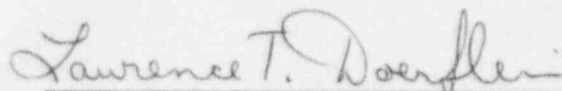


U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-317/95-09; 50-318/95-09
License Nos. DPR-53/DPR-69
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
Inspection conducted: September 17, 1995, through November 4, 1995
Inspectors: Carl F. Lyon, Acting Senior Resident Inspector
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Approved by:


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Reactor Projects Branch No. 1
Division of Reactor Projects

12/5/95
Date

Inspection Summary:

Core, regional initiative, and reactive inspections performed by the resident inspectors during plant activities are documented in the areas of plant operations, maintenance, engineering, and plant support. Additionally, inspections conducted by regional inspectors are documented in the areas of security, radiation protection, and engineering.

Results:

See Executive Summary.

EXECUTIVE SUMMARY

Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Inspection Report Nos. 50-317/95-09 and 50-318/95-09

Plant Operations:

During failure of a turbine bypass valve on Unit 2, the reactor operator, with concurrence from the control room supervisor, inappropriately responded to lowering primary temperature by withdrawing control element assemblies. While the immediate consequences of the event were minor, it indicated that BGE has not been completely successful in their efforts to improve reactivity management.

Maintenance:

Cleaning and inspection of the 11 fuel oil storage tank and replacement of the 12 battery charger were well planned and executed.

Good use was made of probabilistic risk assessment information and consideration of trip risk during the planning and execution of maintenance activities and operations evolutions. However, inspectors noted that the risk assessment planning process did not always account for work scheduled at the site by off-site groups.

The root cause analysis of difficulties encountered while attempting to pull four tubes from the 21 service water heat exchanger on September 7 was clear and forthright with good recommendations for corrective actions. Using the lessons learned, the tubes were pulled without incident on November 8.

Engineering:

The failure to review and document adequate justification for the acceptance of a vendor-identified non-conforming condition for some safety-related power supplies in order to prevent their inadvertent use or installation was identified as a Non-Cited Violation.

The lack of a formal process to identify and replace components (for a mild environment) before the end of its expected design life was identified as a weakness in BGE's component replacement program.

Plant Support:

BGE implemented, overall, an effective radioactive waste processing, handling, storage, and transportation program. Maintenance of radioactive waste processing systems was commendable. There was an apparent need for additional attention to detail when completing radioactive waste shipping documentation and determination of curie content of steel shipping boxes. Although training of radwaste handling personnel was good, it was not apparent what other

station personnel should receive the training outlined in IE Bulletin 79-19. The inspector could not identify any recent documented audits of training of personnel on radioactive waste activities including handling of mixed waste.

In general, except for weaknesses identified in the main protected area and independent spent fuel storage installation intrusion detection systems and their testing program, BGE maintained an acceptable security program. No weaknesses were identified in the area of personnel and package access control. The quality of the CCTV coverage and alarm assessment was very effective. A review of BGE's protective strategies against the external threat indicated that they were sufficient to protect against the threat. Based on discussions with the security training staff, a review of training records, discussions with security officers and inspector observations, the inspector determined that the officers were being trained in accordance with the NRC-approved Training and Qualification Plan.

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DETAILS

1.0 SUMMARY OF FACILITY ACTIVITIES

Units 1 and 2 operated at full power throughout the period except for minor power reductions for main condenser water box cleaning and turbine valve testing.

2.0 PLANT OPERATIONS (Inspection Procedures (IPs) 71707, 92901)

The inspectors observed plant operation and verified that the facility was operated safely and in accordance with licensee procedures and regulatory requirements. This review included tours of the accessible areas of the facility, verification of engineered safeguards features (ESF) system operability, verification of proper control room and shift staffing, verification the units were operated in conformance with technical specifications and that appropriate action statements for out-of-service equipment were implemented, and verification that logs and records were accurate and identified equipment status or deficiencies. During the inspection period, the inspectors provided onsite coverage and followup of unplanned events. There were no significant operating events during this period.

2.1 Plant Operations and Safety Review Committee

The inspectors attended several Plant Operations and Safety Review Committee (POSRC) meetings. TS 6.5.1 requirements for required member attendance were verified. The meeting agendas included safety significant issue reports, proposed tests that affected nuclear safety, 10 CFR 50.59 evaluations, reportable events, and proposed changes to plant equipment that affected nuclear safety. Overall, the level of review and member participation was satisfactory in fulfilling the POSRC responsibilities. During a meeting held on November 1, the POSRC received an excellent briefing on their duties regarding review of drafts of the new improved Technical Specifications prepared in accordance with NUREG 1432 and 10 CFR 50.36. The POSRC members displayed a good questioning attitude during the presentation.

2.2 Routine Operation Observations

On October 16, one of the four Unit 2 turbine bypass valves (TBVs), 2-MS-3944-TBV, failed open. Operators observed lowering primary cold leg temperature (Tc) with a steady main turbine load and discovered the open TBV. The TBV controller would not respond in manual. Operators unloaded the main turbine approximately 120 MWe to stabilize primary temperature. Plant equipment responded as designed to the over-steam demand. Reactor power increased to about 102% and resulted in a high power pre-trip alarm on one channel of the reactor protection system. Operators isolated the TBV within ten minutes and restored the plant to normal parameters within twenty minutes.

The TBV opened due to a failed positioner. Preliminary analysis of the TBV determined that the positioner diaphragm was hard, brittle, and showed evidence of cracking. The diaphragm failed due to the degradation, which caused the positioner to fail and the TBV to open. BGE plans to replace all of the positioners on both units by early December. The failed positioner on

2-MS-3944-TBV was replaced and the valve was tested satisfactorily and returned to service. The root cause analysis of the positioner failure was still in progress at the end of the inspection period. In the interim, operators were briefed on the preliminary findings and the expected actions should another TBV failure occur.

Subsequent BGE investigation determined that the reactor operator, with concurrence from the control room supervisor, inappropriately responded to lowering primary temperature by withdrawing control element assemblies (CEAs). The shift supervisor entered the control room and directed the CEA withdrawal be stopped. The CEAs were withdrawn about three inches and contributed negligible positive reactivity. While the immediate consequences of the event were minor, BGE considered it a potential challenge to safe reactor operation. The event indicated that BGE has not been completely successful in their efforts to improve reactivity management since the January 15, 1995, Unit 2 trip (see NRC Inspection Report 50-317 and 318/95-01). The Plant General Manager and Operations management immediately discussed the issue with the shift crews to re-emphasize their expectations for conservative decision making and reactivity management. In addition, BGE initiated an investigation with independent help from the operating experience review unit to determine any underlying casual factors for the inappropriate CEA withdrawal. The inspectors assessed that BGE's response to the event was appropriate.

On October 12, Unit 1 entered a two hour technical specification action statement because the 12 DC bus did not have a battery charger aligned to it supplied from an operable emergency diesel generator (EDG). While cycling 1-SW-106, the 12 saltwater pump south sluice gate, for routine preventive maintenance, approximately 10 gallons of grass were cut free. The grass accumulated in the 12 service water heat exchanger, resulting in a high differential pressure across the exchanger. The heat exchanger, and subsequently the 12 EDG, were declared out of service. Since the 21 EDG was already out of service due to routine scheduled maintenance on the 21 saltwater header, Unit 1 entered a two hour action statement. Operators recognized the condition immediately and the heat exchanger was cleaned and returned to service within an hour.

As corrective action, operations management modified the work control process to prevent cycling sluice gates on operating saltwater pumps, and initiated an investigation with maintenance staff to determine if the risk of cycling the sluice gate while the 21 saltwater header was out of service was adequately considered. The inspectors assessed that BGE's response to the event was good.

3.0 MAINTENANCE (IPs 62703, 61726, 92902)

3.1 Routine Maintenance Observations

The inspector reviewed selected maintenance activities to assure that the work was performed safely and in accordance with proper procedures. Inspectors noted that an appropriate level of supervisory attention was given to the work depending on its priority and difficulty. Maintenance activities reviewed are listed in Attachment 1.

The inspectors noted that the cleaning and inspection of 11 fuel oil storage tank (MO 0199501279) was very well planned and executed. A sample of the approximately two inches of sludge found on the tank floor was sent off-site for independent analysis. However, no debris was found which could potentially have blocked the fuel oil suction lines to the emergency diesel generators or the diesel driven fire water pump. The inspectors also noted that stringent foreign material exclusion controls were implemented and properly adhered to by cleaning and inspection personnel.

The inspectors noted excellent coordination and control of the 12 battery charger replacement (MO 1199403908). The 12 battery charger was the last of the eight battery chargers to be replaced, and all of the work was done safely, despite the close proximity to trip sensitive equipment in the cable spreading rooms. Good contingency plans were in place, pre-job briefings were thorough, coordination with the control room operators was good, and excellent supervisory oversight was exercised.

The inspectors noted good use of probabilistic risk assessment information and consideration of trip risk during the planning and execution of maintenance activities and operations evolutions. On several instances, work was re-scheduled due to identification of unassessed risk potential or emergent work that conflicted with the approved risk profile for the day's activities. Operators and maintenance staff usually demonstrated good awareness of potential risk of evolutions and work, both in weekly maintenance planning meetings and day-to-day business. However, inspectors noted that the risk assessment planning process did not always account for work scheduled at the site by off-site groups. For example, on two occasions BGE non-Calvert Cliffs personnel arrived to begin work in the switchyard that was not on the daily maintenance schedule. In both cases, the work was delayed by control room operators until it could be evaluated by the maintenance risk assessment process. The inspectors discussed the issue with BGE maintenance and operations staff, who indicated that the work control process was being reviewed to eliminate the weakness.

The inspectors reviewed the BGE root cause analysis of difficulties encountered while attempting to pull four tubes from the 21 service water heat exchanger (SRWHX) on September 7. The heat exchanger was experiencing excessive numbers of tube failures, and BGE planned to remove four tubes for materials analysis. The job was expected to take one shift; instead, the SRWHX was out of service for a day and a half and mechanics were unsuccessful in removing any tubes. One tube was damaged, and BGE ended up plugging it and several adjacent tubes to return the heat exchanger to service.

BGE determined that several causal factors contributed to the job failure, including failure to use mockup training; failure to establish criteria at which to stop work, re-evaluate the situation, or ask for outside help; inadequate skills and knowledge to do the task; breakdowns in communication within the work group and with the system engineer; and weaknesses in documentation and foreign material control. The inspectors assessed that the root cause analysis was clear and forthright and recommended reasonable corrective actions. Using the lessons learned and incorporated in procedures to prevent recurrence, the work was planned and performed with proper mockup

training and appropriately skilled and experienced personnel. The four tubes were removed without incident on November 8.

3.2 Routine Surveillance Observations

The inspectors witnessed/reviewed selected surveillance tests to determine whether properly approved procedures were in use, details were adequate, test instrumentation was properly calibrated and used, technical specifications were satisfied, testing was performed by qualified personnel, and test results satisfied acceptance criteria or were properly dispositioned.

The surveillance testing was performed safely and in accordance with proper procedures. The inspectors noted that an appropriate level of supervisory attention was given to the testing depending on its sensitivity and difficulty. Surveillance testing activities reviewed are listed in Attachment 1.

4.0 ENGINEERING (IPs 37551, 92903)

4.1 Review of Qualification Records for Safety-Related Power Supplies

The inspector reviewed BGE's procedures, qualification reports, procurement specifications and purchase orders, and the modification package and interviewed several engineering and procurement staff to verify that power supplies purchased from the nuclear equipment vendor (Nuclear Logistics Inc.(NLI)) were qualified for their safety-related applications.

BGE purchased five 0-60 Vdc power supplies, part number NLILCD-2-44 (S/N 20-24), and five 0-7 Vdc power supplies, part number NLILCS-2-01 (S/N 2-6), from NLI. BGE's Purchase Orders No. 05239LNP and 93826GX and Specification 2007D provided the procurement, quality assurance program (10 CFR 50, Appendix B) and design requirements for replacing the power supplies originally supplied by Lambda Electronics. NLI purchased the power supplies as commercial-grade items and dedicated them to meet the safety-related requirements. The critical characteristics, including physical and electrical characteristics of the original Lambda power supplies were identified and qualification plans were developed. The qualification plans were reviewed and approved by BGE's procurement and engineering groups. After the power supplies were manufactured and tested, NLI submitted the final qualification reports to BGE for their review and approval. The inspector noted that BGE received 0-60 Vdc and 0-7 Vdc power supplies on April 7 and February 7, 1995, respectively, after the qualification reports were reviewed and approved. BGE stated that NLI was an approved supplier under 10 CFR Part 50, Appendix B, for BGE. From a sample review of BGE surveillance reports dated June 29 and August 2, 1995, the inspector determined that BGE was adequately monitoring NLI's quality assurance activities.

A review of qualification plans and final qualification reports (QR-054001-1 and QR-054002-1) showed that the replacement power supplies met the seismic response spectra criteria established by BGE. The power supplies did not have to meet harsh environment equipment qualification requirements of 10 CFR 50.49 because they were to be installed in a mild environment. 10 CFR 50.49 defines

mild environment as one that would at no time be significantly more severe than the environment that would occur during normal plant operation, including anticipated operational occurrences. The qualifications met the provisions of IEEE 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations" and IEEE 323-1983, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

During the review of NLI's Certificate of Conformance, the inspector noted that the power supplies had a design life of twelve years. The inspector questioned BGE regarding the process for replacing this power supply after twelve years. BGE stated that it had not addressed this issue and that the preventive maintenance program would address the replacement of these power supplies before the expiration of their design life. The inspector verified an installation of a 0-60 Vdc power supply (S/N NLILCD-2-44-023) in panel 2C-43A. No unacceptable conditions were identified. However, the lack of a formal process to identify and replace components (for a mild environment) before the end of its expected design life was identified as a weakness in BGE's component replacement program.

The inspector noted that NLI used NLILCD-2-44-11 and NLILCS-2-01-1 power supplies as test specimens for qualifying 0-60 Vdc and 0-7 Vdc power supplies respectively. Deviations from the test acceptance criteria were identified and documented properly, and resolutions were recommended by NLI. These deviations were reviewed by BGE for acceptance during their seismic qualification review summary (SQRS) evaluations and equivalency evaluations. The inspector noted that in one case, BGE did not document any justification for the acceptance of a deviation for 0-7 Vdc power supplies. Specifically, the worst-case power supply ripple documented in test data was 552 microvolts instead of a maximum of 250 microvolts as specified in Verification Plan No. VP-054001-1. This deviation was documented in NLI's Deviation Report No. 054001-2. NLI considered this power supply ripple to be very minor in typical uses and recommended a "use as is" disposition. NLI forwarded this information to BGE for further review and approval in finalizing the qualification of these power supplies before they were shipped. BGE accepted this deviation, as documented by the signature of the Instrumentation and Controls engineer in Report No. 94-NLI-01, unaccompanied by any written justification. BGE's Equivalency Evaluation Package No. 94-154-004 also failed to review this deviation.

The inspector questioned the impact of higher voltage ripple (552 microvolts) on the safety-related instrument circuits. During the inspection, BGE did not provide any basis for its acceptance of its intended applications at Calvert Cliffs. BGE stated that, to date, none of the above 0-7 Vdc type power supplies were installed at Calvert Cliffs. However, BGE also stated that an evaluation of this deviation would be conducted in the near future. Subsequent to this inspection, BGE determined that the non-conforming power supplies were acceptable, as documented in Engineering Service Packages ES199501751 and ES199501753, both dated September 12, 1995. The failure to review and document adequate justification for the acceptance of the NLI-identified deviation or non-conforming condition for power supply ripple, in order to prevent their inadvertent use or installation, as required by 10 CFR

50, Appendix B, Criterion XV, was a violation of NRC requirements. However, based on BGE's prompt corrective action and the low safety significance of the specific issue, this violation is being treated as a Non-Cited Violation, consistent with Section VII of the NRC Enforcement Policy.

5.0 PLANT SUPPORT (IPs 86750, 81700, 71750, 92904)

5.1 Radiological Controls

5.1.1 Radiation Protection

During tours of the station, the inspector noted boron deposits on tell-tail sampling drains for the spent fuel storage pool. The inspector's questioning indicated that the BGE had identified a small leak in the liner of the fuel storage pool (Segment 10). The inspector's discussions indicated BGE was monitoring the leak and there was no pathway for any limited leakage to exit the station. The leak was directed to a collection area.

5.1.2 Radioactive Waste Processing, Handling, Storage and Shipping

5.1.2.a Organization and Staffing

The inspector reviewed the current radioactive waste processing organization, its staffing and its responsibilities and authorities against criteria contained in Technical Specification 6.2, "Organization." The inspector evaluated BGE's performance in this area by discussion with cognizant personnel and review of documents.

The inspector's review indicated that there were no significant changes in the organization or its responsibilities and authorities since the previous inspection in this area (NRC Combined Inspection Nos. 50-317/94-23; 50-318/94-23 dated July 14, 1994). The Supervisor Material Processing and his staff continued to be responsible for implementation of the radioactive solid waste processing and transportation program. The Chemical Analytical Services Unit continued to be responsible for mixed waste and its handling and storage and handling. Responsibilities and authorities were appropriately defined.

5.1.2.b Radioactive Waste Procedure and Program Changes

The inspector discussed with cognizant BGE personnel changes in radioactive waste processing, handling, and shipment procedures and programs since the previous inspection.

Other than the resumption of radioactive waste shipping activities in July 1995, concurrent with the reopening of the Barnwell, South Carolina, radioactive waste disposal site, there were no significant program changes identified.

5.1.2.c Radioactive Waste Sources and Processing Systems, Radionuclide Scaling Factors, Waste Classification, and Volume Reduction Efforts

The inspector reviewed and discussed sources of radioactive waste at the station, the processing (as appropriate) of the waste, the development of scaling factors for difficult to detect radionuclides, the classification of the radioactive waste, and the volume reduction efforts for waste. The inspector also performed a limited review of surveys and monitoring of non-radioactive/non-contaminated trash shipped for disposal to landfills. The review was against criteria contained in 10 CFR 20, 61, 71, the Updated Final Safety Analysis Report, and applicable NRC Branch Technical Positions.

The inspector's review indicated that BGE had performed an excellent analysis of waste sources using industry support and self-initiatives. BGE performed sampling of the various waste streams (as appropriate) and developed radionuclide scaling factors for each waste stream. The inspector's review of selected waste streams, including review of selected radioactive waste shipment documentation packages, indicated that radioactive waste shipped for disposal was properly classified.

The inspector walked down all accessible portions of the station's radioactive liquid and radioactive solid waste collection, processing, and storage systems/locations (Auxiliary Buildings, Material Processing Facility and exterior station storage areas). The inspector noted that the systems/storage locations were well maintained. Tanks were periodically inspected relative to ASME codes. BGE aggressively pursued repair of leaks. Decontamination and replacement of piping (as appropriate) were performed to minimize radiation dose rates emanating from tanks, piping and components. Essentially all portions of the liquid and solid waste systems were accessible in street clothes. The storage locations were properly posted and secured.

As previously reported (See NRC Combined Inspection Nos. 50-317/94-23; 50-318/94-23 dated July 14, 1994), BGE developed and implemented plans and programs to reduce radioactive waste volumes to a minimum. The inspector noted that implementation of the plans and programs have resulted in significant decrease in radioactive waste generated since implementation of the Initial Low Level Waste Minimization Plan in 1992 and the industry assist visits in 1994. BGE expects to achieve at least a 50% reduction in radioactive waste generated for 1995 as compared to 1994 (both 1994 and 1995 included a refueling outage). The inspector also noted excellent efforts to manage water movement and processing during the recently completed (May 1995) Unit 2 refueling outage. BGE developed and implemented water management plans to minimize unnecessary overboarding of water as radioactive liquid effluent and maximize clean-up to reduce total curies released.

Overall the inspector concluded that BGE implemented effective programs in the areas of radioactive waste source evaluation and waste processing, radionuclide scaling factors determination, waste classification, and volume reduction efforts. BGE was monitoring clean trash in accordance with NRC guidance.

The following observations were brought to the BGE's attention for review and evaluation, as appropriate.

- The inspector noted apparent insulation to be coming off piping in the spent resin metering tank room. Also, an unexplained deficiency tag was noted on a valve in the room. BGE initiated a review of these matters.
- There was no defined preventive maintenance program for the composite resin sampler or the high integrity container fill head. The sampler was used for collecting composite samples of spent resin sluiced from the spent resin metering tank to high integrity containers. The composite samples collected are analyzed and used for purposes of qualification of total resin curie content for shipping purposes. BGE indicated that these matters would be reviewed.
- The inspector identified a pallet of unlabeled 55 gallon drums in a non-radioactive waste storage area next to the Lake Davies Interim Resin Storage Area. The drums were not marked and one appeared to contain material. BGE removed the drums.

5.1.2.d Program Audits

The inspector reviewed BGE's audits, assessments, and surveillances of the radioactive waste handling processing, and storage programs, as well as audits of the Process Control Program, against the criteria contained in Technical Specification 6.5.4.8.1, "Audits."

The inspector's review indicated that technical specialists were used (as appropriate) to perform audits, surveillances were performance based, and corrective actions for identified concerns were prompt and comprehensive. BGE performed an excellent self-assessment in August, 1995, of documentation for radioactive waste shipments following NRC identification (July, 1995) of documentation concerns in another department. BGE audited radwaste shipment documentation packages for radwaste shipments made following re-opening of the Barnwell, South Carolina disposal site in July, 1995. BGE maintained close communications with the State of Maryland regarding proper storage and handling of mixed waste.

The inspector concluded that BGE performed effective performance based audits of the radioactive waste processing, handling, storage, and shipping programs.

The following observations were brought to BGE's attention for review and evaluation, as appropriate.

- The inspector was not able to identify a documented recent audit of the training or qualification of personnel performing radioactive waste processing, handling, or shipping activities (i.e., IE Bulletin 79-19 or 49 CFR 172, Subpart H, training). The inspector noted that a June, 1995, audit of radwaste activities was performed and training was apparently reviewed, however, no documentation of audit findings was made.

- The inspector's review of an individual auditor's findings for a June, 1995, radwaste audit identified that five out of 10 shipments selected for audit had discrepancies associated with radwaste shipping package documentation. The inspector noted that the findings were not included in the audit report or effectively communicated to management in the radwaste organization. Although no immediate action was taken by BGE following the identification of the discrepancies and the discrepancies appeared to be administrative in nature, BGE's August, 1995, self-assessment addressed and corrected the discrepancies.

BGE's August, 1995, self-assessment of shipping documentation identified several hundred individual discrepancies for all 1995 shipments. A similar analysis of 1994 radwaste shipments also identified a number of discrepancies. The inspector concluded that it appeared that the June, 1995, audit-identified discrepancies should have been brought to the radwaste organization management's attention for review and evaluation. The audit and self-assessment findings indicated an apparent need for additional attention to detail when completing radioactive waste shipping documentation and a potential need for procedure/shipping form enhancement to preclude errors/discrepancies.

BGE initiated a review of these matters.

5.1.2.e Training

The inspector reviewed the training provided personnel involved in radioactive waste generating, processing, and handling activities and personnel handling mixed waste against criteria contained in IE Bulletin 79-19 and 49 CFR 172, Subpart H. The inspector reviewed training records, lesson plans and discussed training with cognizant BGE personnel.

The inspector's review indicated that BGE continued to provide biannual training to Materials Processing Unit personnel in accordance with IE Bulletin 79-19 and 49 CFR 172, Subpart H, guidance. Further, the inspector noted that the training was provided by a contractor every two years and BGE staff other years.

The inspector was not able to identify the scope and depth of training provided to other station personnel who may generate or process radioactive waste as outlined in IE Bulletin 79-19. BGE's 1980 response to the subject bulletin indicated, at that time, that the subject training was to be provided to personnel involved with operating a dry active waste (DAW) compactor. The compactor is no longer used. BGE indicated the guidance outlined in the bulletin would be reviewed and the station populations needing such training would be identified and trained, as appropriate.

The inspector noted that the Chemical Analytical Services Unit personnel (responsible for mixed waste), received the training outlined in 49 CFR 172, Subpart H. However, the inspector was not able to identify what other station groups, other than the Materials Processing Unit, received the training outlined in 49 CFR 172, Subpart H. BGE indicated the guidance outlined in 49

CFR 172, Subpart H, would be reviewed and personnel needing such training would be identified and trained.

The inspector also noted that the personnel who attended mixed hazardous waste (mixed waste) training received a certificate from the contracted training facility. It was not apparent that the training certificate or other documentation provided met the employer certification guidance of 49 CFR 172.704. BGE indicated this matter would be reviewed.

5.1.2.f Radioactive Waste Shipping Activities

The inspector selectively reviewed radioactive waste shipping records for shipments made since the previous inspection and subsequent to re-opening of the Barnwell, South Carolina, disposal site. The records had been reviewed by BGE during a comprehensive self-assessment of radioactive waste shipping documentation. The review was against criteria contained in 10 CFR 61 and 71, 49 CFR 100-199, the Barnwell, South Carolina, disposal facility license, and applicable certificates of compliance for various shipping casks. The inspector reviewed shipments of low specific activity (LSA) material, spent resins, and irradiated metals.

Overall, the inspector concluded that BGE implemented an effective radioactive waste shipping program and that individuals involved in shipping activities were knowledgeable of applicable requirements. BGE was noted to verify, by hand calculation, computer results for waste classification and also required verification of shipment radiation dose rates by a second individual.

The following observations were brought to BGE's attention for review and evaluation, as appropriate.

- The method of determination of curie content for strong-tight packages (steel boxes) was not clearly defined in procedures. The Materials Processing Unit supervisor's expectation was that the average of nine contact radiation dose rates on the package surface, in conjunction with a dose-to-curie conversion factor, were to be used for curie content determination of the steel boxes. The inspector's review indicated technicians were using the highest contact dose rate readings rather than an average of nine. The inspector's review indicated curie content of one shipment reviewed was 2.5 times that determined by use of averages.
- The inspector identified several examples where survey documentation for radwaste shipments was not clear. For example, a three foot marking was indicated on the shipment survey map when in actuality a one meter reading was apparently taken. Also, alpha contamination survey values were indicated as minimum detectable activity (MDA) but MDA was not identified on the survey sheets.
- Radwaste shipment documentation also did not clearly indicate that all the routine determinations specified by 10 CFR 71.87 were made.

- Procedures did not clearly require verification of Certificate of Compliance requirements for radwaste shipping casks.
- Radwaste shipment driver instructions did not ensure non-movement of tractor/trailer configuration to preclude inadvertent increases in driver cab radiation dose rates.

BGE indicated these matters would be reviewed.

5.2 Emergency Preparedness

BGE conducted their partial participation annual emergency preparedness exercise on September 19. Inspection results were documented in NRC Inspection Report 50-317 and 318/95-07.

5.3 Security

5.3.1 Testing, Maintenance and Compensatory Measures

5.3.1.a Testing and Maintenance

The inspector's review of testing and maintenance records for security-related equipment confirmed that the records committed to in the NRC-approved physical security plan (the Plan) were on file and that, except for the manner in which the perimeter intrusion detection system (PIDS) equipment testing was being performed, BGE was testing and maintaining systems and equipment as committed to in the Plan. Based on a review of the PIDS quarterly testing procedure, and testing documentation, the inspector determined that BGE's PIDS testing failed to meet the testing requirements outlined in Regulatory Guide 5.44 from which the procedure was developed. Specifically, the testers were not testing the PIDS adequately to determine if an intruder was able to crawl through or jump over the zones as specified in the performance criteria of Regulatory Guide 5.44. The inspector discussed the issue with BGE's security management and was informed that the testing procedure would be revised to correct the testing weaknesses.

5.3.1.b Compensatory Measures

The inspector found that BGE's use of compensatory measures and security force overtime was minimal. The inspector determined, based on a review of documentation trending compensatory measures from 1992 to the present, that security force overtime had decreased by seventy eight percent due to the effort and prompt response of the maintenance group assigned to the security organization.

5.3.2 Security Training and Qualification

The inspector randomly selected and reviewed training and firearms qualification/requalification records of eight armed/unarmed supervisory and non-supervisory nuclear security officers (NSOs). The inspector determined that the training had been conducted in accordance with the security training and qualification (T&Q) plan and was properly documented.

During the previous inspection, it was difficult for the training personnel to retrieve inspector-requested documentation because of the manner in which the security training records were being maintained. BGE subsequently reorganized the training records so that all required T&Q documentation is contained in a single folder, including historical documentation. No discrepancies were noted.

The inspector interviewed several NSOs to determine if they possessed the requisite knowledge to carry out their assigned duties and determined that the individuals were knowledgeable of their job requirements.

5.3.3 Performance Assessment of Station Security

This performance assessment of station security was conducted in lieu of inspecting the following: audits, corrective actions and management support; effectiveness of management controls; security program plans; protected area (PA) detection equipment; vital area (VA) access control of personnel and vehicles; and alarm stations and communications.

The methodologies used by the inspection team to assess program performance were either observations of program activities or physical tests of security equipment. Physical tests consisted of compliance testing and challenge testing. Compliance testing was conducted in accordance with BGE's testing procedures, while challenge testing probed for vulnerabilities beyond those that would have been identified during compliance testing. BGE personnel observed all testing that was performed by the NRC contractor.

5.3.3.a Personnel and Package Search Equipment

The team conducted tests of the PA access control equipment, including the explosive detectors, metal detectors, and x-ray equipment located in the main access control point using BGE's test procedures and test equipment. There were no observed weaknesses identified in the x-ray and explosive detection equipment. However, a minor weakness was observed during testing of the metal detectors. BGE was aware of this weakness and had procedures in place to mitigate it. No deficiencies in search equipment were found.

5.3.3.b Perimeter Intrusion Detection System (IDS)

The team conducted performance testing of the main perimeter IDS in 18 zones at 45 locations, and three zones in three locations at the independent spent fuel storage installation (ISFSI). The tests consisted of either jumping, running, crawling either under, over, or through the system, and probing for sensitivity. Isolation zones were clear and wide, and system installation was considered good. However, the team identified vulnerabilities in five of eighteen microwave zones in the main PA and nine of nine microwave zones in the ISFSI.

The licensee took immediate corrective measures as vulnerabilities were identified. The corrective measures in the main PA were later tested and were determined by the inspector to be a sufficient safeguard against undetected penetration of the system. The corrective measures in the ISFSI consisted of

compensatory posting by NSOs of the entire perimeter until equipment corrective measures were completed. Initial (prior to correction) test results were as follows:

Main Protected Area

- One zone was circumvented in two areas by crawling at a slow pace, under the microwave beam.
- Four zones were circumvented by jumping over the microwave beam.

Independent Spent Fuel Storage Installation

- Two zones were circumvented by jumping over the microwave beam. It was agreed upon by both NRC and BGE personnel present during the testing, that the jump-over technique would work in all of the zones due to the similarity in which the microwaves were installed.

The failure of the microwave systems to detect penetration attempts by either crawling into the zones or jumping over the zones in five of eighteen zones in the main protected area and nine of nine zones in the independent spent fuel storage installation is a violation of the Calvert Cliffs Nuclear Power Plant Physical Security Plan and ISFSI Security Plan, which require intrusion detection systems designed to meet the performance criteria of U.S. NRC Regulatory Guide 5.4.4. A contributing factor associated with the violation was the licensee's failure to ensure the zones were being adequately tested to determine if an intruder was able to crawl through or jump over the zones as specified in the performance criteria of U.S. NRC Regulatory Guide 5.44 (VIO 50-317/95-09-01 & 50-318/95-09-01).

5.3.3.c Alarm Station Operations and Assessment Capabilities

The team determined by observations and discussions with the Central Alarm Station (CAS) and Secondary Alarm Station (SAS) operators that the operators were very knowledgeable of their duties and responsibilities. Alarm call-up and camera coverage were assessed as team members, accompanied by an NSO, generated alarms as they walked and ran through the isolation zones of the PA and ISFSI perimeters. Camera coverage overlap, picture quality of closed circuit television (CCTV) monitors, and general assessment capability were the primary areas of review.

The perimeter assessment system consisted of fixed CCTV cameras, pan, tilt and zoom (PTZ) cameras, response by NSOs, and a video capture system which was inoperative during the inspection. The quality of the CCTV coverage and the CCTV portion of the assessment system was observed and tested by a daytime check of camera coverage of the PA and ISFSI zones and by conducting call-up tests at night of a person in the perimeter zones trying to avoid being seen on the CCTVs by attempting to hide in the zones. No weaknesses were identified in the main perimeter zones. Five zones were identified in the ISFSI, during night time assessment, in which the test person was not clearly seen upon alarm. However, the person was clearly visible by using the PTZ

cameras to assess the cause of the alarm further, as required by procedure. The team determined that, overall, BGE's assessment system was effective.

5.3.4 Defensive Strategy Against External Threats

The team evaluated BGE's strategy for responding to external threats by using two table-top contingency drills to evaluate vital equipment protection. Vital equipment target sets were agreed upon by NRC and BGE personnel. The benchmark for the drills was BGE's ability to protect against the NRC design basis threat. Four specific criteria were used in the drills. Did the response force (1) get a sufficient number of responders, (2) appropriately armed, (3) into appropriate protected positions, (4) in time to interdict the adversaries? BGE response team leaders implemented drill-defensive strategies as NRC contractors countered as would-be adversaries.

The drills indicated that BGE's response force could meet the four criteria. The inspector noted that this was a significant improvement over the response observed in the 1994 Operational Safeguards Response Evaluation (OSRE). BGE had implemented changes both in response strategy and plant layout which significantly aided response capability. No deficiencies were noted.

6.0 FOLLOWUP OF PREVIOUS INSPECTION FINDINGS

Licensee actions taken in response to open items and findings from previous inspections were reviewed. The inspectors determined if corrective actions were appropriate and thorough and previous concerns were resolved. Items were closed where the inspectors determined that corrective actions would prevent recurrence. Those items for which additional licensee action was warranted remained open. The following items were reviewed.

6.1 Security

(Closed) VIO 50-317/94-12-02 and 50-318/94-12-02: Submission of potentially inaccurate information in a revision to the Calvert Cliffs Nuclear Power Plant, Units 1 & 2, Security Plan.

On April 19, 1994, an enforcement conference was held in the NRC Region I office with BGE to discuss several violations, their causes and BGE's corrective actions.

During Inspection 95-01, based on a review of pertinent documentation, and discussions with security management, the inspectors determined that BGE's corrective actions, as explained during the enforcement conference and documented in the licensee's response to the Notice of Violation, dated July 29, 1994, were effective. The corrective actions included the performance of a root-cause analysis, the re-emphasis of the need for self-checking to all individuals involved in the preparation of security documentation by the Director, Nuclear Security, and the issuance of a memorandum to security personnel addressing expectations and guidance pertaining to the accuracy of document reviews. Additionally, BGE developed and implemented a directive to provide additional assurance that all NRC submittals and changes made were accurate. No deficiencies were noted.

(Closed) IFI 50-317/94-12-03 and 50-318/94-12-03: Failure to perform cross-disciplinary review of Security Plan implementing procedures as required by Tech. Spec. 6.5.1.7.A.

During Inspection 95-01, the inspectors determined that BGE's corrective actions to resolve the concern were adequate, based on discussions with security management and the review of a newly developed and implemented administrative procedure, SE-2-301, "Control of Security Plans and Procedures." SE-2-301 ensured that a process was in place for the development, review, approval, change, revision, cancellation, and periodic review of security documents. No deficiencies were noted.

(Closed) VIO 50-317/94-14-01 and 50-318/94-14-01: Failure of the required annual audit of the security program to evaluate the potential impact of the security program on plant and personnel safety.

During Inspection 95-01, the inspectors determined by discussions with security management and a review of applicable documentation that the corrective actions were adequate. The corrective actions included the updating of the 1994 audit matrix to include the requirement to evaluate and document the potential impact of security and contingency plans and procedures on plant and personnel safety. Additionally, BGE performed an evaluation, as documented in Surveillance Report S-94-2-08. No deficiencies were noted.

7.0 MANAGEMENT MEETING

During this inspection, periodic meetings were held with station management to discuss inspection observations and findings. At the close of the inspection period, an exit meeting was held to summarize the conclusions of the inspection. No written material was given to the licensee and no proprietary information related to this inspection was identified.

7.1 Preliminary Inspection Findings

A Violation was identified regarding vulnerabilities in the perimeter intrusion detection system, as described in section 5.3.3.b. A Non-Cited Violation was identified regarding failure to review and document adequate justification for the acceptance of a non-conforming condition on some safety-related power supplies, as described in section 4.1.

ATTACHMENT 1

Routine Maintenance and Surveillance Observations

MO 2199502985	Clean 22 SRWHX
MO 2199502986	Clean 22 CCHX
MO 2199406101	Repack 23 HPSI cooling inlet valve 2-CC-246
MO 2199005440	Replace 2-SI-1073
MO 0199501056	Repack 0-SFP-122
MO 1199207272	Replace 11 Salt Water Pump with spare
MO 1199504343	Drain and flush #14 circulating water pump lower bearing
MO 0199501279	Clean and Inspect #11 Fuel Oil Storage Tank
MO 1199403908	Replace #12 Battery Charger
MO 1199502602	Inspect inboard bearings on 11 AFW pump
MO 2199503818	Replace OCKV-21-DSA-100
MO 1199501652	Modify seismic hangers for 11 component cooling water pump
MO 199500600	Replace 12 AFW pump governor valve stem
STP-0-008B-1	12 EDG & 4KV Bus 14 LDCI Sequencer Test
STP-0-073D-1	Charging Pump Performance Test
STP-0-007A-2	ESFAS A Train Logic Test
STP M-200-1	Reactor Trip Breaker Functional Test
STP-0-073A-1	11 Salt Water Pump Performance Test