CFR 50.54(q). After a limited, in-office review of the changes, the inspectors concluded that the changes were made in accordance with the provisions of §50.54(q). A list of the changes reviewed are included as an attachment to this report.

F8 Miscellaneous Fire Protection Issues**F8.1 (Closed) LER 50-317&318/98-09: Missed Fire Watch Due to Personnel Error****a. Inspection Scope**

The inspector conducted an on-site review of a Licensee Event Report (LER).

b. Findings and Observations

The BGE (LER) described an occurrence where an hourly fire watch for two adjoining safety related emergency diesel generator rooms was completed twenty minutes late. BGE stated that the cause of the late fire watch was distraction of the assigned individual and inattention to detail. The safety consequence of the occurrence was low because no hot work was ongoing at the time of occurrence and both fire detection and automatic fire suppression equipment in both diesel rooms remained in service. During the onsite inspection, the inspector verified that the training discussed in the LER had been either completed or was planned. The late fire watch was considered a minor violation.

BGE also identified in the LER that the late fire watch, although promptly identified in the BGE corrective action program, was not reported to the NRC within 30 days of occurrence, as required by 50.73(a)(2)(B). Reportability of the issue for a missed technical specification action was identified during a fire protection audit conducted in December 1998. The inspector reviewed the initial BGE issue report and learned that the reviewing supervisor for the issue was a contractor supervisor, rather than a regular BGE employee. The inspector was concerned that BGE contractor supervisors were not trained on making operability or reportability decisions for BGE. Failure to report the missed fire watch action within 30 days of occurrence was a violation of 10 CFR 50.73. Because the issue was identified by BGE and entered into their corrective action system, and because it was neither a repetitive nor willful issue, the issue was considered non-cited in accordance with VII.B.1 of the NRC Enforcement Policy. **(NCV 50-317&318/98-12-07)**

c. Conclusions

A reportability decision was made incorrectly by a contractor supervisor when a fire watch was conducted twenty minutes after the technical specification allowed time. The problem was identified by BGE during an annual fire protection audit.

F8.2 Brush Fires in the BGE Owner Controlled Area

On January 12 and 13, BGE experienced brush fires in the owner controlled area outside of the protected area. The fires took place at the BGE recreational facility adjacent to the power plant. The brush fires were small and extinguished by the BGE fire department with no threat to the protected area. BGE security and fire departments responded appropriately and extinguished the fires quickly.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors with Mr. G. S. Barber of NRC Region I in attendance, presented the preliminary inspection findings to members of BGE management at the conclusion of the inspection on February 17, 1999. BGE acknowledged the preliminary inspection findings.

X3 Management Meeting Summary

On January 29, 1999, NRC Commissioner Jeffrey Merrifield and members of his staff, accompanied by the NRC Region I Administrator and the resident inspectors, toured Calvert Cliffs and met with BGE management. The meetings included general discussions of plant performance and other regulatory issues.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

BGE

C. Cruse, Vice President - Nuclear Energy Division
P. Katz, Plant General Manager
K. Cellars, Manager, Nuclear Engineering
L. Wechbaugh, Superintendent, Nuclear Maintenance
M. Navin, Superintendent, Nuclear Operations
B. Montgomery, Director, Nuclear Regulatory Matters
S. Sanders, General Supervisor, Radiation Safety
T. Sydnor, General Supervisor, Plant Engineering
D. Holm, General Supervisor, Plant Operations
T. Pritchett, Superintendent, Technical Support
L. Smialek, Radiation Protection Manager
J. Lemons, Manager, Nuclear Support Services Department
T. Forgette, Director, Emergency Planning Unit

NRC

H. Miller, NRC Region I Administrator

INSPECTION PROCEDURES USED

IP 71707 Plant Operations
IP 62707 Maintenance Observation
IP 61726 Surveillance Observation
IP 92700: Onsite Follow up of Written Reports at Power Reactor Facilities
IP 37551: Onsite Engineering
IP 71750: Plant Support Activities
IP 82701: Operational Status of the Emergency Preparedness Program

LIST OF ACRONYMS USED

AFW Auxiliary Feedwater
CEA Control Element Assembly
EDG Emergency Diesel Generator
ENS Emergency Notification System
I&C Instrument & Controls
IR Issue Reports
LER Licensee Event Report
MO Maintenance Orders
NEF Nuclear Engineering Facility
OSC Operational Support Center
PCBs Polychlorinated-biphenyls
P&ID Piping and Instrument Drawing
PDR Public Document Room
RMS Radiation Monitoring System
RP&C Radiological Protection & Chemistry Controls
RTCB Reactor Trip Circuit Breaker

SIT	Safety Injection Tank
SRA	NRC Senior Reactor Analyst
SW	Salt Water
TLD	Thermoluminescent Detector
TS	Technical Specifications

ITEMS OPENED, CLOSED

Opened

50-317&318/98-12-01	EEI	Missed out-of-specification log reading during operator rounds was an apparent violation of technical specifications.
50-317&318/98-12-05	IFI	Verify preventive inspection of diesel generator speed switch adapter spring clips.
50-317&318/98-12-06	IFI	Review use of the two factor for neutron dose estimates

Opened/Closed

50-317&318/98-12-03	NCV	A spare reactor trip breaker had been temporarily placed in service without completing technical specification testing requirements
50-317&318/98-12-02	VIO	Failure to tighten the flange bolting on the 11 A service water strainer in accordance with maintenance procedures
50-317&318/98-12-04	NCV	Two station battery chargers were in service without seismic positioners, contrary to technical specifications
50-317&318/98-12-07	NCV	Failure to promptly report a missed technical specification action - Missed fire watch

Closed

50-317&318/98-80-05	VIO	Failure to identify and correct problems with a diesel speed switch
50-317/98-05	LER	Installed Spare Reactor Trip Circuit Breaker Inoperable
50-317&318/97-08-01	VIO	Failure to establish test procedures for control element assembly position indication
50-317&318/97-08-02	VIO	Failure to meet technical specifications for two control element assembly position indications out of service
50-317/98-001	LER	Control Element Assembly Position Indication Out of Service
50-318/98-001	LER	Inoperable Emergency Diesel Generator
50-317/98-004	LER	Battery Charger Breakers Missing Seismic Positioner
50-317&318/98-09	LER	Missed Fire Watch Due to Personnel Error

ATTACHMENT 2
Emergency Response Plan and Implementing Procedures Reviewed

DOCUMENT	DOCUMENT TITLE	REVISION NO.
ERP	Calvert Cliffs Nuclear Power Plant Emergency Response Plan	26
-----	Calvert Cliffs EAL Basis Document	7
ERPIP 3.0	Immediate Actions	21(Ch. 1) 22 (Ch.1,3) 23
ERPIP 102	Superintendent-Nuclear Operations	4
ERPIP 103	On-Shift Operators	0
ERPIP 104	NRC Emergency Notification System (ENS) Communications	2
ERPIP 105	Control Room Communicator	4 (Ch. 1) 5
ERPIP 106	Plant Parameters Communications-Control Room	1
ERPIP 107	Interim Radiological Assessment	4
ERPIP 109	Radiation Monitoring System (RMS) Communicator	2
ERPIP 201	Technical Support Director	4,5
ERPIP 202	Plant General Manager	3,4
ERPIP 203	Chemistry Director	3
ERPIP 204	Operations Analyst	1
ERPIP 205	Reactor Engineer	1
ERPIP 206	Technical Analyst	1
ERPIP 207	TSC Computer Maintenance Staff	3
ERPIP 208	Plant Parameters Communications-TSC	2
ERPIP 209	Technical Support Center Communicator	4
ERPIP 301	Operational Support Center (OSC) Director	5
ERPIP 303	Radiation Protection Director	3
ERPIP 315	Plant Parameters Communications-OSC	1
ERPIP 401	Nuclear Engineering Facility (NEF) Director	5

ATTACHMENT 2 (continued)
Emergency Response Plan and Implementing Procedures Reviewed

DOCUMENT	DOCUMENT TITLE	REVISION NO.
ERPIP 403	NEF/NSF Monitor	4,5
ERPIP 502	Recovery Officer	2
ERPIP 503	Emergency Operations Facility (EOF) Director	4
ERPIP 504	Environmental Assessment Director	1 (EC-1)
ERPIP 508	Plant Parameters Communications-EOF	2
ERPIP 509	Emergency Operations Facility Communicator	4
ERPIP 511	Radiological Assessment Director	3
ERPIP 512	Radiological Assessment Specialist	2
ERPIP 760	Plant Parameters Communications-Media Center	3
ERPIP 800	Core Damage Assessment	1
ERPIP 801	Core Damage Assessment Using Containment Radiation Dose Rates	2
ERPIP 802	Core Damage Assessment Using Core Exit Thermocouples	2
ERPIP 803	Core Damage Assessment Using Hydrogen	2
ERPIP 804	Core Damage Assessment Using Radiological Analysis of Samples	2
ERPIP 810	Main Steam System Radioactivity Release Estimate	2 (Ch. 1) 4
ERPIP 832	Emergency Work Permits	3 (EC-1)
ERPIP 901	Communications Equipment	3
ERPIP 904	Emergency Response Training	4
ERPIP 905	Exercises, Tests and Drills	4
ERPIP B.1	Equipment Checklist	22