

ENCLOSURE
INTERIM SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION
REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE
INSPECTION REPORT NUMBERS
50-424/90-23 AND 50-425/90-23

GEORGIA POWER COMPANY

VOGTLE, UNITS 1 AND 2

OCTOBER 1, 1989 THROUGH SEPTEMBER 30, 1990

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observations and data on a periodic basis and to evaluate licensee performance on the basis of this information. The program is supplemental to normal regulatory processes used to ensure compliance with NRC rules and regulations. It is intended to be sufficiently diagnostic to provide rational basis for allocation of NRC resources and to provide meaningful feedback to the licensee's management regarding the NRC's assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on November 20, 1990, to review the observations and data on performance, and to assess licensee performance in accordance with the guidance in NRC Manual Chapter NRC-0516, "Systematic Assessment of Licensee Performance". The Board's findings and recommendations were forwarded to the NRC Regional Administrator for approval and issuance.

This report is the NRC's assessment of the licensee's safety performance at the Vogtle Units 1 and 2 for the period October 1, 1989 through September 30, 1990.

The SALP Board for Vogtle was composed of:

- L. A. Reyes, Director, Division of Reactor Projects (DRP), Region II (RII) (Chairperson)
- A. F. Gibson, Director, Division of Reactor Safety, (DRS), RII
- B. S. Mallett, Deputy Director, Division of Radiation Safety and Safeguards, (DRSS), RII
- A. R. Herdt, Chief, Reactor Projects Branch 3, DRP, RII
- D. B. Matthews, Director, Project Directorate II-3, Office of Nuclear Reactor Regulation (NRR)
- D. Hood, Project Manager, Project Directorate II-3, NRR
- B. R. Bonser, Senior Resident Inspector, Vogtle, DRP, RII

Attendees at SALP Board Meeting:

- K. E. Brockman, Chief, Project Section 3B, DRP, RII
- S. E. Sparks, Project Engineer, Project Section 3B, DRP, RII
- R. F. Aiello, Resident Inspector, Vogtle, DRP, RII
- R. D. Starkey, Resident Inspector, Vogtle, DRP, RII
- G. R. Wiseman, Reactor Engineer, Technical Support Staff, DRP, RII

II. SUMMARY OF RESULTS

During this assessment period, Vogtle has been operated in a safe manner. Plant management has maintained an active involvement in directing daily plant operations. Concern has been expressed over the licensee's

commitment to fostering effective communications channels, both with the NRC and within its own organization. Also, operational occurrences and inspections have identified the licensee's commitments to conservative operations and implementation of effective risk management as areas requiring continuing attention.

On March 20, 1990, the site experienced a loss of vital ac power which resulted in the loss of all shutdown cooling for a period of 36 minutes. Overall, the response of the plant staff was successful in ensuring the health and safety of the public was maintained. However, numerous shortcomings were identified in areas such as procedural adequacy, command and control, and outage management.

Performance in the area of Radiological Controls continued to be very effective. A reduction in the number of personnel contamination events and a decrease in contaminated area was observed. The program to control and quantify radioactive effluents, as well as the program to reduce the number of out-of-service channels in process and effluent monitors, was considered a strength.

Satisfactory performance was identified in the Maintenance/Surveillance area. Improvements were noted in preventive and predictive maintenance programs. The material condition of the plant is being greatly improved. However, inadequacies were identified in the safety system outage program philosophy. Technical Specification (TS) surveillances also continued to be missed. Maintenance activities contributed to four reactor trips during the assessment period.

The March 20 event identified significant problems in the Emergency Preparedness area, as demonstrated by the site's failure to make timely notifications to emergency agencies, event classification procedure weaknesses, loss of command and control, and personnel accountability problems. Management attention and corrective actions were evident during the subsequent annual exercise.

The licensee continued to experience significant difficulties in the area of control and protection of safeguards information. Some improvement was noted in the security program in the areas of training, armed response capability, and search equipment. However, corrective actions to resolve weaknesses have been slow. Inadequacies were also identified in alarm assessment capabilities and the manner in which contingency drills were conducted.

Engineering/Technical Support effectiveness was inconsistent during the assessment period. Site engineering involvement in daily activities was evident, control over the design change process was demonstrated, and engineering evaluations were typically comprehensive. However, several engineering deficiencies were noted during the assessment period, such as drawing legibility, check valve testing, and recurring Emergency Diesel Generator (EDG) temperature switch problems. Communications between the

various technical departments within the plant could be improved. Deficiencies in outage management and risk assessment, identified after the March 20 event, have received increased attention at both the site and corporate levels.

Safety Assessment and Quality Verification were satisfactorily implemented during this assessment period. The Plant Review Board was effective. The Quality Assessment program identified numerous significant issues. Radiological control audits were aggressive in identifying deficiencies. Additional management attention was noted in root cause analysis and corrective actions, however, longstanding problems were not always recognized and corrected.

Overview

Performance ratings assigned for the last rating period and the current period are shown below.

<u>Functional Area</u>	<u>Rating Last Period</u> <u>10/1/88 - 9/30/89</u>	<u>Rating This Period</u> <u>10/1/89 - 9/30/90</u>
Plant Operations	2	2
Radiological Controls	2 (Improving)	1
Maintenance/Surveillance	1	2
Emergency Preparedness	2	3 (Improving)
Security and Safeguards	2 (Declining)	3
Engineering/Technical Support	2	2
Safety Assessment/ Quality Verification	2	2

III. CRITERIA

The evaluation criteria which were used to assess each functional area are described in detail in NRC Manual Chapter MC-0516, which can be found in the Public Document Room files. Therefore, these criteria are not repeated here, but will be presented in detail at the public meeting to be held with licensee management. However, the NRC is not limited to these criteria and others may have been used, where appropriate.

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

This functional area addressed the control and performance of activities directly related to operating the facility (including fire protection).

Overall, operational performance during the assessment period was adequate. Licensed and non-licensed operators displayed competence in performing their duties. Normal shift staffing levels exceeded TS requirements. However, past attrition of licensed operators prevented the licensee from attaining their goal of assigning extra personnel to shift coverage. In response, early in this SALP period, the licensee instituted a cash incentive program to promote licensed operator retention. While attrition during the past year has been low, whether this incentive program has resulted in a long term correction has yet to be determined.

Operators continued to display a professional attitude toward their responsibilities while maintaining a good control room demeanor. They were attentive to annunciators and knowledgeable of changing plant conditions. Turnover checklists were thorough and detailed. Shift crew briefings were adequate and provided necessary plant status for the oncoming crew. During the assessment period, Reactor Operators adopted the use of a twelve-hour shift schedule, resulting in improved continuity, fewer shift turnovers, and better implementation of the team concept. Control room log book entries were legible and accurately reflected plant status. An exception to good log keeping was identified with EDG start failures. Numerous EDG start failures were not considered to be valid and were, therefore, not appropriately logged. Proper logging of the EDG response could have led to an earlier recognition of the EDG air start valve problem discussed in Section IV.G.

The most significant operational event of the assessment period occurred on March 20, 1990, when Unit 1 experienced a loss of all safety (vital) ac power. In response to this event, an Augmented Inspection Team (AIT) was dispatched to the site on March 21, 1990. This inspection effort was subsequently upgraded to an Incident Investigation Team (IIT) which culminated in the issuance of NUREG-1410.

Overall, the plant staff's response to the event was successful in minimizing the threat to public health and safety. Aggressive actions were taken to re-establish shutdown cooling and containment integrity. Both short-term and long-term alternatives were pursued by the plant staff in trying to restore vital electrical power. However, numerous shortcomings were identified during the event. No procedures existed to assist the staff in re-establishing vital ac power from potential sources such as the non-vital buses, or Unit 2. Long-standing deficiencies in the protective trip system for the EDGs were discovered. Application of effective risk management

in the licensee's outage management philosophy was brought into question (Section IV.F). The ability of the licensee to accurately reconstruct the details of the event and to communicate these details and other information to the Commission was poor.

During this assessment period, one incident occurred in which operations personnel made decisions and took actions without sufficient support or input from either the applicable onsite or offsite organizations. This incident occurred during the Unit 1 refueling startup when shutdown bank E dropped to zero steps from a withdrawn position. Operations performed trouble-shooting activities and resumed the control bank worth measurements without obtaining any technical input from other plant groups for establishing proper procedural controls.

During the last two SALP periods, problems were identified within the Operations area concerning attention to detail. These problems have continued as exemplified by decisions to make a Mode change while in an LCO Action Statement, and by the removal of both trains of Containment Spray from service during a Mode which required one train to be operable.

Operations management continued to have an active involvement in daily plant operations. Daily operations status meetings were attended by both site and corporate management. This has promoted open discussions between all department managers concerning plant status. A general area of concern throughout this SALP period has been communications between management and the NRC. These communication channels have recently improved as was evidenced by an increase in licensee management interface with the resident inspectors on information regarding potential regulatory issues and maintenance problems. An additional example of management involvement has been the Management Observation Program. This program, which includes mandatory field observations by all levels of plant managers, has provided a formal means for management to evaluate plant activities.

During a Unit 1 walkdown conducted by an NRC inspector, several valves were identified as missing their label tags. This was the result of plant personnel failing to initiate actions to replace the tags in accordance with plant procedures. The licensee is currently conducting a retagging effort to resolve these discrepancies in Unit 1, scheduled to be completed in 1991. Labeling in Unit 2 was observed to be adequate. Based on inspector walkdowns, housekeeping was determined to be satisfactory.

During this assessment period, Unit 1 experienced four unplanned reactor trips. Two were manually actuated and two were automatically actuated. Two of these trips were caused by personnel error when personnel working on or near sensitive equipment initiated actions which subsequently caused the reactor trips. The other two trips were caused by electrical equipment malfunctions which in one case resulted in the loss of control power to both main feedwater pumps and in the other case caused a Main Steam Isolation Valve (MSIV) to fail closed.

Unit 2 experienced seven unplanned reactor trips during this assessment period. Three of the unplanned trips were manually actuated and four were automatically actuated. Four of the seven trips were partially caused by personnel error and included: (1) using improper techniques while valving in 'A' Heater Drain Tank high level dump valve following maintenance, (2) failing to maintain proper steam generator level while awaiting main turbine roll, (3) incorrectly aligning the 'B' heater drain tank high level dump valve during maintenance, and (4) incorrectly setting the tap for the variable ratio current transformers located on the generator main output breakers. The remaining three trips were caused by equipment failures and included: (1) an MSIV closure due to a non-isolable hydraulic fluid leak, (2) a dropped control rod due to failure of a diode on a rod gripper control card, and (3) an MSIV closure due to the failure of a seal-in relay.

The licensee's evaluation of each trip and the resulting corrective actions to prevent recurrence has shown mixed success. The total number of unplanned trips has not significantly decreased from the previous assessment period (ten to eleven), and trips related to personnel error have increased from three to six.

A detailed review of Emergency Operating Procedures (EOP) was conducted by the NRC during this assessment period. The EOPs were adequate to cover the broad range of accidents and equipment failures necessary for the safe shutdown of the plant. Accident mitigation strategies were, generally, in accordance with guidelines. Procedural steps had been appropriately modified to improve human factors, comply with the writer's guide, and incorporate unique plant configurations. The licensee had applied a single writer's guide to EOPs and AOPs resulting in improved procedural consistency. Weaknesses included an inadequate engineering evaluation of an emergency response guideline which had not been included in the EOPs, technical deficiencies and a lack of detail in the EOPs and Abnormal Operating Procedures (AOPs), inadequate step deviation documentation, and weak administrative controls for verification and validation. The licensee is committed to correcting these weaknesses in an expeditious manner.

The licensee's fire protection activities have improved during the assessment period. Fire team members responded quickly and appropriately during observed drills. Additional plant staff participated in the drills to assist the fire team in staging support equipment. A fire drill scenario was developed which permitted the actual charging and discharging of fire hoses. This scenario provided realistic training in fire hose handling techniques which is an improvement over prior practices.

Three violations were cited.

2. Performance Rating

Category: 2

3. Recommendations

The Board had great difficulty in determining the final performance rating for the plant in this functional area.

During the rating period, it was noted that there were numerous instances when activities were pursued without interactive communications having been established between the various cognizant groups at the plant. Attention to detail continued to be a problem and contributed to several operational occurrences. Finally, plant configurations were established which, when combined with operational events, resulted in situations which aggravated plant responses and allowed the plant's engineering safety features to be challenged.

The Board concluded that the proper characterization of this area was a Category 2; however, inspection effort should remain high and the licensee needs to improve performance throughout those areas which impact plant operational activities.

B. Radiological Controls

1. Analysis

This functional area addressed those activities directly related to radiological controls and primary/secondary chemistry control, reviewed during routine inspections conducted throughout this assessment period.

The licensee's radiation protection staff was well qualified and had the expertise necessary to implement effective programs. Staffing levels, including Health Physics (HP), Radwaste, Chemistry, and Transportation staffs were proper to support routine and outage operations. During the Unit 1 second

refueling outage (1R2), the licensee had to authorize several overtime requests to support the outage. To preclude this increased overtime from recurring, the licensee increased the contract HP Technician staff to support the Unit 2 first refueling outage (2R1). In addition, the licensee made better use of the HP staff during 2R1, including use of more roving HP technicians in containment. The training programs for HP technicians and General Employee Training in radiation protection were well defined and effectively implemented.

The licensee's program for maintaining occupational exposures as low as reasonably achievable (ALARA) was effective, mainly due to effective control of source terms. During this assessment period, the licensee's collective radiation dose was approximately 166 Rem. This was an increase from the previous assessment period, but was expected due to two refueling outages in 1990 and an increase in work scope for 1R2. Licensee management continues to establish aggressive collective dose goals and closely monitors performance toward these goals. This performance reflects a strong management commitment to ALARA.

During the assessment period, there was a significant decrease in personnel contamination events (PCEs). The licensee experienced 123 PCEs during the assessment period, which was well within the licensee's goal of 223 PCEs. The decrease was partly attributable to the relatively low number of contaminated work areas.

As indicated above, licensee management was effective in minimizing the contaminated areas of the plant. During this assessment period, the average area of the plant controlled as contaminated was 3,583 square feet, or less than one percent of the total plant area. This was a decrease from the previous assessment period, in which the licensee maintained an average of 4,297 square feet of the plant controlled as contaminated. The decrease in contaminated square footage resulted from a more aggressive decontamination effort, an increase in the number of decontamination personnel, and the implementation of the catch basin leak containment program.

There is effective coordination and cooperation between the HP group and other organizations. The HP group actively participates in the Plan of the Day meetings.

The licensee's program to control and quantify radioactive effluents was implemented effectively. Liquid and gaseous effluents from July 1989 to June 1990 were within the dose limits specified by TS and within the radioactivity concentrations specified in 10 CFR Part 20, Appendix B. Gaseous releases for the first half of 1990 had decreased slightly as compared to the last half of 1989. The waste gas system had

been constructed for essentially zero waste gas decay tank releases and the plant's gaseous releases were typically confined to containment vents and purges. Liquid fission and activation products for the first half of 1990 increased as compared to the last half of 1989. This increase was attributed to 1R2, and to the absence of refueling outages during the last half of 1989.

There were no unplanned or accidental releases during the assessment period, and no TS required liquid or gaseous effluent monitoring instrumentation inoperable for greater than 30 days during this time period. The maximum doses to an individual member of the public due to their activities inside the site boundary during the first half 1990 were consistent with formerly reported doses in the previous semiannual effluent report, and well within regulatory requirements.

As noted in the previous SALP report and again during this assessment period, the licensee's program to reduce the number of out-of-service (OOS) channels in the process and effluent monitors remains effective. The number of OOS channels did not increase over the average 1989 values and TS required monitors received priority attention to prevent extended LCO requirements.

Primary and secondary chemistry parameters were maintained within TS requirements and Electric Power Research Institute (EPRI)/Steam Generator Owners Group (SGOG) guidelines. The facility maintained very low dose equivalent iodine values for both units which indicated good fuel integrity.

The licensee continued to have operability problems with the Post Accident Sampling Systems (PASS) on both units. These operability problems included online monitors, system valves, and sample mixing within the system. Earlier in 1990, the licensee determined the causes and took corrective actions for problems associated with inconsistent automatic dilution of liquid samples and with low hydrogen results as compared to routine reactor coolant analyses. Although progress was made in these specific problem areas, overall system operability was not consistently maintained. This system is very complex and requires extensive technical effort to correct component failures. Consequently, the licensee has agreed to implement a program, with milestone dates, to improve overall PASS reliability.

The licensee's environmental laboratory demonstrated the ability to accurately measure radioactivity in the environment. The laboratory experienced little personnel turnover and the current staff appeared knowledgeable in their various areas. The personnel involved in sample collection were well trained and

knowledgeable of sampling procedures and TS requirements for environmental monitoring. Analytical procedures were complete with sufficient detail. Furthermore, the laboratory performed well in the Environmental Protection Agency crosscheck program.

No violations were cited.

2. Performance Rating

Category: 1

3. Recommendations

None

C. Maintenance/Surveillance

1. Analysis

During this assessment period, NRC inspections were conducted in the area of maintenance, surveillance, and refueling activities. The inspections included a review of the administrative controls, the technical adequacy of the procedures, and the implementation of the Maintenance and Surveillance Programs. Activities inspected also included corrective maintenance, preventive maintenance, predictive maintenance, equipment control, equipment status tracking, functional testing, containment tendon surveillance, snubber testing program, and housekeeping.

Staffing of the maintenance department was sufficient to accomplish maintenance activities. Training and qualifications of personnel at all levels was acceptable. Management and supervisory ranks continued to remain stable. Staffing levels were continuously being reviewed to ensure an appropriate mix of craft personnel. Contract craft personnel were replaced as maintenance personnel complete the accredited training program.

The licensee was effective in identifying and correcting programmatic weaknesses in the maintenance area. During the past year, the maintenance engineering group issued a welding manual which replaced several implementing procedures. In November of 1989, the maintenance department revised the Maintenance Work Order (MWO) program. The new program utilizes a Work Request Tag (WRT). Operations submits the WRT to Work Planning which subsequently converts the WRT tag to a MWO which includes the WRT number. With this new system, personnel in the field can now readily identify both the problem and MWO by utilizing the WRT cross reference.

The maintenance department lessons learned program (outage and non-outage) continued to play an active role in promoting a safe and efficient working environment. Information gained was utilized in several areas, such as shift scheduling for supervisors, foreman and craftsman, establishing effective communications at all levels of the department, and routine problem areas. To reduce problems that developed in performing routine tasks, the maintenance department set up a pilot program to perform a self-assessment of the department. Identified problems were resolved and documented. The maintenance department intends to implement this program fully following 2R1. The outage lessons learned program has helped to improve Vogtle's maintenance performed during the outage. Examples of implemented improvements included equipment hatch lifting techniques, containment communications, and establishing a maintenance point-of-contact and a tool shop inside containment.

During the previous assessment period, planned and corrective maintenance backlogs were significantly reduced. Maintenance backlog continued to decrease by approximately 10 percent during this assessment period. Work orders on hold or having a restraint were noted and expedited. Vogtle's safety system outage program had previously been recognized as being effective in minimizing the time components and systems were OOS, in reducing the work scope of refueling outages, in reducing the overall number of clearances, and in reducing the backlog of both corrective and preventive maintenance. However, a shortcoming in the implementation of this program was identified during this assessment period. Phase II of the snubber reduction program resulted in the initiation of safety system outages (e.g., Residual Heat Removal (RHR) and Nuclear Service Cooling Water (NSCW) systems) solely for the purpose of replacing snubbers with struts. Initiating outages for this unique purpose, not integrating maintenance, surveillance, and modification activities, detracted from previous accomplishments of the safety system outage philosophy.

In January 1990, a major coatings upgrade program was implemented. The material condition of plant components and structures is being greatly improved with this program. To accomplish the goals of the program, an integrated schedule through December 1992 has been developed. However, a lack of adequate administrative controls for evaluating and monitoring painting activities within the plant resulted in an inoperable EDG on June 19, 1990. The painter's standard practice of taping stainless steel and moving parts of equipment resulted in the EDG fuel racks being taped in the shutdown position. The painters were not cautioned to be aware of the fuel racks, were

not aware that the EDG had to remain available for emergency starts, and did not recognize (on a walkdown) that the operability of the diesel could be affected. In an effort to mitigate any further occurrences of this nature, an interim painting walkdown checklist has been developed to ensure operability concerns are identified and addressed prior to application.

Several changes and improvements have been implemented in the predictive maintenance program in the past year. Miscellaneous equipment not included in the normal predictive scope now receives vibration and lubrication condition monitoring on a routine basis through the use of area predictive tasks. A corporate task force developed an infrared thermography program. Two thermographic surveys at the Vogtle site detected anomalies such as condenser air inleakage, overheating conductors, and overheating of the Unit 1 Isophase Bus Duct.

Programmatic weaknesses in preventive and corrective maintenance continued to be highlighted by both corporate and site management. The preventive maintenance program has been completely revised from the previous cumbersome and regimented approach to a reliability centered program. The effort was to build a preventive maintenance program that would be based on reliability centered maintenance techniques as defined by EPRI and the Institute for Nuclear Power Operations (INPO) but without an expansive use of contractors or a loss of expertise used in establishing the existing program. Effective prioritization has allowed work activities to be accomplished consistent with manpower availability.

A program was initiated this past year to modify valves in the plant to accept live load packing to reduce leakage and improve material condition. During 1R2 a total of 16 valves, primarily in the secondary plant, were modified. Approximately 60 valves will be modified during 2R1. After 2R1, additional valves for live load packing will then be identified.

During the SALP period, the licensee continued the snubber reduction program initiated to reduce maintenance activities and exposure workers received when performing surveillance activities. Phase I, completed during 1R2, involved the removal of 75 snubbers and 19 support modifications in the Main Steam, Containment Spray and the Auxiliary Feedwater systems. Phase II, started during this assessment period, addressed all of the systems with snubbers outside containment. Thus far, 176 snubbers have been removed and 83 supports modified.

During the previous assessment period, isolated instances of missed surveillances were noted. While fewer TS surveillances have been missed during this SALP period, this continues to be a weakness at Vogtle. Five surveillances were noted to be incomplete or inadequately performed prior to the due date and two were not performed at all by their due date. These problems were attributed to misleading task sheets, personnel error, and procedural inadequacy. Once discovered, the licensee promptly performed the surveillances. The licensee is transferring the surveillance tracking program to the site main-frame computer, to improve reliability and to provide all site personnel with access to the information.

The implementation of the Inservice Inspection (ISI) program was reviewed during the assessment period. ISI personnel were cognizant of examination requirements and well qualified. Procedures were sufficiently defined and available to personnel during examinations. Planning of testing activities and tracking of results indicated management involvement in the ISI program. During 1R2, the major Inservice Inspection (ISI) work performed consisted of Eddy Current testing on all steam generators. These exams resulted in the plugging of 4 tubes, 3 of which were discretionary. This reflects a conservative approach to steam generator tube plugging.

During the assessment period, maintenance activities contributed to four unplanned reactor trips: (1) Unit 1 trip when maintenance workers accidentally shut off the control air to a MCIV causing the valve to close; (2) A Unit 1 trip when the MSIV control fuses failed after a jumper was installed per procedure; (3) A heater drain tank level control valve reassembly error led to a high level in the moisture separator reheater and Unit 2 trip; (4) A Unit 2 trip after packing replacement of the heater drain tank level control valve. These trips are further discussed in Section V.H. In response, the licensee has incorporated into the Plan Of the Day (POD) an evaluation of the potential trip hazards that should mitigate any further trips of this nature.

Three violations were cited.

2. Performance Rating

Category: 2

3. Recommendations

The Board noted that there has been improvement in numerous areas within the predictive and corrective maintenance programs. However, the Board also noted that the timely and comprehensive

completion of surveillances was a continuing problem. Even more significant, maintenance/surveillance activities were direct contributors to four reactor trips during this period. The Board concluded that the appropriate characterization of performance over the entire SALP period was a Category 2.

D. Emergency Preparedness

1. Analysis

This functional area included the evaluation of activities related to the implementation of the Emergency Plan and procedures, the support and training of onsite and offsite emergency response organizations, and the licensee's performance during emergency exercises and actual events. Performance was also evaluated in the areas of and interactions between onsite and offsite emergency response organizations. During the assessment period, inspectors conducted one routine inspection, and one exercise evaluation inspection.

The loss of Unit 1 vital ac power event on March 20, 1990, resulted in a Site Area Emergency (SAE) declaration. Additionally, a Notification of Unusual Event was declared for a TS required shutdown during this SALP period. Two Emergency Plan changes have been submitted and were being reviewed at the end of the SALP period.

The emergency response facilities were maintained in an acceptable state of readiness. One exception to this was that procedures in several facilities were not maintained current. Staffing levels and response facilities were demonstrated to be sufficient during the August 1, 1990 exercise.

During the March 20, 1990 event, notification of Burke County and the Georgia Emergency Management Agency Operations Center was not accomplished until approximately one hour after the SAE was declared. This failure to make the required timely notifications resulted from the loss of the Emergency Notification Network (ENN) in the Control Room, due to the loss of vital ac power, and the fact that the backup ENN was not designed to reach the Georgia emergency agencies. Training and procedural deficiencies also contributed to the delay. This failure to make the required timely notification resulted in a Severity Level II violation and a civil penalty (\$40,000).

The classification of the event as an SAE was deemed appropriate, even though the classification procedure was ambiguous and lacked sufficient site specific detail. During the previous assessment period, a loss of command and control was noted during the performance of the emergency exercise. Command and control problems within the site's emergency

response organization were again highlighted during the March 20 event. During the event, the operation shift superintendent decided not to include a portion of the site announcement that would have instructed nonessential personnel to leave the protected area. The licensee's site evacuation procedures also did not provide adequate direction in this area, which led to some confusion among site personnel and resulted in an accountability problem.

The licensee's root cause analysis of the March 20, 1990, event resulted in the following extensive corrective actions: (1) The Primary Emergency Notification (ENN) power capability has been changed to include battery backup and personnel have been trained on power supplies; (2) The Backup ENN has been expanded to reach all outside agencies. Communicators have been trained that both Primary and Backup ENNs reach all agencies; (3) A simultaneous notification process was implemented through the installation of a multipath fax machine; (4) ENN testing by communicators is to begin immediately after emergency declaration, and communicators have been trained to promptly inform the Emergency Director of failure to contact any agency; (5) Emergency Director will initiate emergency notifications immediately after classification and focus on initial notification functions. Georgia agencies have been given increased notification priority.

The licensee implemented its required audit program, but corrective actions were not always timely. The licensee's audit of the emergency program in July 1990, identified telephone directories used by field monitoring teams that were out-of-date and procedures in Emergency Response Facilities (ERFs) that were not the current revisions. Subsequent NRC review of the Emergency Plan and its Implementing Procedures in the ERFs found multiple examples of maintenance and distribution problems. A violation was issued for failure to distribute and maintain current Emergency Plan and Emergency Plan Implementing Procedures.

The annual exercise, which used the Control Room simulator, was conducted on August 1, 1990. The exercise demonstrated that the licensee had the capability to implement the Emergency Plan and Implementing Procedures. The exercise was a full scale participation exercise with the State of Georgia and Savannah River Site participating from their Technical Support Center (TSC) and Emergency Operating Facility (EOF), and included field monitoring teams. The scenario was detailed and fully exercised the response organizations. The ERFs were activated fully within the required activation times. Site assembly and

accountability were timely. Classifications were correct and timely by procedure. Notifications were timely, complete, and the licensee followed up the verbal notification using the newly installed multipath fax machine. The exercise critique was thorough and substantive findings were documented for review and correction. No exercise weaknesses were identified.

Two violations were cited.

2. Performance Rating

Category: 3

Trend: Improving

3. Recommendations

It was noted that significant improvements in the emergency response organization and facilities have been made since the March 20, 1990, loss of vital ac power event. The upgrades to and additions of emergency equipment exceed regulatory requirements in many areas.

While licensee performance during the annual drill demonstrated an ability to effectively implement the Emergency Plan Implementing Procedures, the performance deficiencies which occurred during the actual Site Area Emergency are pre-eminent in establishing the evaluation for the SALP period. The Board concluded that a Category 3 rating was most descriptive of performance. An improving trend recognized the utility's corrective actions and subsequent improved performance.

E. Security and Safeguards

1. Analysis

The adequacy of the security force to provide protection for the station's vital systems and equipment was evaluated for this functional area. The evaluation included a Regulatory Effectiveness Review during this assessment period. To determine the adequacy of the protection provided, specific attention was given to the identification and resolution of technical issues, enforcement history, staffing, effectiveness of training, and staff qualifications. The scope of this assessment also included all licensee activities associated with access control, physical barriers, detection and assessment, armed response, alarm stations, power supply, communications, and compensatory measures for degraded security systems and equipment.

The licensee continues to experience difficulties in the control and protection of safeguards information. This was determined to be a programmatic problem, and resulted in a civil penalty (\$7,500) issued February 2, 1990. This followed several instances of licensee identified and reported failures to provide adequate protection for safeguards material. As a result of inadequate corrective action and a subsequent licensee-identified and reported instance of failure to adequately secure safeguards material, a second civil penalty (\$50,000) was issued June 27, 1990. The licensee has since reported the occurrence of another instance in which safeguards material was left unsecured.

Since the last assessment period, improvement was noted in the areas of training, armed response capability, weapons, and search equipment. However, the licensee has been slow to implement necessary actions to resolve weaknesses in perimeter alarm assessment capability that have been repeatedly identified by the NRC. Testing and evaluations revealed some deterioration in the functional adequacy of the security computers related to call-up time for the assessment of alarms.

During the assessment period, security force management and shift staffing levels were maintained at an acceptable level. Sufficient security personnel were available to meet compensatory posting requirements without excessive overtime expenditures.

The licensee submitted seven changes to its security plans during this SALP period. Of the seven, one change was not consistent with the provisions of 10 CFR 50.54(p). The licensee was responsive to the NRC's concerns regarding the inconsistent change. Overall, the plan revisions were properly documented.

During the assessment period, improvement in the effectiveness of firearms training and qualification was noted, and the routine use of compensatory measures for degraded or inoperative security systems and equipment was reduced. The licensee's construction and equipping of a secondary access portal with "state of the art" detection equipment is noteworthy.

The onsite review of safeguards events indicated proper licensee identification and reporting.

The Regulatory Effectiveness Review (RER), conducted in April 1990, did not identify any violations of regulatory requirements or any safeguards vulnerabilities.

Four violations were cited.

2. Performance Rating

Category: 3

3. Recommendations

None

F. Engineering/Technical Support

1. Analysis

The Engineering/Technical Support functional area addressed the adequacy of engineering and technical support for all plant activities including activities associated with plant modifications, technical support provided for operations, maintenance, testing and surveillance, outage management, and licensed operator training.

Engineering and technical support performance effectiveness was inconsistent during the assessment period. Site engineering was routinely involved in plant activities, addressed technical issues, and participated in plant event critique teams and daily plant management meetings. A duty engineer was maintained on-call to provide a 24-hour engineering resource availability. Engineering evaluations were typically comprehensive as demonstrated in the Cold Leg Accumulator metallurgical concerns issue and the HVAC equipment seismic monitoring issue. Engineering's Ten-year Interval ISI Program was detailed and demonstrated a thorough understanding of applicable regulatory and industry guidance.

With minor exceptions, engineering demonstrated effective control over the design change process. The modification to resolve reactor vessel mid-loop level indications initially was unacceptable in that, when installed, the local indication could not be read without difficulty. Additional modification was necessary to correct this human factors deficiency. The program for development of minor design changes was effective with the exception of some 10 CFR 50.59 safety evaluations which were not sufficiently detailed. The design process was adequately monitored by the licensee.

Several NRC identified engineering performance deficiencies were noted during this assessment period. Deficiencies with the legibility of critical drawings were identified in the previous assessment period and again this period. Engineering's final corrective actions were thorough. Upon identification of this deficiency, the engineering department immediately reviewed and corrected all critical drawings. The long term corrective

action was the initiation of a computer aided drawing system for drawing updates to resolve legibility problems. A second engineering deficiency involved the check valve testing portion of the Inservice Testing (IST) program, where the established criteria for flow verification were inadequate. This weakness indicated the licensee's review of Generic Letter 89-04 was not thorough. Corrective actions included revision of implementing procedures for check valve testing, and an additional review of the Generic Letter positions. A final example of an engineering deficiency involved the technical content of the licensee's resolution to the surge line stratification issue (NRC Bulletin 88-11). Engineering did not identify the potential significance of the difference between the assumed line analysis temperature and the actual measured plant temperature.

During the assessment period, a practice was identified in which a generic procedure was used to calibrate CALCON pneumatic temperature sensors. The procedure did not establish either consistency or repeatability in the calibration process. Failure of CALCON temperature switches has been a recurring problem with the EDG protective trip system, as identified by the IIT. Since the March 20 event, the analysis concerning CALCON switch characteristics has been detailed and effective. EDG reliability has been increased with the isolation of the jacket water temperature signal from the emergency trip system. Isolation of this signal prevents spurious EDG failures stemming from jacket water temperature sensor failure.

Outage management was also noted by the IIT as an area of performance shortcomings. Plant configurations and conditions were allowed to exist during 1R2 that resulted in an unnecessary reduction in safety margin which led to the March 20 event. By planning, scheduling, and conducting outage activities based on the relative risk, the potential loss of the RHR system could have been limited without having a negative impact on the outage duration. Rather than doing this, outage management relied on its TS which contain few requirements for cold shutdown. Electrical power sources were at minimal levels while in mid-loop conditions. Equipment was staged such that the containment equipment hatch could not be closed in a timely manner. Portable equipment refueling procedures were not implemented so as to defend against potential accidents.

Improvements in outage management subsequently occurred following the March 20, 1990 event. These improvements included an increase in the number of available electrical sources used to power Class 1-E emergency buses during periods of Reactor Coolant System (RCS) reduced inventory, conducting an extra drain down of the RCS to midloop during the defueled window to allow for maintenance of RCS valves, providing a monitoring capability for RHR pump cavitation, developing of an electronic

transfer of data between the scheduling program and the work order database, and providing a method for closing the containment equipment hatch during loss of all power conditions. Furthermore, the sequence for performing the Engineered Safety Features Actuation System (ESFAS) testing and associated EDG inspections has been moved to the beginning of the outage to include as much safety equipment testing as possible.

An additional area of concern identified during this SALP period was the inadequacy of communications between the various technical departments supporting the plant. The March 20 event displayed this inadequacy in three ways - the use of incore thermocouples by the operating staff which were not indicative of core conditions, the discovery of a construction error on the Unit 2 main turbine differential overcurrent relay setting, and the inability to close the Unit 1 containment equipment hatch as required. This was further exemplified by the NRC identified condition where containment integrity was not maintained during hydrogen analyzer testing. In all three cases, lack of effective interdepartmental exchanges of information were contributing factors to these problems. However, there were instances of effective interdepartmental cooperation. An example was ESFAS testing, where site engineering's involvement in daily management meetings helped enhance communications and allowed the test to be conducted effectively.

During the last assessment period, communications between the corporate engineering staff and the NRC displayed some weaknesses. Since that time, communications have been good. This was demonstrated in the licensee's interface with the NRC on technical issues, including the surge line stratification and the Ten-year Interval ISI Program.

A strong licensed operator training program was demonstrated by the initial and requalification examination results. Initial examinations were administered to 16 Senior Reactor Operators (SROs) with 16 SROs passing. The requalification training program was rated as satisfactory based on a 94 percent pass rate. Six of 6 Reactor Operators (ROs), 10 of 11 SROs, and 4 of 4 crews passed requalification examinations. The simulator was upgraded to resolve modeling deficiencies identified in the previous assessment period. The simulator was on schedule for certification in late 1990.

The actions of the operators during the March 20 event also demonstrated the adequacy of the training program. Core exit thermocouple and water level indications were closely monitored so that core conditions could be evaluated. EOPs and AOPs were effectively used. However, some training deficiencies were

identified such as the identification of the cause of the EDG trips and the local operation of the sequencer. In addition, licensed and non-licensed operators and the plant engineers did not understand the operation of all EDG systems under abnormal conditions.

No violations were cited.

2. Performance Rating

Category: 2

3. Recommendations

None

G. Safety Assessment/Quality Verification

1. Analysis

This functional area addressed the licensee implementation of safety policies, activities related to license amendments, exemptions, relief requests, responses to Generic Letters, Bulletins, and Information Notices, resolution of safety issues (10 CFR 50.59 reviews), safety review committee activities and the use of feedback from self-assessment programs and activities. It included the effectiveness of the licensee's quality verification function in identifying and correcting substandard or anomalous performance, in identifying precursors for potential problems, and in monitoring the overall performance of the plant.

The Plant Review Board (PRB), established to advise the General Manager on all matters related to nuclear safety, performed its intended function and carried out its designated responsibilities. One improvement implemented late during the previous assessment period and reviewed this period was the membership in the PRB. The PRB was upgraded such that department managers replaced supervisors as the PRB members. The Assistant General Manager - Plant Operations was appointed as chairman of the PRB. This change was considered a strength.

The Safety Audit and Engineering Review (SAER) group performed audits of the Vogtle quality assurance program and conducted activity oriented evaluations of specific work practices such as control room turnovers, surveillance testing, maintenance testing and refueling outage activities. These activities were effective and resulted in the identification of numerous

significant issues. Issues identified included an invalid American Society of Mechanical Engineers (ASME) Section XI valve stroke time test, a failure to properly calibrate plant computer data points for the primary precision heat balance resulting in an inadequate surveillance, and valid diesel generator failures not being recorded and evaluated as required by plant TS. Each of these issues resulted in a Licensee Event Report (LER) or NRC required special report.

The SAER group manager and site supervisor are licensed SROs. Other SAER personnel have received training in Pressurized Water Reactor (PWR) systems similar to that received by plant engineering personnel. All site auditors are certified lead auditors pursuant to the American National Standards Institute (ANSI) standards. The SAER group also called upon technical experts to assist with selected audits. Staffing of this group is adequate.

Longstanding problems were not always recognized and corrected. One example involved sticking starting air valve pistons on the diesel. On at least five occasions during this assessment period, the diesel generators failed to start on a non-emergency start. The licensee was slow in recognizing that there was a problem with the diesels and determining the cause. The licensee's investigation into the problem finally determined that there was a manufacturing deficiency in the air start system that could allow the starting air valve pistons to stick. As a result of this investigation the manufacturer issued a 10 CFR Part 21 report.

The licensee's corrective action program was seen as a significant programmatic shortcoming in the previous assessment period. Licensee management recognized the identification of root causes and the slow or ineffective implementation of corrective actions as a weakness and focussed attention in this area. Actions in this area included training personnel in root cause analysis, improving guidance in root cause determination and the identification of corrective action, establishing formal interdisciplinary event critique teams and improving the deficiency card program. However, this improvement effort is an ongoing process and has not reached its full potential.

The licensee's self-assessment activities resulted in several licensee identified violations of NRC requirements. This indicated a strong program whose goal was to ensure that appropriate compliance was maintained.

Radiological control audits performed by the onsite Quality Assurance audit organization were generally complete, timely, and thorough. During the last assessment period, the quality of the audits in the area of radioactive waste control was

identified as a weakness. This aspect of the licensee's program improved significantly in that the audits were found to be well planned and contained items of substance relating to the radwaste and transportation programs.

The LERs adequately described all of the major aspects of the reported events, including component or system failures that contributed to the events and the significant corrective actions taken or planned to prevent recurrence. The reports were well written and, generally, provided the reader with enough information to readily understand the events. Previous similar occurrences were referenced as appropriate. The licensee submitted updates to the LERs when needed.

Licensee proposals and responses were generally well prepared, accurate, and thorough. Examples of such responses included the response to Generic Letters 89-13 (Service Water Systems) and 89-08 (Erosion/Corrosion), and Bulletins 89-03 (Shutdown Margin during Refueling) and 88-10 (Molded Case Circuit Breakers). In support of licensing activities, the licensee's submittals concerning technical and safety issues was consistently good. Submittals reflected a clear understanding of the technical and regulatory issues involved, and the approach to the resolution of these issues was consistently conservative. The licensee's assessment of the impact of Generic Letters and Bulletins on the plant resulted in timely responses. The licensee expeditiously processed the TS amendment application to support their waiver of compliance request to manually bypass the EDG high jacket water temperature sensors, and subsequently implemented the plant modification and performed the associated EDG testing in a timely fashion.

Two violations were cited.

2. Performance Rating

Category: 2

3. Recommendations

None

V. SUPPORTING DATA AND SUMMARIES

A. Licensee Activities

During this assessment period, Unit 1 completed a scheduled refueling outage of 56 days duration. This unit experienced a loss of vital ac power on March 20, 1990, while the plant was in cold shutdown as discussed in Section IV.A. Short duration power reductions or forced outages occurred due to repair of a steam leak on a main feedwater

pump, heater drain pump and valve maintenance, and turbine vibration problems.

Unit 2 initiated coastdown on June 14, 1990, in preparation for its first refueling outage. The reactor was manually tripped on September 14, 1990. The planned outage duration of 50 days was extended due to fuel handling machine problems and retaining ring main generator difficulties. Forced outages and reduced power levels were caused by heater drain tank pump and level control problems.

B. Direct Inspection and Review Activities

In addition to the routine inspections performed at the Vogtle facility by the NRC staff, special inspections were conducted as follows:

- March 23 - June 8, 1990; Incident Investigation Team concerning the Unit 1 loss of vital ac power event on March 20, 1990.
- April 9-16, 1990; RER (Physical Security) Inspection
- May 7-18, 1990; Emergency Operating Procedure Inspection
- July 30 - August 3, 1990; Emergency Preparedness Exercise Evaluation
- August 6-17, 1990; Special team inspection of operational safety

C. Management Conferences

December 11, 1989; Enforcement Conference at Region II to discuss protection of safeguards material.

February 26, 1990; Management meeting in Rockville, Maryland, to discuss problems regarding thermal stratification in the pressurizer surge line.

May 22, 1990; Enforcement Conference in Region II to discuss the circumstances of an unsecured safeguards container on April 25, 1990, and accountability and control of safeguards documents.

September 5, 1990; Enforcement Conference in Region II to discuss numerous items identified by the Incident Investigation Team which was chartered in response to the Site Area Emergency event of March 20, 1990.

D. Confirmation of Action Letters

A Confirmation of Action Letter (CAL) was issued March 23, 1990, as a result of the March 20, 1990, SAE event. The licensee agreed to cooperate with the IIT and take actions necessary to support this investigation. The commitments identified in the CAL included the

concurrence of the Regional Administrator prior to Unit 1 power operation, equipment quarantine, preservation of records or damaged equipment, availability of plant personnel for questioning, conduct of separate investigations. The licensee was fully responsive to the CAL issues, and was released from the CAL on July 20, 1990.

E. Review of Licensee Event Reports (LER)

During the assessment period 37 LERs were analyzed. The distribution of these events by cause as determined by the NRC staff was as follows:

<u>Cause</u>	<u>Totals</u>	<u>Unit 1</u>	<u>Unit 2</u>
Component Failure	7	2	5
Design	2	0	2
Construction/Fabrication Installation	1	1	0
Personnel			
- Operating Activity	9	7	2
- Maintenance Activity	5	4	1
- Test/Calibration Activity	9	5	4
- Other	1	1	0
Other	3	1	2
Totals	<u>37</u>	<u>21</u>	<u>16</u>

- Notes:
1. With regard to the area of personnel, the NRC considers lack of procedures, inadequate procedures, and erroneous procedures to be classified as personnel error.
 2. The Other category is comprised of LERs where there was a spurious signal or a totally unknown cause.
 3. Eight LERs were submitted as security and safeguards LERs, and are not included in the above tabulation.
 4. The above information was derived from a review of LERs performed by the NRC staff and may not completely coincide with the licensee's cause assignments.

F. Licensing Activities

In support of licensing activities various communications were maintained with the licensee. These consisted of meetings, telephone and written correspondence. There have been approximately 91 active licensing actions for the Vogtle units during this evaluation period of which 56 were completed. Of these, 23 were license amendments.

G. Enforcement Activity

Functional Area	No. of Deviations and Violations in Each Severity Level (Unit 1/Unit 2)				
	Dev.	V	IV	III	II I
Plant Operations		3/3			
Radiological Controls					
Maintenance/Surveillance		3/3			
Emergency Preparedness		1/1			1/1*
Security		3/2		1/1	
Engineering/Technical Support					
Safety Assessment/Quality Verification			1/2		
TOTAL	0/0		11/11	1/1	1/1

*Issued after the assessment period.

A Severity Level II violation in the area of Emergency Preparedness was issued on October 19, 1990, involving failure to make emergency notifications to state and local authorities within 15 minutes after the declaration of an emergency. (\$40,000 Civil Penalty)

A Severity Level III violation in the area of Security and Safeguards was issued on June 27, 1990, for failure to follow 10 CFR Part 73 and an Administrative Procedure in that a safeguards information storage cabinet containing approximately 140 safeguards information documents, including the site Physical Security and Contingency Plan, was found unsecured and unattended. (\$50,000 Civil Penalty)

A Severity Level IV violation in the area of Security and Safeguards was issued on February 2, 1990, for failure to properly protect and account for documents containing Safeguards Information. (\$7,500 Civil Penalty)

H. Reactor Trips

This summary includes the unscheduled manual and automatic reactor trips that have occurred since the beginning of the SALP period, October 1, 1989.

Unit 1

July 23, 1990 - The unit was manually tripped from 100% power in anticipation of low-low steam generator level. This resulted from an internal fault experienced on a non-1E, 4160-volt to 480-volt transformer which caused a loss of power to the speed control circuitry for the main feedwater pump turbines. This in turn caused a loss of both main feedwater pumps. Steam generator water levels had decreased to 24% (narrow range) when the operator initiated a manual trip.

April 25, 1990 - The unit was manually tripped from 87% power in anticipation of low-low steam generator level. This occurred when local maintenance workers accidentally shut off the control air to a main steam isolation valve (MSIV) causing the valve to close.

January 24, 1990 - An automatic reactor trip from 90% power occurred on low steam generator level caused by fast closure of an MSIV during a partial stroke test. When a jumper was installed in accordance with the test procedure, the MSIV control fuses failed.

October 2, 1989 - An automatic reactor trip from 100% power occurred on low-low steam generator when an MSIV inadvertently closed. The licensee determined that a ground on an MSIV limit switch caused a fuse in the MSIV control circuitry to blow, which in turn resulted in a loss of power to the MSIV solenoid valve and the subsequent closure of the MSIV.

Unit 2

June 30, 1990 - The unit was manually tripped from 18% power in anticipation of decreasing levels in the steam generators due to inadequate feedwater control during low power operation.

June 28, 1990 - The unit was manually tripped from 87% power when an MSIV drifted closed following an O-ring failure and subsequent loss of hydraulic fluid.

May 6, 1990 - An automatic reactor trip from 100% power occurred on low-low steam generator level due the closure of an MSIV. This was the result of a failure in the AX1 relay which energizes both the air supply solenoid and the hydraulic pump solenoid to allow the MSIV to remain open.

March 20, 1990 - An automatic trip from 100% power occurred due to a turbine trip on an electrical fault.

December 2, 1989 - An automatic trip from 100% power followed a turbine trip when a heater drain tank level control valve reassembly error led to a high level in a moisture separator reheater.

November 5, 1989 - The unit was manually tripped from 100% power due to decreasing level in the steam generators after the loss of the "B" main feedwater pump. The licensee was returning the heater drain tank level control valve (high level dump valve to the hotwell) to service after packing replacement. The valve opened for unknown reasons and resulted in lowering main feedwater pump suction pressure. The standby condensate pump failed to start, and subsequently, the "B" main feedwater pump tripped on low suction pressure.

October 11, 1989 - An automatic reactor trip from approximately 58% power occurred on high neutron flux rate when a rod dropped because a diode failed on a rod gripper control card.