INITIAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

REPORT NOS. 50-317/91-99 AND 50-318/91-99

CALVERT CLIFFS NUCLEAR POWER PLANT

ASSESSMENT PERIOD: APRIL 1, 1991 THROUGH MARCH 28, 1992

BOARD MEETING DATE: MAY 27, 1992

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1. INTRODUCTION

The Systematic Assessment of License .'erformance (SALP) is an integrated NRC staff effort to collect the available observations and data on a periodic basis and to evaluate licensee performance based upon this information. SALP is supplemental to the normal regulatory processes used to ensure compliance with NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee management to promote quality and safety of plant operation.

An NRC SALP Board, composed of the staff members listed below, met on May 27, 1992, to review the collection of performance observations and data to assess BG&E's performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Sub-Section IV.B, Supporting Data and Summaries, of this report.

This report is the NRC's assessment of BG&E's safety performance at the Calvert Cliffs Nuclear Power Plant for the period of April 1, 1991, to March 28, 1992.

The SALP Board was composed of:

Chairman:

W. Hehl, Director, Division of Reactor Projects (DRP)

Members:

- W. Lanning, Deputy Director, Division of Reactor Safety (DRS)
- J. Durr, Acting Deputy Director, Division of Radiation Safety and Safeguards (DRSS)
- R. Capra, Director, Project Directorate I-1, Office of Nuclear Reactor Regulation (NRR)
- C. Cowgill, Chief, Projects Branch No. 1, DRP
- D. McDonald, Senior Project Manager, NRR
- P. Wilson, Senior Resident Inspector

Other Attendees:

- L. Nicholson, Chief, Reactor Projects Section 1A, DRP
- A. Howe, Resident Inspector
- C. Lyon, Resident Inspector
- J. Furia, Senior Radiation Specialist, DRSS
- J. Kottan, Laboratory Specialist, DRSS
- E. McCabe, Chief, Emergency Preparedness Section, DRSS
- R. Albert, Physical Security Inspector, DRSS
- R. Keimig, Chief, Safeguards Section, DRSS
- A. Lohmeier, Senior Reactor Engineer, DRS
- S. Greenlee, Reactor Engineer, DRP
- J. Yerokun, Project Engineer, DRP

II. SUMMARY OF RESULTS

ILA Overview

At the c. d of the last SALP period, licensee performance continued to improve. During the period, the licensee had several management and programmatic efforts on-going which strengthened overall performance. Most notable were close management oversight of plant activities and improved communication between departments. There was an improving trend noted in the Engineering/Technical Support area.

The board noted that during this period, the licensee continued to operate the facility safely. Improved performances over the previous assessment were noted in the Operations and Radiological Controls area. Better performances were also noted in Emergency Preparedness and Security. An improving trend was not as evident in the Engineering/Technical Support area, however, performance in this area was good. In the other functional areas, BG&E's performance was assessed to be unchanged from the previous SALP period.

In the Operations area, operator performance was strong and they demonstrated excellent understanding of plant condition, at all times. Management oversight of activities and improved communication within operations and between departments significantly contributed to the improved performance. Continued emphasis is appropriate in the housekeeping of safety related areas and in fire fighter refresher training.

In the Radiological Controls area, significant improvement was noted in radiological housekeeping, staffing and responsiveness to quality assurance audit findings. Strong performance was noted in programs for ALARA, dosimetry, training and Radiological Environmental Monitoring Program (REMP). Some minor weaknesses were observed in the radwaste program near the end of the assessment period.

Performance in the Maintenance/Surveillance area remained consistent with the prior assessment period. While program improvements continued as programs matured, instances of inadequate program implementation occurred. The quality of maintenance packages and procedures was good. However, occasional technical errors still existed. Some weaknesses exist in maintenance implementation. BG&E's management attention has been successful at resolving identified programmatic concerns.

Emergency Preparedness performance improved over the assessment period. Program administration and management involvement in program activities were good. Implementation of the Emergency Response Plan (ERP) during two plant events which occurred this period was effective. BG&E properly participated in the full-participation exercise that occurred during the assessment period. Significant improvement was observed in the Security area. BG&E continued to provide excellent management support for the program. The declining trend observed over the previous SALP period has been corrected and this area was assessed as a Category 1 during this period.

In the Engineering/Technical Support area, performance continued to improve in some areas. Overall, the pace of improvement has been less than anticipated considering the initiatives implemented during the last SALP period. BG&E successfully completed the reorganization of engineering, and the organizations are fully staffed. In the Safety Assessment/Quality Verification area, clear management focus on safety and quality continued. The strong performance of the Operating Experience Review Organization was particularly noteworthy.

II.B Facility Performance Analysis Summary

	Functional Area	Rating, Trend Last Period	Rating . Trend This Period
1. 2. 3. 4.	Plant Operations Radiological Controls Maintenance/Surveillance Emergency Preparedness	2 2 (Improving) 2	1 1 2 2 (Improving)
5.	Security Engineering/Technical	1 (Declining)	i (improving)
7.	Support Safety Assessment/ Quality Verification	2 (Improving)	2

Previous Assessment Period January 1, 1990, through March 31, 1991 Present Assessment Period April 1, 1991, through March 28, 1992 III. PERFORMANCE ANALYSIS

III.A Plant Operations

III.A.1 Analysis

This area was rated Category 2 during the previous assessment period. Strong operator performance and effective licensed operator training were noted. Close management oversight of operations activities was a strength. Continued emphasis was needed on procedure upgrades, work controls, and communications.

During the current assessment period, plant operations were conducted in a safe and controlled manner. Strong performance continued to be observed during major evolutions. This was evidenced by the event free conduct of numerous unit startups and shutdowns, including a dual unit shutdown performed late in the period. Operators exhibited a professional demeanor in the control room. They were very knowledgeable of equipment status and operating procedures. Evolutions were consistently performed in a confident manner with due regard for safety.

Operator performance has improved. BG&E's program to stress event free operation has been effective. The frequency, number, and safety significance of events attributed to operator error have substantially declined during this period compared to the last assessment period.

Operators maintained an excellent understanding of plant conditions at all times, including situations requiring prompt action. Timely and appropriate actions were taken in response to plant events such as the two automatic reactor trips which occurred as a result of main feed pump problems. Prudent action was taken to insert a manual reactor trip when a feedwater heater relief valve lifted and failed to reseat, resulting in erroneous indications and a low main feed pump suction pressure alarm. In another instance, good initiative by operators, following the failure of a high pressure safety injection pump breaker, resulted in the timely replacement of the breaker and minimized the time that the high pressure safety injection train was unavailable.

Management oversight of activities continued to be a strength for plant operations. Senior managers were frequently observed in the control room and the plant, and demonstrated active involvement in day-to-day plant operations. Managers and supervisors conducted safety audit tours to observe watchstanding practices. These tours were one element of a strong self-assessment program instituted by operations management which monitored selected operations performance objectives to enable evaluation and feedback regarding safety and quality performance.

Communications within operations and between departments have improved. Shift turnover, preshift, and pre-evolution briefings were detailed and comprehensive. Face-to-face operator communications were excellent. The relocation of the shift supervisor's office to within the control room improved the oversight of control room activities and the interface with the operators. Daily management meetings between departments have been restructured to be more efficient. In general, the commitments made by BG&E to establish a pre-evolution briefing process, improve guidance on communications, and enhance guidance regarding supervisory actions have been effectively implemented.

Managers have used several programs to improve communication with the operations staff. Some of these programs were the General Supervisor of Nuclear Plant Operations (GS-NPO) Book, electronic voice mail, and safety audit tours performed by managers and supervisors. The GS-NPO Book was frequently used to communicate management's operating philosophy, including its philosophy about safety, quality, and event free operation. Electronic voice mail was extensively used for timely communication with the operations staff. These programs were used by management to promulgate and reinforce policies and expectations, disseminate potential problems and concerns, and solicit feedback from operators.

Operator training continued to be effective as indicated by an overall 83% pass rate for initial examinations and 94% pass rate for requalification examinations. The requalification program was satisfactory; however, BG&E continued to experience minor problems in the development of a requalification examination. For example, weaknesses were identified in proposed examination scenarios which did not contain sufficient challenges to allow evaluation of operator Emergency Operating Procedure decision points.

The fire protection program was determined to be satisfactory. Procedures were good and there was good control of ignition sources. Some weaknesses were identified in refresher training of fire fighters and in documentation of training. Some instances were identified where fire fighters missed required training or drill participation. In many cases, evaluations for continued fire brigade membership were not conducted or documented. BG&E took appropriate action to correct these weaknesses.

The five operating crews were fully staffed throughout the period. In addition, there were several personnel, including shift technical advisor candidates, enrolled in the various operator training programs during the period to increase shift staffing levels (approximately an entire new shift complement) in the near future. A twelve hour shift rotation, begun as a pilot program during the last period, has been implemented on a permanent basis. The staffing level of the operation support group in the area of operations maintenance coordination was increased during the period which enhanced work prioritization, work control, communication, and outage coordination.

The procedure upgrade program continued to produce good quality operating procedures at a reasonable pace. All of the surveillance test procedures have been through the upgrade program and the remaining site technical and administrative procedures are on schedule. The revised procedures are improved compared to the originals.

Overall, plant housekeeping was acceptable. However, some problems were noted by the NRC with cleanliness in the service water and emergency diesel generator rooms. BG&E was taking effective action to address this concern.

In summary, improvements in communications, the quality of operating procedures, and effective management oversight have contributed to strong operator performance, as evidenced by the low number and frequency of operator errors. Operator performance during major evolutions and plant transients continued to be a strength. Training and staffing levels were supportive of effective operations. Some weaknesses were noted in the housekeeping of safety related areas and in fire fighter refresher training. These weaknesses were effectively addressed by BG&E. Overall, operations performance was markedly improved over the previous period.

III.A.2 Performance Rating

Category: 1

III.B Radiological Controls

III.B.1 Analysis

During the previous assessment period, the Radiological Controls program was rated Category 2, with an improving trend noted. Licensee strengths were noted in the areas of ALARA, dosimetry, Radiological Environmental Monitoring Program (REMP) and chemistry controls. Weaknesses were noted in the radiological effluent program and in radiological housekeeping.

BG&E continued to implement an effective radiation safety program during the assessment period, with improvements noted in the housekeeping, staffing and training arc.s, while continued strong performance was identified in ALARA and dosimetry. Throughout the assessment period, the radiation controls staff was observed to be responsive in anticipating changing radiological conditions during plant evolutions. Control of work activities during the Unit 2 mid-cycle maintenance outage was generally very good; plant housekeeping, especially in the containment, significantly improved. Good planning and implementation were also observed during the temporary relocation of the main Radiologically Controlled Area (RCA) access point during a phase of the plant restoration project.

ALARA performance continued to be exceptional during the assessment period. Total Person-Rem dose for 1991 was 131.2, which was well below the original goal of 260 Person-Rem, and also well below the later revised goal of 145 Person-Rem. Backlogs of records and reports which were a weakness early in the assessment period were eliminated by the end of 1991. An aggressive chemistry control program, careful pre-job planning, and use of mock-ups were the major contributors to this exceptional performance. Also during the assessment period, BG&E continued to make progress in its plant restoration project, with the resultant continued reduction in the total square footage of contaminated spaces within the plant. In addition, BG&E undertook very aggressive steps to reduce the number of personnel contamination incidents (PCIs) at the plant. These steps included replacement of all protective clothing in use, the implementation of a supervisory training program on PCIs, and the establishment of a PCI review committee, which included the Manager, Technical Support, to review all PCI occurrences. As a result, the number of PCIs was reduced from 540 in 1990 to 234 for 1991.

The BG&E internal and external dosimetry program continued to be operated in an outstanding manner during the assessment period. Usage of respiratory protection equipment continued to be minimized through the use of aggressive controls to limit the creation of airborne contamination areas. Records for approximately 2200 personnel on the site were maintained in accordance with all applicable regulations. Near the end of the assessment period, the licensee was taking actions to obtain dedicated computers for use in dosimetry record keeping which would include a radiation rafety database system.

BG&E continued to maintain a model training program for the radiation technician staff, which included eight weeks of systems based training for each qualified radiation controls technician per year. Improvements were also made to the new technician training program to make it more responsive to the needs of the radiation safety staff. The staffing level was ample and continued to increase during the assessment period, with the continued hiring of BG&E staff to replace contractor technicians for normal operational periods, and with the hiring of two additional plant health physicists to augment the technical staff.

The BG&E Quality Assurance group continued to provide high quality reviews of radiations safety programs, while the plant staff significantly improved its responsiveness to recommendations identified in these reviews.

BG&E continued to maintain an effective radwaste and transportation program during the assessment period. Near the end of the assessment period; however, problems were identified by the licensee involving the manifesting of several radwaste shipments. The root causes for these problems included inaccurate data being supplied by the chemistry department to the radwaste section and an instance of failing to follow procedures. BG&E has proposed corrective actions to be implemented.

Radiological Environmental Monitoring and Effluent Control Programs

BG&E continued to maintain and implement an effective Radiological Environmental Monitoring Program (REMP). BG&E procedures were well written and concise, providing excellent guidance and direction for REMP sample collection and analysis. BG&E maintained an excellent laboratory QA/QC program for radioanalytical measurements. Overall, BG&E actions reflected a clear understanding of Offsite Dose Calculation Manual (ODCM) requirements and technical issues with respect to the REMP.

In the radioactive effluent area, BG&E adequately monitored and controlled both liquid and gaseous effluent. BG&E's corrective actions for NRC previously identified weaknesses in the ODCM and Radiation Monitoring System (RMS) calibrations were not effective in that they were not implemented in a timely manner. A noted strength in this area was the BG&E's continuation of the RMS upgrade project. During the assessment period excellent primary and transfer calibrations of many of the effluent radiation monitors were performed as part of the RMS upgrade short-term project. Also, the oversight of air cleaning systems was excellent.

QA audits of both the REMP and effluent areas were thorough and of excellent technical depth. Audit findings were resolved in an appropriate and timely manner.

In summary, BG&E has continued to implement an effective radiological control program. Significant improvement was noted in radiological housekeeping, staffing and responsiveness to quality assurance audit findings. Licensee strengths continued in the areas of ALARA, dosimetry, training, and REMP. Some minor weakness in the radwaste program was identified near the end of the assessment period.

III.B.2 Performance Rating

Category: 1

III.C Maintenance/Surveillance

III.C.1 Analysis

This area was rated Category 2 during the previous assessment period. Several changes were implemented that improved long standing problems regarding the maintenance backlog and the surveillance program. Weaknesses were identified in some maintenance procedures and in foreign material exclusion controls. For other weaknesses, such as post maintenance test coordination and surveillance test coordination, appropriate adjustments were noted. Sufficient checks and balances were in place to ensure significant maintenance and surveillance activities were properly prioritized.

Overall, progress was noted during the current assessment period as existing maintenance and surveillance programs matured, process refinements were made, and new programs were initiated. However, some program implementation weaknesses were observed.

Several positive changes to maintenance work control processes were made that standardized work controls and improved planning efficiency. These included the consolidation of the planning and scheduling functions and the implementation of a site wide computer system for maintenance planning. Additionally, a single maintenance order concept was initiated that utilized only one maintenance order between several different disciplines to accomplish work rather than separate maintenance orders for each discipline. This concept fostered task ownership by the lead craft and increased intra-departmental communications.

The work process improvements and continued management attention reduced the maintenance backlog by about 50 percent. Improved scheduling and work coordination, coupled with the maturation of the Quarterly System Schedule, resulted in minimizing outage times for major evolutions such as emergency diesel generator maintenance and saltwater system work. Additionally, newly implemented planning meetings have resulted in work scope discussions about two weeks before the actual work. These efforts also contributed to the reductions in the maintenance backlog.

The quality of planned routine maintenance packages was generally good and improvements were seen during the period. Maintenance procedures formed a part of many maintenance packages. Lessons learned from previously identified errors, such as improvements on service water system valve repairs, were incorporated. However, occasional technical errors were found in the maintenance procedures. For example, errors in the procedure for the control room heating and ventilation systems contributed to equipment failures that resulted in a Unit 2 shutdown.

Staffing of the maintenance organization was appropriate with key positions filled. Openings in some departments were augmented by contractor support. Based on observations and discussions, the maintenance staff was generally well trained and technically competent. Positive attributes such as good pre-job briefings, supervisory and system engineer presence and involvement in the field, knowledgeable craft workers, and good workmanship were generally observed. Good management attention was observed during high priority jobs such as auxiliary feedwater actuation logic troubleshooting and investigation of the failure of the Unit 1 main turbine mechanical trip solenoids. However, performance during maintenance implementation was mixed.

Several maintenance implementation problems were noted during the period that challenged plant operations and indicated that weaknesses persist. Early in the period, personnel performance errors caused by poor work practices, inadequate self verification, and failure to follow procedures were noted. These errors included the improper installation of jumpers that made a shutdown cooling suction valve inoperable, and improper termination of leads on an auxiliary feedwater steam admission valve which caused the valve to fail to operate. Management efforts resulted in some improvement in reducing the frequency and significance of the errors by the end of the period.

Near the end of the period, some additional program weaknesses were identified. The program controls for scaffolding installation were not effectively implemented. Inadequately restrained transient equipment was frequently noted in safety related areas; a long standing issue that had not been corrected by BG&E. Resolution of these issues was on-going as the period ended.

Management attention has been successful at resolving some previously identified programmatic concerns. For example, foreign material exclusion control programs were significantly improved. Some program implementation problems remain, however, as evidenced by several instances where foreign material was found inside clean areas. The controls for measuring and test equipment (M&TE) were also improved.

Substantial improvements in preventative maintenance (PM) implementation were observed. Increased management attention to assure timely performance and improve scheduling have contributed to the reduction of the backlog of past due PM procedures. However, there were some minor occurrences where PM deferrals were not processed in a timely manner. Also, technical details such as torque specifications were not found in certain procedures. Additionally, the procedure change process did not contain measures to assure that a change in one procedure was implemented into other similar procedures in a timely manner. The PM program was undergoing substantial upgrade during the period as a part of BG&E's improvement program. The above symptoms were indicative of longstanding program concerns that required further corrective action.

Execution of the post maintenance test (PMT) program has generally been good. Problems with control element assembly (rod) worth found during Unit 2 startup testing were effectively resolved. Post modification testing also uncovered design errors in a hydrogen purge valve control circuit modification. However, some program implementation problems were also noted as evidenced by the lack of formal PMT requirements for troubleshooting maintenance. A guideline developed for determining the appropriate PMT for the work scope was not consistently used by the planners. Also, a required PMT of the spent fuel pool filters was missed due in part to a failure of the organizations involved to understand their responsibilities to identify the required PMT and coordinate its performance.

The procurement program was in a state of transition during the period. Improvements were noted in procurement, receipt inspection, and material traceability. However, little progress was noted in the areas of material handling and storage and procedure improvement. The procedures for some areas such as receipt inspection were weak in that they had not been revised to reflect changes in the program governing documents. BG&E's program changes continued as the period ended.

Surveillance test program performance was generally consistent with some improvements observed. The centralized surveillance test group continued to perform effectively to ensure that required tests are performed as scheduled and that failed tests are reviewed by the Plant Operations Safety Review Committee. Surveillance test field performance was good. The preparation and execution of several high profile tests such as integrated safety features testing were excellent. Performance of most other routine tests was good and procedures were effectively used.

Some instances of weak surveillance program issue resolution were identified. For example, the root cause review of radiation monitoring test procedure errors was initially limited in scope. The lack of timely review of the main steam isolation valve testing resulted in the need for ASME code relief. Appropriate management response was observed to resolve these issues.

During the period, a technical adequacy review of the surveillance test procedures was conducted that improved overall technical adequacy. This review entailed a detailed analysis of all surveillance test procedures to verify that they fulfilled their technical specification requirements. Corrective actions for minor deficiencies were placed in a formal tracking system for resolution. High priority deficiencies were quickly resolved such as those regarding emergency diesel generator engine speed verification.

In summary, the maintenance and surveillance program improvements continued as programs matured and new programs were initiated. Previously identified programmatic weaknesses in foreign material exclusion and M&TE control were effectively corrected. However, during the period there were several instances of inadequate program implementation. These included work controls, PMT, foreign material exclusion, scaffolding, and unrestrained transient equipment. Further management attention is needed in these areas. The centralization of plant work controls and reduction of the maintenance backlog were noteworthy.

III.C.2 Performance Rating

Category: 2

III.D Emergency Preparedness

III.D.1 Analysis

During the previous SALP, Emergency Preparedness was rated Catego. 2. This rating was based upon a well qualified Emergency Response Organization (ERO), assistance to local counties in improving their emergency response facilities, effective responses to three Unusual Events, and satisfactory administration of the EP program. However, concerns were identified with event under-classification provisions in procedures, exercise communication and procedural adherence weaknesses, and not resolving Emergency Action Level and QA audit discrepancies.

Two plant events required immediate response actions and implementation of the Emergency Response Plan (ERP) during this assessment period: a June 15, 1991, loss of control room air-conditioning and a March 19, 1992, declaration of inoperable emergency diesel generators. Both events were quickly recognized and correctly classified as Unusual Events by shift crews. Implementation of the ERP, notifications of off-site authorities, and use of Emergency Response Plan Implementing Procedures (ERPIPs) were effective during both events.

In the November 1991 full-participation exercise, BG&E personnel coordinated closely with 17 c., State, and Federal Emergency Management Agency (FEMA) personnel in developing a mallenging scenario which supported FEMA-required ingestion pathway (50-mile) objectives. There were no weaknesses in responses by ERO personnel to scenario events. Only minor areas for improvement were identified in simulator control room and Technical Support Center (TSC) performance, and overall performance s. swed the ability to protect public health and safety. Performance strengths were noted in TSC-Emergency Operations Facility (EOF) dose assessment coordination, Operations Support Center (OSC) staff demonstrations, and interaction with State of Maryland response personnel. Previous exercise weaknesses concerning communications and procedure use were corrected. The post-exercise critique was constructive, with clear identification of areas for program improvement.

Good initiative was noted in BG&E upgrading of Emergency Response Plan Implementing Procedures, moving toward a performance-based approach. Changes were made to improve key ERPIPs (e.g., the RADDOSE IV dose assessment code and the off-site assembly and accountability procedure). Emergency response facilities (ERFs), equipment, and supplies were dedicated and appropriately maintained for immediate availability. A BG&E-initiated study of the off-site siren notification system found adequate coverage, but resulted in a commitment to improve siren coverage in the 10-mile Emergency Planning Zone (EPZ). Overall, EP program changes were properly reviewed by management and provided suita' le program enhancements.

On-site and off-site program administration by the Supervisor, EP Unit (EPU) and assigned EP staff were effective at maintaining the ERP and ERPIPs, conducting drills and exercises, ensuring readiness of emergency response facilities and equipment, and interfacing with off-site support groups. All EP Unit positions were filled. Management involvement in EP program activities was evident from regular meetings with the EP Unit Supervisor, maintenance of ERO qualifications, and participation in drills and exercises. The assignment of one staff member each to the Maryland Department of the Environment and Maryland Emergency Management Agency was a noteworthy enhancement to the support to the State of Maryland.

The EP training program was well-defined and appropriately implemented by the EP Unit and Technical Training Unit staffs. The plant simulator was used for the annual exercise and other training drills. This was a positive initiative to add realism to EP training. A good mix of classroom, practical, and ERF walk-through training was provided to ERO assignees. A training matrix clearly described required lesson plans (LPs) and emergency information necessary for each position within the ERO, but LPs not being updated to reflect new ERPIPs was a weakness.

Scheduled drills were held throughout the year and included participation by different ERO personnel within each functional area. All key ERO positions were filled at least three deep, with an ample number of staff qualified to fulfill each functional response duty.

To satisfy ERO qualification, reactor operators received classroom and simulator training in ERO direction and control, accident classification, off-site notification, and protection action recommendations, but were not required to participate in drills or exercises. Coordination between the EP Unit and the operations staff for review of scenario information was not evident. Event classification inaccuracies were identified by the NRC in EP scenarios used for the operator requalification program. NRC walk-through drills with shift crews also identified concerns with the Emergency Action Level (EAL) scheme and the ability of shift supervisors to readily classify emergencies. Previous NRC-identified issues about EAL conformance to NUREG-0654 guidance were addressed by the BG&E staff, but a lack of specific instrument values or equipment status in total loss of feedwater and loss-of-coc ant accident EALs inhibited timely classification during walk-throughs. To address the EAL and training concerns, BG&E committed to a comprehensive corrective action plan at the end of the assessment period. This constructive and thorough recognition of a potential problem area was assessed as indicative of a more positive licensee approach to assuring emergency plan and plan implementation quality.

Quality assurance reviews were independently performed and were satisfactory in scope and content. Results of audits were distributed to senior management and provided to Maryland and local county officials. Audit findings and recommendations received prompt attention by the EP staff and were resolved in a reasonable time.

In summary, BG&E effectively responded to actual events and to the full-participation emergency exercise scenario. The EP training program was well-defined, but coordination of EP scenario reviews with operations staff vas weak. BG&E recognized the need for EAL conformance to NUREG-0554 guidance, but the EALs were not detailed enough to assure accurate and timely classifications of fast-breaking events by shift crews. The licensee exhibited a positive approach to resolving this issue. A high level of effort and a distinct commitment were evident in maintaining the relationship with the State of Maryland through allocation of assigned staff to the State. EP program administration and management involvement in program activities was good, and an ample staff maintained ERO qualification.

111.D.2 Performance Rating

Category: 2

Trend: Improving

III.E Security

III.E.1 Analysis

Baltimore Gas and Electric (BG&E) was rated Category 1 (Declining) for the previous SALP period. That rating was based on a performance-based security program with good management support. However, the declining trend was identified by an increase in the number of personnel errors which resulted in several prompt reportable events.

The licensee began this assessment period emerging from a significant security event which indicated that plant security management may have been insulated from day-to-day security force activities and that security force members may have been reluctant to inform security management of improprieties. As a means of achieving more effective management control and support, plant security management initiated daily meetings with key personnel responsible for security operations. In addition, all security shift supervisors were required to attend a "Teamwork Building Course," conducted by corporate training personnel and company psychologists. The licensee's adjustments were effective in that there were no reportable security events during this period.

Plant security management continued to provide effective oversight of the security program, even under unfavorable conditions, when a security shift supervisor was arrested for growing marijuana in a remote area of the owner controlled property around the facility. The licensee conducted an intensive investigation which concluded that the individual did not use or sell drugs at the site and had not collaborated with any other employees. However, while the investigation indicated no programmatic weaknesses, there were areas in the fitness-for-duty testing that needed enhancement. Those vulnerabilities were promptly addressed and corrected.

The licensee also took appropriate measures to offset possible damage to the morale and credibility of security force members as a result of that incident. As a morale booster, the licensee initiated a Shift-of-the-Quarter Program to recognize the shift which best exemplified performance through observations, activities, and suggestions for improvements. Morale remained high, and plant personnel continued their respect for the security program.

BG&E continued to take the initiative in enhancing and upgrading plant security measures during the period, which indicated strong support from corporate management. This support resulted in (1) the transfer of the Nuclear Security Program from the General Services Division to the Nuclear Energy Division as a means of creating more efficient management control and on-site support; (2) continued active participation in industry groups involved in nuclear plant security; (3) significant lighting upgrades throughout the protected area; (4) the start of construction of a new access control facility; and (5) approval of funding for a new computer-generated photo identification system to be installed in calendar year 1992. Security management also took prompt, corrective actions when a potential vulnerability was identified around the waterfront.

Staffing for the security force was maintained at a level consistent with program needs, as demonstrated by a lack of program implementation problems and the limited use of overtime. Throughout the period, security force members performed their duties in a professional and reliable manner. The Security Training Program continued to be well-maintained and reflected significant enhancements in tactical training aids. The licensee purchased a computerized tactical scenario simulator and conventional paint-ball handguns and rifles. The simulator and the paint-ball guns provided excellent reinforcement in principals of marksmanship, defensive tactics, and the importance of cover and concealment. In addition, an outside vendor was contracted by the licensee to provide additional and specialized training in defending against the design basis threats. Security force members demonstrated tactical proficiency and performed other duties throughout the period with only three loggable security events resulting from personnel error. Management actions, such as pay incentives to promote stability in the security force, proved effective; the attrition rate was low.

BG&E also continued to conduct aggressive self-assessment and audit programs. Those programs were effective in identifying potential weaknesses and initiating effective, corrective actions. Early in the period, the licensee identified problems with the protection of safeguards information. The corrective actions that were implemented proved effective in resolving the problem.

BG&E continued to provide excellent support for implementation of the Fitness-For-Duty (FFD) program as indicated by the FFD program being transferred to the Medical Department and by the creation of a FFD administrator at the site. The program was also supported by comprehensive audits through which minor program deficiencies were identified and corrected.

During the period, the licensee submitted two revisions to its Contingency Plan; four revisions to its Physical Security Plan; and two revisions to its Training and Qualification Plan under the provisions of 10 CFR 50.54(p). The revisions were of high quality, technically sound, and reflected well-developed policies and procedures.

In summary, BG&F continued to provide excellent management and financial support for the Nuclear Security Program, as indicated by the transfer of the Nuclear Security Program to the Nuclear Division. The program remained performance-oriented and very effective, as demonstrated by a period free of 1-hour reportable security events. The licensee effectively managed an unfavorable incident involving a member of the security force that could have adversely impacted security operations, but instead, members of the security organization remained professional and provided high quality nuclear security.

III.E.2 Performance Rating

Category: 1

III.F Engineering/Technical Support

III.F.1 Analysis

This functional area was rated Category 2 (Improving) in the previous SALP period. During that period, a major reorganization of the engineering department was implemented with the formation of a Technical Support Department reporting to the Plant General Manager to allow better oversight of plant site activities. The existing nuclear engineering organization was modified to focus on the prioritized implementation of short, intermediate, and long term projects. Engineering staff was increased, including utilization of contract engineers, to levels commensurate with growing organizational needs. Improvement programs included drawing upgrade, training, inter-department communication and cooperation, effective implementation of modifications, and initiatives to improve plant engineering performance. Weaknesses were identified in engineering problem resolution and in the quality of Corporate non-destructive examination (NDE) support programs.

During this SALP period, engineering and technical support performance improved in some areas but the overall performance has not sustained the level of performance noted during the last SALP. The pace of improvement, following the initiatives implemented during the last period, has been less than anticipated.

The reorganization of engineering that was started last SALP period was successfully completed and the engineering organizations were fully staffed. Utilization of contract engineering continued on an as-needed basis. Based on a Corporate Mission statement (Mission 92), both nuclear engineering and technical support developed performance objectives for immediate and future term performance. Engineering performance was measured and tracked against these objectives. In this way, an excellent means was developed to measure engineering performance and identify engineering units not meeting performance objectives.

Calvert Cliffs nuclear and technical support engineering displayed good performance in design, development, and implementation of system and equipment modification. Modifications were generally performed in a comprehensive manner. Examples of good modification engineering included salt water system pipe replacement, LPCI pipe check valve replacement, safety injection tank (SIT) check valve replacement, intake structure cooling fan installation, and through-wall leak repair of Unit No. 1 saltwater header. However, many safety-related minor modifications contained inadequate justification for not performing 10 CFR 50.59 safety evaluations.

Engineering performance for emerging issues was generally well managed, technically accurate and demonstrated a good safety perspective. Examples included issues of service water flow to containment air coolers and component cooling flow to shutdown cooling heat exchangers, degraded seals on containment air coolers, and a leaking discharge valve on a Unit I safety injection tank. However, the operability determination for a defective service water heat exchanger support was not performed in a timely manner.

A majo, ongoing long-range program in nuclear engineering was directed at correcting drawing errors and their root causes, and complemented the BG&E configuration management program by providing an improved drawing control system. Longer term initiatives, such as establishing completion dates for lower priority drawings, drawing database implementation, and completing conversion to complete assisted drafting were at various stages of development. These provided for more effective control of engineering drawing activity and were found to be meeting operational needs.

Communications between engineering groups continued to be good as a result of active participation in meetings by members of each engineering unit and operations personnel. Good interactions occurred in the daily report, management, and Plant Operations Safety Review Committee (POSRC) meetings.

A comprehensive engineering training program has continued over the period with particular focus directed at the design control process. However, in the case of 10 CFR 50.59 evaluations, the training did not include current industry guidance. This was found to have contributed to the failure to provide adequate justifications for not performing safety evaluations on many minor safety related modifications.

Engineering procedures have been upgraded which provided an excellent basis for ensuring that engineering activities were performed in accordance with established procedures. In addition, as part of the procedure upgrade project, BG&E implemented a new set of procedures which establish a formal process for development, initial review, approval, change, revision, cancellation, and periodic review of technical procedures.

However, several weaknesses in engineering support were identified during the period. Engineering input to the inservice testing program was found to be inadequate in that the reference values for saltwater and component cooling pumps were changed without sufficient assessment. Other engineering support weaknesses included a circuit design error in a modification to the hydrogen purge isolation valve and an untimely evaluation given for acceptance of a horizontal disc in a vertical application for steam supply check valves. System engineer walkdowns have, in some cases, not been thorough, in that defective conditions were not always properly identified.

During the last SALP period, BG&E had mixed success in control of outside contractors. The nuclear engineering department implemented a number of programs to control design engineering contractors, including augmented contractor project meetings, establishing contractor performance indicators, team building and quality task circles, and internal standards and performance measurement methods. These programs were effective and responsive to design engineering needs.

Strengths were noted in engineering efforts applied to BG&E's motor operated vave (MOV) program. Personnel involved in the program were knowledgeable and demonstrated strong technical capability. The program is proceeding toward meeting the schedule discussed in Generic Letter 89-10.

BG&E's self assessment program included an electrical distribution system functional inspection. Although it was a positive initiative, it did not identify multiple significant safety concerns related to emergency diesel generators identified in a recent NRC Electrical Distribution Safety Functional Inspection (EDSFI). The EDSFI team concluded that the engineering/technical support staff provided adequate support for the safe operation of the Calvert Cliffs electrical distribution system. Calculations for the electrical design basis reconstitution were found to be comprehensive. However, design deficiencies were identified in the emergency diesel generator load sequencer which resulted in shutdown of both units. Additional weaknesses were identified in the area of problem resolution. Problems requiring analyses were not always effectively resolved. Two of these problems included (1) adequacy of the swing diesel generator operating without cooling water and (2) concerns regarding the emergency diesel loading analysis. Some root cause analyses were not comprehensive. For example, some did not identify appropriate human performance problems.

BG&E continued to invest resources in engineering initiatives which contributed to improved productivity, enhanced safety, and increased reliability. The selection of targets for this investment was made in a comprehensive manner with attention paid to impact on safety and reliability. Included in these initiatives were the development of design implementation guides and life cycle management applied to plant life degradation issues such as salt water corrosion and the reactor vessel surveillance program plan. These initiatives were indicative of mature engineering organization involvement in issues supported by a corporate management with a long range perspective.

In summary, BG&E reorganization of engineering activity has been completed successfully. The fully manned engineering units are now implementing the performance improvement initiatives to improve the safety and reliability of the plant. Strengths were noted in modification engineering, dealing with emerging engineering issues, and improving contractor control in the nuclear engineering department. Weaknesses were noted in safety evaluation justifications for minor modifications. Concerns with design adequacy and control were identified. Although engineering performance continued to improve in some areas, overall performance has not sustained the level of performance noted during the last SALP and the pace of improvement has been less than anticipated.

III.F.2 Performance Rating

Category: 2

III.G Safety Assessment/Quality Verification

III.G.1 Analysis

This functional area was rated a Category 2 with no trend identified during the last assessment period. A heightened awareness and responsiveness to safety issues were noted throughout the assessment period as well as a clear emphasis on safety and quality. Good self-assessment was observed which used a variety of techniques. However, it was noted that performance was mixed regarding timely identification and assessment of conditions adverse to quality.

During this assessment period, BG&E senior and line management continued its policy of strong emphasis on safety and quality as outlined in its Nuclear Program Plan. Management support for plant safety during the period was clearly evident and included several prudent decisions to shut down the units. Good management oversight was also exhibited during the startup of Unit 2. The Startup Review Board process provided structured management oversight and assessment of startup activities and assured effective resolution of problems. During the fall outage on Unit 2, enhancements developed from shutdowr safety self-assessments were effectively implemented. However, there was an instance where the operations' staff made an incorrect operability determination regarding the reactor protection system logic and management failed to challenge the determination.

Mixed performance was noted in the processes to identify, review, and resolve problems. A new issue report system to replace the problem report system started during the period. A new multi-disciplined review committee effectively screened issues and elevated significant problems to plant management in a timely manner. The threshold for initiating an issue report was appropriate with minimal instances of failure to initiate an issue report noted. While the issue report program was a clear improvement, concerns with issue resolution were noted. There was a backlog of old issues and a growing backlog of current issues. Timely and effective corrective actions were not always achieved due to ineffective management controls and oversight, BG&E's self-assessment overview process identified the management weaknesses and the untimely resolution of issues. Actions were initiated to correct these weaknesses in resolving issues.

The Quality Assurance (QA) program performance continued to improve during this assessment period with detailed and performance based audits observed. Noteworthy examples include audits of the measuring and test equipment program and two corrective action program audits. In addition, a QA audit identified several discrepancies with the subcontractor work being performed in support of the construction of an independent spent fuel storage installation (ISFSI) at the plant site. Significant improvement in Quality Verification (QV) was also noted. Previous concerns with informal tracking of QV performance indicators were corrected by establishing a program to identify and utilize the indicators to improve QV priorities and activities. Procedures have been developed and implemented to effectively support the QV function and staffing with technical discipline experience.

Self-assessments performed during the period provided objective and thorough assessments of performance to management. The Operating Experience Review Organization, composed of the Independent Safety Evaluation Unit, the Plant Operating Experience Unit, and the Industry Operating Experience Review Group, provided management timely and thorough feedback. Other self-assessment initiatives, such as the Performance Improvement Plan Review Panel, provided a disciplined approach to review closure of Performance Improvement Plan actions. The self-assessment process and results demonstrated a sound safety perspective and was a notable strength during this assessment period.

BG&E was effective in resolving onsite technical issues and in utilizing industry experience to identify and resolve safety issues. Rod worth discrepancies found during Unit 2 startup testing were properly dispositioned via onsite vendor interaction. As a result of growing industry concern, an extensive effort was undertaken to evaluate shutdown safety concerns. Enhancements, such as operational safety reviews of outage scheduling, were implemented which were effective in increasing awareness of shutdown risks and enhancing safety during shutdown conditions.

The onsite and offsite safety review committees, POSRC and OSSRC, respectively, continued to perform thorough reviews of issues and exhibited a strong safety perspective. Meetings of both committees facilitated open discussion of issues and exchange of perspectives. The OSSRC provided a focus on process issues rather than product issues which enhanced a broad safety perspective. However, process weaknesses were noted which screened modifications on safety-related equipment from POSRC review and allowed the installation of temporary modifications on systems or equipment that affect nuclear safety without prior POSRC review. Corrective actions were taken to eliminate these process weaknesses.

A significant number of licensing actions were processed during this assessment period. These actions included amendment requests; exemption and relief requests; responses to generic letters and bulletins; multi-plant issues; temporary waivers of compliance; and other regulatory initiatives. The submittals were generally acceptable, technically sound, and supported resolution of the requested actions or safety issues. Examples of technically sound licensing actions completed, including those provided in the Engineering/Technical Support section of this report, included: the amendment supporting the maintenance and surveillance of the swing emergency diesel generator; approval of changes in the reactor vessel material surveillance program; and response to NRC Bulletin 89-01 relating to steam generator tube plugging. However, mixed performance was noted in some relief and temporary waiver of compliance requests. Although most of the requests were appropriately prepared and technically sound, others did not thoroughly address all the safety aspects of the issues and required additional interaction with the staff. Examples which lacked thoroughness included the waiver request for the surveillance of a safety injection tank valve and a Code relief request for a saltwater system repair.

The BG&E Licensee Event Reports (LERs) continue to provide clear descriptions and adequate details of the subject events. Appropriate reportability determinations were made, adequate root cause analysis performed, and technically sound corrective actions recommended.

In summary, clear management focus on safety and quality continued. A variety of self-assessment methods resulted in effective feedback of performance to management. Particularly noteworthy was the strong performance of the Operating Experience Review Organization. Mixed performance was noted regarding timely resolution and effective assessment of some issues. The function and oversight of onsite and offsite safety review committees remained strong. However, process weaknesses which resulted in the screening of some safety-related equipment modifications from the POSRC and the installation of temporary modifications, which could affect safety, without prior POSRC review were noted. Most licensing actions continued to be generally acceptable, technically sound, and supported resolution of the requested action or safety issue. A few exceptions were noted which required additional interaction. Strong QA/QV performance and improvements were noted during this assessment period.

III.G.2 Performance Rating:

Category: 2

IV. SUPPORTING DATA AND SUMMARIES

IV.A.1 Licensee Activities

Unit 1

Unit I began the SALP period at full power. On May 17, the unit was shut down for a planned maintenance and surveillance outage. On July 18, the unit resumed power operation.

On October 1, an automatic reactor trip occurred due to a low steam generator water level resulting from a main feed pump malfunction. The unit returned to power operation on October 5.

The unit operated at full power until December 21 when the unit was shut down to repair a safety injection tank discharge check valve. The valve was found to have excessive leakage. The unit resumed power operation on December 29.

On March 19, 1992, an Unusual Event was declared when all of the site emergency diesel generators were declared inoperable due to load sequencer concerns. The unit was shut down and began the cycle 10 refueling outage. The unit remained in cold shutdown (Mode 5) for the remainder of the SALP period.

Unit 2

Unit 2 began the SALP period in a continued shutdown for the eighth refueling outage. On April 5, BG&E was authorized to restart the unit and Confirmatory Action Letter (CAL) 89-08 and its supplements were formally closed by the NRC, acknowledging completion of committed actions.

The unit resumed power operation on May 1. On May 2, an automatic reactor trip occurred due to a main feed pump malfunction which resulted in a low steam generator level. The unit returned to power operation on May 4.

On May 11, a shutdown was conducted to realign a main turbine bearing which was vibrating excessively. The unit resumed power operation on May 13 and reached full power on May 20.

On May 23, the unit was shut down to repair an unisolable steam leak on a main steam drain line. The unit returned to power operation on May 26.

On June 15, an Unusual Event was declared and the unit shut down due to the failure of both trains of control room air conditioning. The unit resumed power operation on June 28.

On October 18, the unit was shut down for a planned maintenance and surveillance outage. On November 24, the unit returned to power operation.

On January 2, 1992, the unit was manually tripped after a feedwater heater relief valve lifted and failed to reseat. The resultant steam caused numerous plant alarms. The unit resumed power operation on January 4.

On March 19, 1992, an Unusual Event was declared and the unit shut down when all of the site emergency diesel generators were declared inoperable due to load sequencer concerns. The unit remained in Mode 5 for the remainder of the SALP period.

IV.A.2 Unplanned Shutdowns

Unit 1

Date	Power Level	Root Cause	Functional Area
10/1/91	93%	Component i lilure	Not applicable

An automatic reactor trip occurred following a loss of feedwater event. The loss of feedwater occurred when control power was lost to the No. 12 main feed pump control circuit. The cause of the control power loss was a faulty fuse holder in the main feed pump control circuit.

12/21/91 60% Component Failure Not applicable

An unplanned shutdown was made to allow repair of seat leakage past the No. 12B safety injection tank outlet check valve. Valve O-ring was found damaged. Cause for the O-ring failure was determined to be a slight misalignment between the valve disk and seat.

3/19/92 100% Inadequate Design Engineering/Technical Support

An unplanned shutdown was made after all emergency diese' generators were declared inoperable. A design review showed that during certain small break loss-of-coolant incidents (LOCI) concurrent with a loss of offsite power, a potential exists for creating a degraded emergency bus voltage. This situation could be created with certain combinations of multiple loads starting on an emergency diesel generator (EDG) simultaneously. This potential existed because the LOCI sequencer design could allow EDG loading outside of the desired and analyzed sequence.

Unit 2

 Date
 Power Level
 Root Cause
 Functional Area

 5/2/91
 8%
 Component Failure
 Maintenance/Surveillance

An automatic reactor trip occurred following a loss of feedwater flow event. The loss of feed was caused by a circuit board edge connector in the feedwater control circuit which failed due to improper installation and prevented the operator from controlling a steam generator level oscillation at low power. The connector failed as a result of faulty installation.

5/11/91 78% Bearing Misalignment Maintenance/Surveillance

An unplanned shutdown was made to realign the No. 11 main turbine bearing following identification of high vibration. The cause of the high vibration was a turbine shaft bearing misalignment.

5/23/91 100% Component Failure Not applicable

An unplanned shutdown was made to repair an unisolable steam leak on a steam drain for the main steam piping at the inlet to the turbine stop valves. The cause of the leak was fatigue failure of a weld due to drain line vibration.

6/15/91 100% Inadequate Procedures Maintenance/Surveillance

An unplanned shutdown was made due to the complete loss of the control room air conditioning (CR HVAC) system. One of the two required trains of CR HVAC was undergoing corrective maintenance due to a prior failure when the second CR HVAC tripped due to high current. The cause of the event was the tack of procedural guidance associated with the maintenance of the system which allowed non-condensible gases to be introduced.

1/2/92 92% Component Failure Maintenance/Surveillance

A manual reactor trip was initiated after a feedwater heater relief valve failed to reseat and the resultant steam caused the actuation of numerous balance of plant annunciators. The alarms and simultaneous unrelated trip of a charging pump prompted operators to manually trip the unit. The cause of the relief valve failure to reseat was degradation of the relief valve spring due to excessive seat leakage.

3/19/92 100%

Inadequate Design

Engineering/Technical Support

An unplanned shutdown was made after all emergency diesel generators were declared inoperable. A design review showed that during certain small break loss of coolant incidents (LOCI) concurrent with a loss of offsite power, a potential exists for creating a degraded emergency bus voltage. This situation could be created with certain combination of loads starting on an emergency diesel generator simultaneously. This potential existed because the LOCI sequencer design could allow EDG loading outside of the desired and analyzed sequence.

IV.A.3 Direct Inspection and Review Activities

During the assessment period, NRC inspection coverage was provided by a combination of visiting, temporary and permanently assigned inspectors. An Integrated Performance Assessment Team inspection and a Motor Operated Valve team inspection were completed during this period. In addition, an Electrical Distribution System Functional Inspection was in progress as the period ended.

There were a total of 6351 inspection hours during the period or 638 — aspection hours on an annual basis.

IV.B Criteria

Licensee performance is assessed in selected functional areas, depending on whether the facility is in a construction or operational phase. Functional areas normally represent areas significant to nuclear safety and the environment. Some functional areas may not be assessed because of little or no licensee activities or lank of meaningful observations. Special areas may be added to highlight significant observation

The following evaluation criteria were used, as applicable, to assess each functional area:

- 1. Assurance of quality, including management involvement and control;
- 2. Approach to the resolution of technical issues from a safety standpoint;
- 3. Enforcement history,
- Operational events (including response to, analysis and reporting of, and corrective action for);

- 5. Staffing (including management);
- 6. Training and qualification effectiveness;

Based upon the SALP Board assessment, each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

<u>Category 1:</u> Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a superior level of performance. NRC will consider reduced levels of inspection effort.

<u>Category 2:</u> Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in a good level of performance. NRC will consider maintaining normal levels of inspection effort.

Category 3: Licensee management attention to and involvement in nuclear safety or safeguards activities resulted in an acceptable level of performance; however, because of the NRC's concern that a decrease in performance may approach or reach an unacceptable level, NRC will consider increased levels of inspection effort.

<u>Category N:</u> Insufficient information exists to support an assessment of licensee performance. These cases would include instances in which a rating could not be developed because of insufficient licensee activity or insufficient NRC inspection.

Trends, if used, are defined as:

<u>Improving</u>: Licensee performance was determined to be improving during the assessment period.

<u>Declining</u>: Licensee performance was determined to be declining during the assessment period and the licensee had not taken meaningful steps to address this pattern.