ENCLOSURE

SALP BOARD REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBERS

50-424/87-58
50-425/87-40

GEORGIA POWER COMPANY

VOGTLE UNIT 1 AND UNIT 2

OCTOBER 1, 1986 THROUGH SEPTEMBER 30, 1987

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I. INTRODUCTION

The Systematic Assessment of Licensee Performance (SALP) program is an integrated NRC staff effort to collect available observation and data on a periodic basis and to evaluate licensee performance based upon this information. SALP is supplemental to normal regulatory processes used to determine 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 licensee's management to promote quality and safety of plant construction and operation.

An NRC SALP board, composed of the staff members listed below, met on November 18, 1987, to review the collection of performance observations and data to assess licensee performing in accordance with guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the NRC staff's assessment of the licensee's safety performance at Vogtle for the period October 1, 1986 through September 30, 1987.

SALP Board for Vogtle:

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*Attended Unit 2 Session only.

Attendees at SALP Board Meeting:

M. V. Sinkule, Chief, Reactor Projects Section 2C, DRP, RII
R. J. Schepens, Resident Inspector (Construction), Vogtle, DRP, RII
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M. B. Shymlock, Chief, Operational Programs Section, DRS, RII

T. Decker, Chief, Emergency Preparedness Section, (EPS) DRSS, RII
D. R. McGuire, Chief, Physical Security Section, DRSS, RII
R. A. Becker, Operations Engineer, Performance Evaluation Branch, Division of Licensee Performance and Quality Evaluation, NRR
R. Weddington, Senior Radiation Specialist, Facilities Radiation Protection Section, DRSS, RII
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II. CRITERIA

Licensee performance is assessed in selected functional areas depending upon whether the facility was in a construction, preoperational, or operating phase. Each functional area normally represents areas which are significant to nuclear safety and the environment, and which are normal programmatic area. Some functional areas may not be assessed because of little or no licensee activities or lack of meaningful NRC observations. Special areas may be added to highlights significant observations.

One or more of the following evaluations criteria was used to assess each functional area.

A. Management involvement and control in assuring quality
B. Approach to resolution of technical issues from a safety standpoint
C. Responsiveness to NRC initiatives
D. Enforcement history
E. Reporting and analysis of reportable events
F. Staffing (including management)
G. Training effectiveness and qualification

However, the staff is not limited to these criteria and others may have been used where appropriate.

Based upon the NRC staff's assessment, each functional area evaluated is classified into one of three performance categories. The definitions of these performance categories are:

Category 1: Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety or construction quality is being achieved.

Category 2: NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety; licensee resources are adequate and are reasonably effective such that satisfactory performance with respect to operational safety or construction quality is being achieved.

Category 3: Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used such that minimally satisfactory performance with respect to operational safety or construction quality is being achieved.

The functional area being evaluated may have some attributes that would place the evaluation in Category 1, and others that would place it in either Category 2 or 3. The final rating for each functional areas is a composite of the attributes tempered with the judgement of NRC management as to the significance of individual items.

The NRC SALP Board may also include an appraisal of the performance trend of a functional area. This performance trend will only be used when both a definite trend of performance within the evaluation period is discernible and the staff believes that continuation of the trend may result in a change of performance level. The trend, if used, is defined as:

Improving: Licensee performance was determined to be improving near the close of the assessment period.

Declining: Licensee performance was determined to be declining near the close of the assessment period.

III. SUMMARY OF RESULTS

A. Overall Facility Evaluation

During this assessment period, the licensee completed Unit 1 plant construction and preoperational testing on schedule and brought the reactor to 100% power. Major strengths were identified in the areas of maintenance, training and emergency preparedness. Major weaknesses were identified in the areas of plant operations and security, however, improving trends were evident in both areas at the end of the appraisal period.

During this assessment period, construction of Unit 2 progressed from approximately 65 percent complete to 75 percent complete. Major strengths were identified in the areas of soils and foundations, containment, safety-related and major steel supports, piping systems, instrumentation, and supports, safety-related components, auxiliary systems, instrumentation, electrical equipment and cables, and quality programs and administrative controls affecting quality. No major weaknesses were identified. Considerable management involvement in Unit 2 construction activities was evident.

During Unit 1 reactor startup, an unusually high number of reactor trips and engineered safety feature actuations were experienced.

Review of these events revealed that the licensee had not sufficiently implemented corrective actions as a result of industry experience, and sufficient evaluations were not performed to determine root cause. It was also evident that the operations organization was not taking advantage of supporting organizations in evaluation of events. In addition, it became apparent, by the occurrence of certain other events, that the operators and equipment operators were not sufficiently attentive to detail. As a result of these deficiencies, licensee management became involved and rectified these short comings. Specifically several programs and initiatives were instituted by the licensee in direct response to these problems to ensure aggressive, effective and efficient management of the processes that affect the safety and reliability of Unit 1's operation. The corrective programs and changes were organized into four broad categories:

a) Organization enhancements

b) Plant and staff program enhancements

c) Training program enhancements

d) Management overview and assessment of effectiveness.

At the end of the SALP period, it appeared that performance had improved in these areas. Unit 1 had operated seventy-three consecutive days without a reactor trip.

A $50,000 Civil Penalty was issued during this period for inadequate interpretation of the Technical Specifications as it relates to testing of the reactor trip breakers, and residual heat removal system flow requirements.

In the physical security area, the licensee failed to recognize the complexities involved in the installation and establishment of functional operability of an integrated security system, the significance of functional operability of an integrated security system, and the significance of ensuring adequate formal instruction and practical proficiency training for the security force prior to full implementation of the security program. This failure was due primarily to a lack of security expertise at the site but also to some degree at the corporate level. The lack of adequate management involvement and oversight also contributed to the failure. These deficiencies resulted in a $200,000 Civil Penalty. As a result, Georgia Power Company officials implemented a number of positive actions, including: organizational changes; upgrading training programs; retraining of security force; upgrading of procedures; hiring additional security officers; providing additional security expertise; and providing administrative help for each shift. At the end of the period, the licensee had made considerable improvements in the physical security areas.

The maintenance program was considered a major strength because the predictive, as well as the corrective maintenance programs were functioning well. It is recommended, however, that special management attention be applied on a continuing basis, to ensure that plant fluid leaks are keep to a minimum.

Considerable improvements were evident in the training areas from the last SALP. Operator examinations during the period resulted in scores well above the industry average.

Performance in the area of emergency preparedness remained at a high level.

B. Facility Performance Summary

The performance categories for the current and previous SALP period in each functional area as follows:

Functional Area	July 1, 1985 September 30, 1986	October 1, 1986 September 30, 1987
(Operations - Unit 1)*		
A. Plant Operations	2	3 (Improving)
B. Radiological Controls	2	2
C. Maintenance	2	1
D. Surveillance	2	2
E. Fire Protection	2	2
F. Emergency Preparedness	1	1
G. Security	3	3 (Improving)
H. Outages	Not Rated	Not Rated
I. Quality Programs and Administrative Controls Affecting Quality	2	2
J. Licensing Activities	2	2
K. Training and Qualification Effectiveness	2 (declining)	1
L. Preoperational Testing	1	2
M. Startup Testing	2	2

*Note: The Unit 1 Functional Areas Plant Operations, Startup Testing, and Surveillance were rated as a single functional area, namely Operational Readiness, in the July 1, 1985 - September 30, 1986 assessment.

Functional Area		July 1, 1985 September 30, 1986	October 1, 1986 September 30, 1987
(Construction - Unit 2)			
A.	Soils and Foundations	1	1
B.	Containment, Safety Related, and Major Steel Supports	1	1
C.	Piping Systems and Supports	2	1
D.	Safety Related Components	2	1
E.	Auxiliary Systems	2	1
F.	Electrical Equipment and Cables	2	2
G.	Instrumentation	1	1
H.	Quality Programs and Administrative Controls Affecting Quality	1	1
I.	Preoperational Testing	Not Rated	1
J.	Other Licensee Activities	1	Not Rated

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

During this evaluation period, inspections were performed by regional and resident inspectors to verify proper implementation of administrative controls and operations procedures to support the startup of Unit 1.

The licensee was issued a low power license for Unit 1 on January 16, 1987, and completed fuel load on January 28, 1987. Initial criticality was achieved on March 9, 1987. A full power license was subsequently issued on March 16, 1987.

During October, November and December 1986 and January 1987, three special team inspections were conducted to determine operational readiness. In the operations area, the teams audited emergency operations procedures, abnormal operating procedures, annunciator response procedures, unit operating procedures for startup and shutdown, administrative procedures for control room activities and plant administrative instructions. System operating procedures were reviewed and partial system walkdowns were performed for 14 safety-related systems. A number of discrepancies were identified which included inadequate application of independent verification, lack of precautions on maintaining subcooling margin, lack of special triggering mechanisms in unit operating procedures for certain Technical Specification surveillances, inadequate procedure prerequisites, and lack of initial operator actions in certain annunciator response procedures. In some cases, considerable NRC effort was needed to obtain acceptable resolutions. Corrective actions for the discrepancies were reviewed in subsequent inspections and found to be adequate. The inspectors found that, although discrepancies were identified, the operating procedures in the categories reviewed were technically adequate and better than average.

Control room administrative procedures were reviewed to verify that documentation of operations activities was in accordance with administrative control requirements. The inspectors found that routine Technical Specification verification requirements were being performed adequately. It is noted that during initial inspections, areas were identified where administrative controls had not yet been fully implemented for startup and one example of failure to conduct shift turnover properly was discovered. During subsequent inspections, the inspectors noted a marked improvement in this area. Operators monitored control room parameters properly. Documentation reflected awareness of the current status of the plant, and shift turnover requirements

were adequate and understood. The inspectors noted that adequate controls were in place to maintain access to the control room in an orderly manner and surveillance of the control boards was adequate.

After licensing, routine, reactive, and 48 hour continuous inspections were performed by the resident and regional staffs. These inspections revealed that operations personnel were generally alert, professional, and attentive to their duties. The transfer of information during shift turnover was comprehensive and included walkdowns of the control boards. However, during the day shift, on numerous occasions, the control room became congested and noisy. Occasionally, the number of personnel within the control room was not limited and contributed to a high noise level. Telephones and public address announcements sounded in the control room almost continuously during the day shift contributing to a high noise level. Several instances occurred where control room operators were not aware of maintenance being performed in the plant until alarms in the control room were generated. Other instances occurred where the operators were not interpreting Technical Specifications correctly. The number of problems have been reduced due to the corrective actions which stemmed from plant management involvement in the large number of reactor trips and Engineered Safety Features (ESF) system actuations which occurred during this time.

Plant housekeeping has improved since licensing as plant area turnovers were completed and minimal construction activity was present. In preparation for the Institute of Nuclear Power Operations (INPO) evaluation, management directed that increased efforts be applied regarding the overall material conditions, and designated one manager to improve the situation. The program improved plant housekeeping in general and corrected weaknesses regarding inplant storage of material.

An assessment of reactor trips during the SALP period shows a significant number of unplanned reactor trips. A total of 25 unplanned reactor trips occurred between March 19 and July 28, 1987. Fourteen of these trips were due to low steam generator level. This was indicative of a lack of operating experience by the operations staff and under utilization of onsite engineering support during the early stage of operations and the startup program. The other eleven reactor trips were due to various reasons as follows:

- A reactor trip on overtemperature delta T was caused by a faulty test card.

- Five turbine trips/reactor trips occurred. Two were due to the stator cooling system, one was due to an electrical

storm, one was due to a power load imbalance caused by an Instrumentation and Control (I&C) technician error, and one was believed to be associated with the generator voltage regulator.

- The remaining five reactor trips were due to a high positive startup rate, a source range high flux, two manual trips on Digital Rod Position Indication (DRPI), and a pressurizer pressure indicator failure.

Several of the reactor trips would not have occurred if a more detailed root cause evaluation had been performed. The licensee has realized this as a weakness and instituted a multidisciplined team approach to review the events for root cause determination. In addition, the authorization level for reactor startup following a reactor trip has been elevated procedurally from the Shift Supervisor to the Plant General Manager. In practice, corporate senior management has been involved in authorizing restart of the reactor.

An assessment of plant system lineups showed that there were several examples of valve misalignments identified by the licensee and NRC which resulted in violations d. and g. below and an NRC Enforcement Conference. Those events were caused by the operator's inattention to detail.

Because of the high number of reactor trips and ESF actuations experienced during startup testing and initial commercial operations, GPC management recognized the need for a prompt and comprehensive reevaluation of operating experiences of Unit 1. The initial history of Unit 1 was examined in detail along with concerns expressed during several meetings with the NRC on this subject. As a result, several programs and initiatives were instituted by GPC in direct response to specific problems to ensure aggressive, effective and efficient management of the processes that affect the safety and reliability of Unit 1's operation. The corrective programs and changes were organized into four broad categories: organization enhancements; plant and staff program enhancements; training program enhancements; and management overview and assessment of effectiveness.

The quality of operations at Vogtle appeared to improve during the last nine weeks of the SALP period with Unit 1 completing a continuous 73 day run at power before a planned outage.

Plant licensee management meetings have been initiated which involve all pertinent individuals to ensure quality resolutions from a safety standpoint as soon as problems arise. Senior licensee management has stressed the importance of determining the root cause of the problem, of following plant procedures and identifying deficiencies in the procedures. The effect has been

evident in the recent marked decrease in the number of reactor trips and ESF actuations. The ability to operate the unit for an extended period of time without significant problems or unplanned trips has had a positive impact on personnel morale.

During recent inspections, the inspectors noted that the plant operations staff was both enthusiastic and dedicated, and morale was high.

The following violations were identified:

a. Severity Level III violation of Technical Specifications for failure to declare both trains of the Residual Heat Removal system (RHR) inoperable (50-424/87-31-02).

b. Severity Level III violation of Technical Specifications for failure to place the unit in hot standby when one of the two minimum channels required became inoperable when the "B" reactor trip breaker was bypassed (50-424/87-37-01).

c. Severity Level IV violation for of failure to follow procedures: (1) an independent reviewer failed to identify that acceptance criteria had been exceeded; (2) a technician failed to obtain the proper approval prior to performance of procedure; (3) several techniciars were observed performing maintenance work orders with out a proper procedure; and (4) on-shift supervisor failed to review and initial shift supervisor's log for previous night (50-424/87-01-01).

d. Severity Level IV violation for failure to follow procedures: (1) the diesel generator main fuel oil valve was found locked closed instead of the required locked open position; (2) the steam generator main steam supply valve to turbine driven auxiliary feedwater pump found locked closed instead of the required locked open position (50-424/87-12-01).

e. Severity Level IV violation for failure to provide adequate protection of vital equipment areas (50-424/87-14-01).

f. Severity Level IV violation of operations procedure when the turbine driven auxiliary feedwater pump was found not in standby readiness during control board walkdown. (50-424/87-27-01).

g. Severity Level IV violation for failure to perform independent verification when a letdown mixed bed demineralizer resin recirculation valve was locked open

instead of required locked closed position. (50-424/87-30-03).

h. Severity Level IV violation for failure to follow procedures: (1) the unit was taken critical with the actual rod height greater than the Estimated Critical Condition (ECC) height and the control banks were not inserted as required (2) while performing surveillance, the operator did not perform the required action; and, (3) the demineralized water to backflushable filter system isolation valve was not placed in the required position when the system was restored to service which resulted in contamination of the demineralized water system (50-424/87-37-02).

2. Conclusion

Category: 3

Trend: Improving

3. Recommendations

Continued management attention is required in this area.

B. Radiological and Chemistry Controls

1. Analysis

a. Radiological Controls

During the assessment period, inspections in the areas of health physics, radiological effluents and primary and secondary chemistry were conducted by regional and resident inspector staffs.

The licensee's preparations to support startup testing and plant operation were reviewed during the preoperational and startup phases. The licensee had obtained or established adequate health physics (HP) facilities, equipment and procedures to support the radiation protection program.

However, in regard to staffing, the licensee had only 27 health physics technicians during the startup phase, which was low when compared to other plants of similar size. The licensee had difficulty in providing sufficient technician coverage for startup surveillances and for completing routine tasks. Technicians were authorized to work 72 hour weeks during this period. The reduced staffing level contributed to violation a. below, concerning failure to post a radiation area in the Equipment Storage Room in the

Auxiliary Building. Following the violation, the licensee took action to increase their staffing and, at the end of the assessment period, the licensee was considering a proposed reorganization plan for the Health Physics and Chemistry Department to add approximately 40 professional and technician positions. This increase, was subsequently approved after the assessment period and now provides a staffing level comparable to other facilities of similar size.

Toward the end of the assessment period, the Health Physics and Chemistry Departments were reorganized. The corporate manager of radiation protection was transferred to the site as the manager of the new Health Physics and Chemistry Department. Health physics responsibilities were divided between Health Physics Operations Group and a Support Operations Group, each with a separate manager reporting to the manager of the Health Physics and Chemistry Department. The Chemistry Operations Group Manager similarly reports to the manager of the Health Physics and Chemistry Department. This reorganization of the Health Physics & Chemistry Departments should provide for increased management controls for Health Physics since these duties had previously been performed by a single individual.

The licensee's program for resolution of technical issues was a weakness. The licensee received violation c. below during startup for inadequate shield verification radiation surveys at the 50 percent power level. Survey procedures were developed by licensee personnel who had no previous experience in this area and without consulting any vendor procedures or industry standards such as ANSI/ANS 6.3.1-1980, Program for Testing Radiation Shields in Light Water Reactors. Consequently, the survey was not designed to demonstrate the complete integrity of the radiation shielding, in that vertical shield areas both inside and outside Unit 1 containment were not scanned between base survey points and surveys were not performed of horizontal shield sections within or outside of containment.

Access controls to areas which had the potential for very high radiation levels during operations were inadequately established. Prior to startup, the NRC identified several areas inside containment where very high dose rates could be encountered during power operation, but noted that these areas had no unique access controls, warning devices or signs. These areas included the seal table room and reactor sump area. Improper entries to the reactor sump area at other facilities have resulted in several overexposures and near-overexposures of workers. These

events have been described in three IE Information Notices between 1982 and 1986 (i.e., IEN 82-51, IEN 84-19, and IEN 86-107). After the access control deficiencies were identified the licensee took actions to provide positive access control to the areas. During a subsequent inspection, it was identified that there was no high radiation area lock on the Unit 1 containment personnel access and violation e. below was issued. Containment access could have been gained by anyone with a valid key card without health physics awareness or the required controls while the reactor was at power. Following startup of Unit 1, two I&C technicians and a HP technician entered containment without being informed that the incore detectors were being moved, an evolution which can cause very high radiation levels in some areas of containment. The HP technician detected the increased radiation levels while in the vicinity of the transverse incore probe (TIP) drive units and directed the safe evacuation of the personnel. The licensee's evaluation of this event led to improvements in containment access control, including development of a containment pre-entry checklist.

Because of generic operational problems reported by other licensees during the construction of the liquid radioactive waste processing systems, similar to the Vogtle system, the licensee started plant operation with an alternate liquid radwaste system provided under contract. A contractor was also used to perform the licensee's process control program for solidification and dewatering of solid radioactive waste. These functions were performed in the Alternate Radwaste Building. The licensee had considered spill and exposure control in the design of this facility. Contractor operations were carried out pursuant to NRC topical reports, when applicable, and approved procedures.

Radioactive contamination of the demineralized water system and of the steam generator blowdown system occurred during backflushing a mechanical filtering device to remove accumulated solid material which caused reverse flow of the contaminated solids into the demineralized water header. Early detection of the presence of the contamination and prompt action by licensee personnel to purge the affected systems prevented major contamination of all systems utilizing the demineralized water system; only the steam generator blowdown system of one steam generator was affected. The resultant low-level contaminated water was pumped to the turbine building sumps. Once the contaminated system was returned to normal status, the accumulated water was processed through the demineralizer system in the Alternate Radwaste Building and released to the environment.

The prompt and efficient action on the part of the licensee personnel demonstrated good engineering judgement and close cooperation between operating groups in handling a complex and highly unusual set of circumstances with minimum impact on plant operations and avoided the uncontrolled release of radioactive material.

The gaseous radwaste treatment and monitoring systems were completed and determined to be adequate for power operation. Some problems were experienced with the air cleaning HEPA filters and charcoal adsorber beds; however, after changes and adjustments, testing revealed that the systems were acceptable for operation. Procedures and training of personnel with relation to operation of the above systems were completed prior to power operation. Failure to properly close a valve in accordance with procedures resulted in the inadvertent release to the atmosphere from a waste gas decay tank with the release of the contents of another tank. There was a monitor in the release line that would have alarmed and terminated the release if it had contained a significant amount of radioactivity. This was identified as a violation of the licensee's procedures and is listed below as violation f.

The plant environmental monitoring program and the Radiochemisty Lab were evaluated during the preoperational part of the period and determined to be adequate for power operation.

The licensee has established an effective dosimetry group for monitoring and recording employee exposures. Management support for the HP staff is evidenced by the licensee procuring state-of-the-art exposure control and detection equipment such as a stand-up fast scan whole body counter, electronic dosimeters with computerized dose tracking and whole body frisking machines. The licensee has generally been effective in installing, making operational and using this equipment. However, with regard to whole body frisking units, the licensee was slow to conduct sufficient tests to determine the capabilities and limitations of the devices, which were not effective in surveying certain areas of the body, such as the upper arms, and that supplemental surveys with a hand held frisker would be necessary. In addition, the devices may not be as sensitive in detecting hot particle contamination on individuals as a survey with a hand held frisker probe. The licensee had not performed tests to ensure that the devices were optimally set up to detect these particles. In the later part of the assessment period the licensee began performing additional tests to determine the capabilities and limitations of these devices.

The licensee's exposure goal for the year was 40 person-rem and as of September 1987 the licensee's actual exposure was 10.0 person-rem. This compared very favorably with other plants with similar operating history. The licensee did not ship any radioactive waste to a disposal site during the assessment period. The licensee's waste generation goal for the year was 1942 cubic feet and 706 cubic feet had been generated as of September 1987. The licensee maintained approximately one percent of the plant as a contaminated area which was also their goal. The licensee had an aggressive program to identify an control leakage and minimize the size of contaminated areas.

b. Chemistry

Inspections in the area of plant chemistry were performed before Unit 1 became commercially operational. The licensees chemistry facilities were well designed and contained state-of-the-art equipment. During the pre-operational period, the licensee's ability to control chemistry and prevent corrosion improved with time and experience.

Throughout this SALP period, the licensee spent considerable time and resources in developing the elements of a water chemistry program. Although this effort began tardily, an acceptable program had been established before plant startup began. A key staff position of Chemistry Supervisor had been filled by a qualified licensee staff chemist on a temporary basis, but two permanent appointments had not been made as of the end of the evaluation period; however, all the responsibilities of the Chemistry Department were being performed adequately. Considerable effort was expended to qualify both chemistry technicians and supervisors. All chemistry laboratories were fully operational; however, the chemistry staff was not completely trained on the operation of the inline instrumentation of the secondary chemistry laboratory.

The following violations were identified:

a. Severity Level IV violation for failure to post a radiation area (50-424/87-30-01).

b. Severity Level IV violation for failure to maintain a record of a radiation survey (50-424/87-30-02).

c. Severity Level IV violation for failure to perform adequate startup shield verification surveys (50-424/87-35-01).

d. Severity Level IV violation for failure to adequately document radiological deficiencies and corrective actions (50-424/87-35-02).

e. Severity Level IV violation for failure to provide adequate high radiation area access controls to the Unit 1 containment (50-424/87-52-01).

f. Severity Level IV violation for failure to adhere to procedural requirement which resulted in the inadvertent release of a waste gas decay tank (50-424/87-34-01).

2. Conclusion

Category: 2

3. Recommendations

Although an overall Category 2 rating was assigned to the radiological controls area, licensee performance in the area of in plant radiation protection was relatively weak. Increased licensee attention is needed to improve performance in this area. NRC inspection frequency in the area of in plant radiation protection should be increased to better monitor the licensee's performance.

C. Maintenance

1. Analysis

During the assessment period, resident and regional inspections were conducted in the area of maintenance. Inspections conducted to review operational readiness prior to fuel load involved inspections of the maintenance program and procedures. The inspections included review of the administrative controls for plant maintenance, the technical adequacy of maintenance procedures and the implementation of the maintenance program. Assessments of corrective maintenance, preventive maintenance, equipment control, equipment status tracking, functional testing requirements, special processes, and housekeeping were conducted.

The preventive maintenance procedures reviewed were adequate for unit operation. Review of completed work requests showed no discrepancies; however, this review was limited and most work requests were controlled in accordance with the startup manual. The licensee was implementing a predictive maintenance program including vibration analysis, lube oil analysis, Motor Operated Valve Analysis and Testing System (MOVATS) testing, infrared analysis and trending.

Corrective Maintenance procedures reviewed were easy to understand and used clear instructions, appropriate Quality Control (QC) hold points and provisions for independent verification. A review of vendor manuals indicated that, with the exception of one comment, vendor manual requirements were adequately incorporated in the procedures. A computer aided system to generate maintenance work orders (MWOs) was being implemented. Overall, the corrective maintenance program appeared to provide appropriate administrative controls and accountability to assure the performance of quality work. Few opportunities to observe implementation of the program were available at the time of startup and, although the program was confirmed to have been implemented, no judgement was made on the adequacy of long-term implementation. During field review of implementation, one example of a violation for failure to follow procedure was cited involving the failure to verify that the current revision of approved drawings, procedures and vendor manuals were included in maintenance work orders. This violation is discussed in Section IV.A.1.c of this report.

Subsequent to unit startup, numerous fluid system leaks existed in the plant. Many leaks have been noted on the steam and feedwater systems. Systems which contain boric acid have leaks as noted by the build up of boric acid deposits at either flanges or valve packing glands. Observation over the SALP period has revealed that while some leaks get repaired, either new or the same leaks recur resulting in a relatively constant number of leaks in the plant.

During the assessment period weakness was noted in work packages development relative to the completeness or accuracy (e.g., work packages was issued to repair a motor operated valve operator with the incorrect type actuator repair procedure specified for the valve).

Also, relative to functional test and/or acceptance criteria, it was noted that the functional testing area was weak relative to ensuring that a correct functional test is performed. The Quality Assurance department has been pursuing this matter extensively. Improvement in the functional and acceptance area is recommended to ensure that a correct functional test is performed and the acceptance criteria is quantitative and qualitative.

A review of housekeeping, cleanliness, and control of special processes indicated that procedures were in place to address these areas. One concern on the specification of cleanliness levels was resolved by the licensee.

As of the end of the assessment period the Unit 1 maintenance organization staffing was adequate. In addition, the GPC

maintenance staff was supplemented with onsite labor contractors. The maintenance organization has a current work order backlog which appears adequate for the generation rate versus the closing rate. This backlog of maintenance items is indicative of a good program in the area of equipment problem identification. The maintenance management staff does not prioritize open maintenance work orders based on safety significance. The Instrumentation and Control (I&C) department maintains a status of off normal control room instrument. At the end of the assessment period, there were 17 of these items. This number consists of 11 annunciators, four recorders, and two status lights. This number has been trending down from a high of approximately 60 and the licensee expects to have it down to approximately 10 coming out of the planned maintenance outage. This compares favorable with industry averages. The I&C Department has aggressively pursued identifying and correcting problems in this area.

Management involvement in maintenance programs is evident by the observation of the licensee's implementation of such programs as MOVATS, predictive maintenance, and preventive maintenance (Section XI program). MOVATS testing for the systems identified in IEB 85-03 has been completed. This consisted of 49 valves, of which 22 were tested under dynamic condition. GPC has expanded its scope of MOVATS testing from 49 to a total of 128 valves. This expansion has included all safety-related valves in the Inservice Inspection program, as well as critical balance of plant valves. The predictive maintenance program consists of vibration analysis, lube oil analysis, infrared analysis, and MWO trending. The status to date of the predictive maintenance program is as follows: Baseline data for vibration analysis is approximately 90 percent complete with the exception of the containment spray, safety injection and diesel generator fuel oil transfer pumps; lube oil analysis baseline data is basically complete and setup for surveillance monitoring is in progress; infrared analysis which will mostly be utilized in the switchyard has not yet started; and MWO trending is in the process of starting. The preventive maintenance program input has been completed and an upgrade started in early July to review the entire database. The upgrade review is focusing on mechanical and electrical items. Technical Specification related items are complete. The licensee's Section XI program is fully implemented.

Management involvement is also evidenced by the maintenance organization's timely pursuit of INPO accreditation. To date, the licensee estimates that they are approximately one year from having an INPO accredited maintenance program. The maintenance organization has implemented a bonus program for I&C, mechanical and electrical crafts. The program awards a monetary bonus to

each individual for successfully passing each phase of their training qualifications.

Maintenance activities undertaken were observed to be well organized and planned by the planning department. Maintenance work schedules demonstrated evidence of prior planning and the assignment of priorities by management in mid-March when an unplanned outage was performed due to a dropped rod. The maintenance organization planned and performed the work which required missile shield and seismic restraint removal to repair a stationary gripper coil connecting pin. Maintenance planning for the 1987 fall outage was thorough.

The following violation was identified.

> Severity Level IV violation for failure to prescribe appropriate procedures for performing maintenance on safety-related equipment (MSIV-1HV-3806B)(50-424/87-31-01).

2. Conclusion

Category: 1

3. Recommendations

Open maintenance work orders for items that are important to safety should be prioritized according to safety-significance. This practice should be encouraged for future trending purposes to ensure that items important to safety are getting the appropriate management attention.

D. Surveillance

1. Analysis

During the assessment period, inspections of surveillance activities were performed by the resident and regional inspection staffs. Prior to fuel load, two special team inspections conducted for operational readiness involved the review of the surveillance program and procedures. The inspectors verified the implementation of the surveillance program administrative controls and the adequacy and implementation of surveillance test procedures.

Surveillance procedures were reviewed for eight systems and selected reactor trip and engineered safety features. Although several deficiencies and two examples of a failure to follow procedure were identified, the overall results of the review indicated that the surveillance program was adequately implemented.

During the surveillance test reviews, the inspectors evaluated the applicability of the final draft Technical Specifications (TSs) by reviewing the final draft TSs against the procedures and conducting plant walkdowns and system reviews to assure that the TSs reflected the as-built plant features. Two TSs were identified that did not clearly reflect the plant design, 3/4.6.1.7, Containment Ventilation Systems, and 3/4.7.5, Ultimate Heat Sink. Corrective action was taken by the licensee to resolve these differences.

Various instances were identified where surveillance procedures did not adequately reflect TS requirements. These problems were resolved prior to startup. Two examples of a violation for failure to follow procedure involving the failure to confirm that surveillance test results satisfied acceptance criteria for 18-month battery inspections, and the failure to obtain a QC holdpoint review and written authorization to begin work were identified. This violation is discussed in Section IV.A.1.c of this report. All other completed surveillance packages and the field observation of surveillance activities were found to be adequate with minor comments.

Also during this assessment period the NRC reported their evaluation of the containment integrated leak rate tests. Management involvement and licensee understanding of the technical requirements were adequately demonstrated by the specifications, controls, responsibilities and priority established in the test procedure and by the performance of test personnel. An error in the computer software caused problems in analyzing the data in the early portion of the test. However, when the error was recognized, it was adequately resolved without impact on the test results. The licensee's Quality Assurance (QA) group had already identified computer software as a potential problem area and were in the process of trying to establish criteria for verification of software.

Subsequent to plant operations inspections were conducted which consisted of observing the performance of routine surveillance testing by the various departments and reviewing the completed test data against the acceptance criteria. In general surveillance testing was conducted by personnel who were knowledgeable of the system and/or component being tested and tests were performed without incident. However, there were some events such as ESF actuations and/or reactor trips which occurred during the performance of surveillance testing. Additional problems noted during the SALP period were missed surveillances as identified by LERs (e.g., on at least two different occasions, the waste gas decay tank was not sampled within 24 hours after addition to the tank) and failure to perform required surveillances after maintenance work (e.g.,

local leak rate testing not performed on containment personnel air lock following maintenance).

Additional concerns and activities dealing with surveillance activities are addressed in Section IV.M of this report.

No violations or deviations were identified.

2. Conclusion

Category: 2

3. Recommendations

None

E. Fire Protection

1. Analysis

During this assessment period, inspections were conducted by the resident and regional inspection staff in the areas of the fire protection and fire prevention program, including a review of the implementation of the safe shutdown and related fire protective guidance of Standard Review Plan 9.5.1.

The pre-licensing safe shutdown inspection was conducted near the beginning of this assessment period by a team inspection group. This inspection reviewed the following areas: the Vogtle safe shutdown analysis; a sample of cabling routes and components associated with redundant trains of essential hot shutdown systems to determine the adequacy of separation; associated circuits for shutdown components and associated cables; shutdown circuits fuse and breaker coordination; and emergency shutdown procedures available for use in the event of a fire.

This inspection verified, based on areas reviewed, that the plant design and available fire protection and operational features are sufficient to limit potential fire damage so that one train of the essential systems required to achieve and maintain hot standby for either the control room or emergency control stations would be free from fire damage.

For the operational fire protection program, the licensee has issued procedures for the administrative control of fire hazards within the plant, surveillance and maintenance of the fire protection systems and equipment, and organization and training of the fire brigade. These procedures were reviewed and found to meet the NRC requirements and guidelines, except for the licensee's failure to control smoking within the plant and

correct other adverse plant housekeeping practices as identified in violation a. below. Otherwise, the program was being satisfactorily implemented.

The fire protection extinguishing systems, detection system and fire barriers were found to be operational. Surveillance inspection and tests and maintenance of the fire protection systems and features were satisfactory. The organization and staffing of the plant fire brigade met NRC guidelines. The training and drills for the brigade members met the frequency specified by procedures and NRC guidelines.

A violation, b. below, was identified for failure to adequately implement the fire protection evaluation for maintenance work orders involving removal of fire barrier shields within containment. As a result of this violation, the licensee revised the fire protection work evaluation procedure to more explicitly identify required fire barriers.

In general, the management involvement and control in assuring quality in the fire protection program was adequate due to the issuance of fire protection procedures that met the NRC requirements. The licensee's approach to resolution of technical fire protection issues indicated an understanding of issues. The responsiveness to NRC initiatives was satisfactory. Fire protection related violations did not indicate a programmatic breakdown. Corrective action was timely and effective.

Staffing and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable.

Licensee management was responsive in resolving one concern in this area. Due to the number of alarms generated, management had directed that a fire protection engineer be placed on shift to support the operations crew. In time, the fire protection engineer became independent in responding to the alarms and the shift supervisor was not involved. In part this was due to the high false alarm rate and utility of the fire protection engineer to correct the condition. Two observations were noted to management that when responding to the alarm, the engineer did not take the required radio, nor was the shift supervisor informed.

A second weakness was noted from discussion with the shift supervisor as to why all three fire pumps were inoperable. It was apparent that the shift supervisor was not in control of the equipment status. Management responded by removing the standing order which routinely allowed two pumps to be removed from

service, revised the plant procedure which appeared to allow all three pumps to be removed from service for seven days vice 48 hours and reinstated the shift supervisor as the person in charge of directing the fire response effort. Inspectors noted that the licensee has not updated the appropriate FSAR limiting condition for operation action statements in this area.

The following violations were identified:

a. Severity Level IV violation for failure to implement fire protection procedures (50-424/87-19-03).

b. Severity Level IV violation for failure to properly implement the fire protection evaluation for maintenance work orders involving removal of radiant energy shields for instruments PT-403 and LT-459 (50-424/87-02-02).

2. Conclusion

Category: 2

3. Recommendations

Licensee management attention is warranted in order to further reduce the number of false alarms associated with the fire protection system.

F. Emergency Preparedness

1. Analysis

During the assessment period, inspections were performed by regional and resident staffs. There were five inspections addressing implementation of the Radiological Emergency Plan and Procedures, and review/assessment of licensee corrective actions implemented in response to improvements and incomplete items identified during the Emergency Preparedness Appraisal conducted in March 1986. The Annual Emergency Preparedness Exercise was observed and evaluated by regional and resident staffs. No Emergency Plan revisions were submitted during this period.

The annual emergency preparedness exercise disclosed no adverse findings regarding the licensee's emergency organization and staffing. An adequately staffed corporate emergency response and planning organization routinely provided support to the plant. Key positions in the corporate and plant emergency response organizations were filled. Corporate management continued to demonstrate a strong commitment to maintenance of an effective emergency response program. Corporate management was also directly involved in the 1987 annual emergency preparedness exercise and followup critiques. Consistent with

regional practice, NRC inspectors participated as players during the exercise to ensure that NRC is continuously aware of the postulated emergency and the management thereof.

The licensee continued to effectively respond to NRC initiatives regarding emergency preparedness issues, and promptly implemented adequate corrective actions when required. Management was responsive in resolving an inspector's concern regarding reporting of an event classification. During a review of the operations night order book, the inspector noted that directions were given to the shift to notify the NRC of an Unusual Event after the plant reached cold shutdown. Management review concurred with the inspector that informing the NRC at the end of the event would not meet the reporting requirement and the necessary corrections in the training program as well as changes in emergency plan implementing procedures would be implemented.

During the above referenced exercise, the following essential elements of emergency response were determined to be acceptable: emergency detection and classification, except as discussed below; protective action decisionmaking; notification and communications; dose calculations and assessment; training, except as noted below; public information; coordination with offsite agencies; identification and resolution of weaknesses and required improvements disclosed during exercise, drills, routine and special inspections. Observation and critique of the annual emergency preparedness exercise disclosed that the Emergency Preparedness Plan and Procedures could be effectively implemented by the licensee, although several areas for improvement were observed by the licensee and the NRC. These items are listed below.

- Violation b. below, involving training, namely: failure to provide training to key members of the Emergency Response Organization listed on the licensee's sixty minute call-out list; and failure to maintain trained personnel consistent with the Emergency Plan as demonstrated by the licensee's failure to provide two Shift Clerks the respective training for that position within the applicable time frame. In response to these findings, the licensee stated that a call-out list would be issued on a quarterly basis containing the names of personnel who were qualified and who would remain qualified throughout the quarter. Further, department heads were directed to ensure that all personnel assigned to Emergency Response Organization positions remain qualified. This item will be reviewed during subsequent inspections.

- Violation a. below involved a security event which the licensee failed to classify as an Unusual Event (NOUE)

consistent with the Emergency Plan. In response to this finding, the licensee committed to conduct training for plant managers, superintendents, and supervisors on proper techniques for regulating and handling suspected explosive devices.

Two inspections were conducted to verify that all corrected actions in response to improvement and incomplete items identified during the March 1986 Emergency Preparedness Appraisal were satisfactorily implemented as required. The inspections verified that all corrective actions committed to by the licensee were implemented, and that all findings identified during the referenced appraisal were resolved.

The following violations were identified.

a. Severity Level IV violation for failure to classify the May 13, 1987, security event in accordance with the Emergency Plan (50-424/87-32-02 and 50-425/87-23-02).

b. Severity Level V violation for failure to provide training to key members of the Emergency Response Organization (50-424/87-32-06 and 50-425/87-23-06).

2. Conclusion

Category: 1

3. Recommendations

None

G. Security

1. Analysis

During this assessment period, seven routine and eleven reactive region based inspections of the implementation of the physical security program were conducted. At the beginning of the evaluation period, the licensee was well into preparing for operational licensing. However, numerous inspection efforts clearly demonstrated that the problems and difficulties encountered in the installation and implementation of the security program were a result of the licensee's failure to recognize the complexities involved in the installation and establishment of functional operability of an integrated security system, the significance of functional operability of an integrated security system, and the significance of ensuring adequate formal instruction and practical proficiency training for the security force prior to full implementation of the security program. This failure was due primarily to a lack of

security expertise at the site but also to some degree at the corporate level, and the lack of adequate management involvement and oversight.

Upon issuance of the low power license, reactive and routine inspections noted significant failures to comply with Nuclear Regulatory Commission security requirements. The numerous failures to comply with regulatory requirements resulted in the Nuclear Regulatory Commission issuing a Civil Penalty of Two Hundred Thousand Dollars ($200,000) for what was considered to be collectively a programmatic breakdown in the Physical Security Program. The violations indicated a lack of plant management attention to the security program; inadequate day-to-day supervision by security managers; failure of the site security staff to have knowledge of and comply with established security procedures; security equipment and hardware deficiencies; failure of the security staff to properly evaluate, record and report safeguards events; inadequate physical security barriers; and repetitive occurrences of inattentiveness by on-duty security officers.

Enforcement Conferences and Management Meetings with Georgia Power Officials were held on April 2, June 17, July 1, and August 20, 1987. As a result, Georgia Power officials have taken postive actions to eliminate the problems previously identified. These positive actions were: transfer the security organization to the Nuclear Operations Department; assign an experienced security professional as the plant security manager; initiate a retraining program; re-organize the security force to establish job duty specialization; upgrade security procedures; replace the security training staff with nuclear-experienced personnel; remove security training from site training to security's control; enhance procedure training; hire nuclear-experienced supervisory, response and training personnel; hire forty additional Georgia Power security officers, had corporate and site management, including senior executive management meetings with security force personnel to hear and review their concerns; assigned an administration specialist to each shift to coordinate the preparation of reports and enhanced administrative procedures to assure records and reports were properly prepared.

As noted above the licensee has assumed a pro-active role resulting in programmatic enhancements and improved performance within the security program however, there continues to be events which reflect inadequacies within the security program.

The following violations were identified.

a. Severity Level III violations for failure to implement adequate compensatory measures. Civil Penalty $75,000. (50-424/87-26-01)

b. Severity Level III violations for failure to follow security procedural requirements. Civil Penalty $75,000. (50-424/87-26-02)

c. Severity Level III violations for failure to maintain positive access controls. Civil Penalty $50,000. (50-424/87-26-03)

d. Severity Level III violations of failure to maintain adequate vital area barriers. A civil penalty was not assessed. (50-424/87-26-04)

2. Conclusion

Category: 3
Trend: Improving

3. Recommendations

The NRC staff recommends continued management attention in this area.

H. Outages

1. Analysis

Routine inspections have been performed in this area following forced shutdowns. The major intent of this functional area is to assess the licensee's ability to handle major planned outages such as refueling. The area includes preparation, execution and recovery activities. Even though a planned refueling outage has not occurred the shorter forced outages have demonstrated that the licensee has been preparing to take advantage of these short outages. In the fall of 1987 subsequent to this assessment period, the licensee executed a well planned outage. Although this outage was extended due to unforseen replacement of a primary pump motor, the outage schedule was adjusted after the start of outage to permit the performance of a number of tasks that were not originally scheduled. Management control of this outage was evident. Management ensures that a weekly forced outage plan is published. This plan includes only those work items which are ready and the work is categorized by outage times. Following a forced shutdown management can declare the outage length and execute the plan commensurate with the recovery of the unit. This program has been utilized several times with positive results.

No violations or deviations were identified.

2. Conclusion

Category: Not rated

3. Recommendations

None

I. Quality Programs and Administrative Controls Affecting Quality (Unit 1)

1. Analysis

During this assessment period, resident and regional inspections were performed. For the purposes of this assessment, this area is defined as the ability of the licensee to identify and correct their own problems. It encompasses all plant activities, all plant personnel, as well as those corporate functions and personnel that provide services to the plant. The plant and corporate Quality Assurance (QA) staff have responsibility for verifying quality. The rating in this area specifically denotes results for various groups in achieving quality as well as the QA staff in verifying that quality.

Inspections of the Plant Review Board (PRB) indicated that the committee was functioning in a manner that was consistent with the technical specifications. Two weaknesses, however were noted and resolved regarding committee membership prior to licensing. Subsequent to licensing, inspections identified another weakness involving the manner in which the PRB executed its responsibility to investigate all violations of the Technical Specifications and to review all reportable events. The PRB was essentially not performing an independent review of these matters. Plant management was responsive in correcting this deficiency and implemented a program change for the PRB to assume a proactive role in pursuing safety issue resolution.

Licensee Event Reporting has been accomplished in a timely manner and reports contain sufficient information to describe the events. Corrective actions are generally adequate but occasionally lack completion dates. The lack of dates has resulted in delayed implementation and verification by the site staff. This has further delayed NRC verification efforts. Management has taken action to properly prioritize the verification process workload to ensure that the significant plant events are resolved as stated in the reports.

Corrective action programs are adequately developed, however, delays in achieving resolution of corrective action have been experienced.

The numerous late responses to the Quality Assurance audit findings are of most concern. The QA audit findings are well developed and contain significant issues regarding compliance in areas such as maintenance, deficiency reporting, engineering, and surveillance. These findings are within the scope of licensee identified violations and merit the same level of response as would an NRC violation.

One violation, b. below, was issued regarding the program for tracking component cycles and transients. During pre-licensing review of the Readiness Review program the NRC identified that the licensee staff did not respond to the Readiness Review finding that a program did not exist. Follow-up of this issue after licensing revealed that an inadequate program had been established and became the subject of the violation. The licensee has been pursuing a more definitive program with the Nuclear Steam Supply System vendor which may serve as a basis for life extension of the plant in the future. Interim measures have been established to collect the required information.

A review was performed on all sections of the SALP report in an attempt to capture apparent strengths and weaknesses related to management controls affecting quality. The following are some observed strengths in management controls affecting quality:

The following are some observed strengths in management controls affecting quality:

- The licensee is ahead of schedule in obtaining INPO accreditation for several training and maintenance

- The operations staff is dedicated and enthusiastic and works with procedures that are comprehensive and well written.

- Management has taken an active role in establishing the necessary measures in reducing unplanned reactor trips.

- Marked improvement is evident in the licensed operator training program as the licensee's passing rate for licensed operators (RO's & SROs) was above the industry average.

The following are some observed weaknesses in management controls affecting quality:

- Numerous security program breakdowns occurred; there was a lack of management involvement at all levels in the security program. This resulted in numerous violations and a Civil Penalty.

- Access control to potentially high radiation areas was poor and the Health Physics group was understaffed for a period of time.

- Corrective Action timeliness has been poor resulting from insufficient management attention to valid and significant QA concerns.

- The program for root cause evaluation of unplanned Reactor trips was an area of concern; however, upgrading of this program has resulted in improved performance.

- Management has not exhibited responsiveness to NRC concerns in several areas (e.g. preoperational testing, FSAR submittals); it appears that the licensee is sometimes only concerned with legal requirements as compared to good practices.

The following violations were identified.

a. Severity Level IV violation for removing a safety-related fan from service without a temporary modification. (50-424/87-44-01)

b. Severity Level V violation for failure to establish a program for the collection and evaluation of transient and operational cycles. (50-424/87-12-02)

2. Conclusion

Category: 2

3. Recommendations

Management support in ensuring that QA audit findings are promptly and properly resolved would be beneficial in improving plant performance.

J. Licensing Activities

1. Analysis

During the assessment period, decision making was generally at a level that ensured adequate management review. Prior planning by the licensee for staff audits, meetings, and telephone

conference calls was evident. The appropriate level of licensee management played a supportive role in addressing staff issues raised in the review of the request to revise jet impingement load criteria (SSER 5, Section 3.6.2). The corrective actions taken by the licensee to ensure nuclear service cooling water (NSCW) system integrity and long-term operability following the waterhammer events demonstrated management's commitment to ensure the issue was fully addressed.

Management involvement was adequate during the safety parameter display system onsite audit, the plant safety monitoring system verification and validation audit, the review of the electrical penetration filter and exhaust system deletion, and the responses to GL 83-28, although some of the responses indicated a lack of full understanding of the GL 83-28 requirements. Management involvement was especially evident in the use of the equivalent static load method in piping seismic analysis, the detailed control room design review, the seismic support in vertical cable trays issue, and the Unit 2 steam generator snubber reduction and associated auxiliary line leak-before-break issues.

Management involvement was inadequate in the areas of corporate and site organization and preoperational and initial startup testing prior to Unit 1 licensing. Submittals and FSAR changes were incomplete and internally in-consistent requiring several submittals to correct errors. In addition, numerous changes were made in these areas relatively close to licensing. There did not appear to be sufficient management involvement or control regarding the information initially provided with respect to the design of the spent fuel rack, which should have been considered a major design change from the original FSAR and SER, or in the revision to the design data for the polar crane rather than trouble-shooting to identify the reason for the speed deviation.

The licensee's approach to resolution of issues was generally adequate and submittals generally contained complete information for staff review. Examples of issues which were adequately resolved by the licensee include (1) the plant safety monitoring system verification and validation, (2) fire protection, (3) Transamerica Delaval Inc. (TDI) diesel generator, and (4) the inservice testing of pumps and valves.

For certain issues addressed during this rating period, the licensee's approach to resolution was especially technically sound, thorough, and timely with the licensee demonstrating a clear understanding of the issues. Examples are (1) the documents submitted on the deletion of the Unit 2 electrical penetration filter and exhaust system; (2) the solutions aimed

at meeting or exceeding requirements for the safety parameter display system issues; (3) the walkdowns, inspections, tests, and analyses performed by the licensee to ensure the system integrity following the NSCW waterhammer events; (4) the design and analysis for safe shutdown following a fire, which for the most part has provided an exceptional design for post-fire safe and alternate shutdown; and (5) the licensee's submittal on the Vogtle Unit 1 preservice inspection program which was especially well prepared, technically sound, and exhibited a concientious effort to comply with regulations.

During the current rating period, several issues were addressed in which the licensee's approach to resolution could have been improved. The licensee's submittals on preoperational testing and regarding plant and corporate organization prior to Unit 1 licensing sometimes displayed a lack of understanding of technical issues and were sometimes incomplete. The licensee also delayed completion of certain tests which were part of its Initial Test Program deviating from its stated intent in FSAR Section 14.2.1 to complete its Initial Test Program prior to commercial operation. The licensee also revised the design of its cranes such that they did not meet commitments previously made, later discovering after crane inspection, it was determined that component failure was involved which should have been corrected in lieu of submitting an FSAR amendment.

The licensee has been generally responsive to NRC initiatives as evidenced by its responses to staff requests for additional information such as those related to (1) confirmatory item 10, "Final pipewhip and jet impingement evaluation;" (2) main steamline break outside containment issue; (3) fire protection issues, (4) the TDI diesel generator issue; and (5) verification and validation of the plant safety monitoring system.

In certain review areas, the licensee's responses were especially timely and complete, such as the responses regarding seismic and operability qualification of equipment, deletion of the Unit 2 electrical penetration filter and exhaust system, the Unit 2 steam generator snubber reduction, and license condition 2.C.(8) regarding zinc coating of the diesel fuel oil storage tanks.

The licensee's responsiveness needed to be improved on several issues such as LOCA in modes 3 and 4 where the response was delayed by several months and on preoperational testing issues prior to Unit 1 licensing where responses were not always timely. The licensee needed to make repeated submittals in the organizational area in order to resolve issues before Unit 1 licensing and was not always responsive to staff concerns. In response to a staff request to correct a discrepancy

associated with an action statement for the Fuel Handling Building Post-Accident Ventilation Actuation System, the licensee's submittal was delayed for several months.

With regard to reporting of operational events, Licensee Event Report (LER) submittals are timely and contain adequate information on the event description, event evaluation, and corrective actions. A recent report by the office for Analysis and Evaluation of Operational Data (AEOD) which evaluated a sample of Vogtle LERs found that they rated well above the industry average in all three sections (text, abstract, and coded fields). However, in April 1987 the staff had to clarify the licensee's obligation to report those engineered safety feature (ESF) actuations (control room isolation) initiated by a control room chlorine detector. Until this time, the licensee had not been submitting LERs on these ESF actuations. In addition the licensee identified that all missed surveillances were not being reported and since June has commenced proper reporting.

In summary, management involvement is generally adequate. The licensee's approach to resolution of technical issues is generally sound. and the licensee is usually responsive to NRC initiatives.

No violations or deviations were identified:

2. Conclusion

Category: 2

3. Recommendations

None

K. Training and Qualification Effectiveness

1. Analysis

During the assessment period, one region based inspection was conducted and four site visits for operator license examinations were performed.

The pre-licensing review of the training and qualification programs was completed in an inspection conducted in October 1986. The inspection results of the October 1986 inspection indicate that the licensee had established adequate training and qualification programs for initial and requalification training of Reactor Operators (ROs) and Senior Reactor Operators (SROs), instructors, shift technical advisors, engineers and

non-licensed staff. The training program met the requirements of NUREG-0737, I.A.2.1 and II.B.4.A. Preliminary review of the requalification training program for licensed operators identified no concerns. The administrative program for licensed and non-licensed staff training, including classroom and simulator training, was reviewed and adequate provisions were in place to assure that up-to-date training materials were being utilized and the training program met the March 14, 1985 NRC Policy on Training and Qualification. The program also satisfactorily assigned responsibilities for completion of training administrative tasks.

During the October 1986 inspection, the inspectors determined that the licensee had taken timely and thorough corrective actions to resolve all concerns identified in previous inspections including those areas of concern identified in the last SALP report. Upgrades were noted in training on Technical Specifications, emergency planning, mitigation of core damage and other areas. No new concerns were identified.

The licensee has dedicated resources to an aggressive INPO accreditation program. The licensee submitted accreditation self evaluation reports for Health Physics and Chemistry in January 1987, and for Non-Licensed Operators, Reactor Operators, Senior Reactor Operators, and Shift Technical Advisors in July 1987. The licensee expects accreditation for these programs in the spring of 1988. The reports for the maintenance and engineering training programs will be submitted in January 1988. The inspectors noted that the licensee's schedule for INPO accreditation of training programs is one to two years ahead of the Commission Policy Statement of March 14, 1985, which recommends that programs be ready for accreditation two years after licensing. Currently an early November 1987 INPO assessment of the first six submitted programs is planned.

The licensee has a dedicated training facility with ample space, materials, and resources to implement the training program, including a plant reference simulator.

Cold license examinations were administered to RO and SRO candidates in October, November, and December 1986 and in April of 1987. The results of these examinations were as follows: 26 of 29 (90%) of the SROs passed and 21 of 23 (91%) of the ROs passed. One instructor certification examination was administered and the instructor passed. Pass rates of the previous SALP period were 55% for SROs and 18% for ROs. These pass rates indicate a marked improvement in the quality of the licensed operator training audit program in which licensed operator candidates are screened just prior to taking the NRC license examination. The overall pass rate of 90% for this SALP

period was significantly above the industry average of approximately 80%. There were no major generic weaknesses noted during the examinations.

One violation involving training was identified and is discussed in Section IV.F.b of this report.

2. Conclusion

Category: 1

3. Recommendations

None

L. Preoperational Testing

1. Analysis

During the assessment period, numerous inspections were conducted in the areas of preoperational testing by regional and resident inspectors. The preoperational testing program was continued from the previous assessment into this assessment period and completed. The inspections in the area included procedures review, observation of testing in progress, and evaluation of completed test results. Observation of testing has indicated that procedures were adhered to, and generally were complete, well maintained, and readily available when requested. Management continued to display a large involvement within the specific tests being performed and initiating corrective actions. Major tests completed during the assessment period included engineered safety features actuation system (ESFAS) testing. Equipment problems were encountered during this testing which resulted in some delays in completing the test. The delays were minor, which was mainly due to the active involvement of management in seeking resolutions to the problems. Conservatism was demonstrated in management decision to discontinue ESFAS testing until the delays were resolved. The resolutions were thorough and technically sound.

The weakness noted in the closing months of the assessment period was an apparent decrease in the licensee's responsiveness to NRC concerns. One example is the response by the licensee to NRC concerns over compliance and interpretation of requirements of the regulatory guide and Technical Specifications regarding diesel generator logs, test evaluation and surveillance determinations. An initial inspection revealed proper logs were not being kept (violation a.); a later inspection showed that records that were then started were inadequate to meet

applicable requirements; and a third inspection showed little improvement in the records and revealed a violation of Technical Specification surveillance requirements.

The four violations listed below were identified during the assessment period violation a. was attributed to failure to place the appropriate significance upon the requirements of the regulatory guide and limit interpretation to a regulatory versus technical position. Violation b. was attributed to oversight and inattention to requirements. Violation c. was attributed to failure on the part of management to followup on the consequences of violation a. and again fail to place the appropriate significance on the record keeping required. Violation d. was attributed to those personnel that are responsible for reporting, not having an understanding of the requirements.

Violations a. and b. were identified during the preoperational test program while violations c. and d. were identified during plant operations. Violations a., c., and d. were for activities which were under the responsibility of the plant operations staff at the time they were identified.

The following violations were identified:

a. Severity Level IV violation for failure to adequately document and evaluate diesel generator performance (50-424/86-118-01).

b. Severity Level IV violation for inadequate documentation and review of Remote Shutdown Panel Test results (50-424/86-132-02).

c. Severity Level IV violation for failure to test the diesel generator in accordance with Technical Specifications surveillance requirements (50-424/87-57-01).

d. Severity Level V violation for failure to report nonvalid diesel generator test failures (50-424/87-57-02).

2. Conclusion

Category: 2

3. Recommendations

None

M. Startup Testing

1. Analysis

Seven inspections were conducted for the startup test program during the appraisal period. One inspection was a team inspection responding to a Commission perception that the unit was undergoing an unusually high number of automatic trips in the course of power escalation. The remaining inspections were routine as required by the inspection program.

At the beginning of the period, inspection activities were directed toward review of proposed test procedures. By use of consultants with more experience in startup test activities than was available from the regular plant staff, a generally acceptable set of procedures had been developed.

Problems and delays were encountered during initial fuel loading. Delays occurred because of failures of source range instruments and fuel handling equipment. In the latter case, the vendor had knowledge of problems at other plants that had required modification of the equipment, but had not provided the information to the licensee. Otherwise, the fueling was in accordance with approved procedures, and was appropriately managed and controlled. Portions of the fueling operations were witnessed by both regional and resident inspectors.

The post-fueling, pre-critical tests were completed acceptably except for the measurement of reactor coolant system leakage. That test was performed using the approved surveillance procedure, which was found inadequate to accomplish the required surveillance.

Two violations a. and b. below, were identified regarding the adequacy of the leak rate procedure. The licensee's efforts to develop an adequate leak rate procedure were extended, frequently inadequate, and generally demonstrated a lack of understanding of the calculational methods and the requirements of technical specifications.

Initial criticality of Unit 1 was achieved in a well-controlled manner and in full adherence to the procedure. The zero-power physics tests which followed were also performed with care and in full compliance with procedures. Data analysis was careful and exhaustive. NRC inspectors were in the control room throughout the approach to criticality. They also witnessed major portions of each of the zero-power tests and reviewed all of the test results.

The loss of off-site power test and shutdown from outside the control room tests were witnessed by NRC inspectors. The inspectors identified a deficiency in the loss of control room tests as performed, and a repeat of part of the test was required and performed at a later date.

By June 7, 1987, Unit 1 had experienced 18 unplanned, automatic reactor trips, of which 13 were from low level in a steam generator. In response to NRC management concern for the high trip rate, a team inspection was conducted from June 22-25, following an introductory inspection during June 8-10. The inspection team concluded that some of the events, called tuning events, could have been avoided had the licensee taken advantage of industry experience. It appears that sufficient vendor information had been available, as a result of startups of similar Westinghouse plants, that indicate the feed water and steam generator control systems were marginally designed such that it was difficult to maintain steam generator levels within the required ranges without a significant amount of operator interaction.

The Startup Test Report for activities completed through June 1987 was issued on August 31, 1987. Compared with other similar reports, this report is more descriptive of the work performed and contains more detailed descriptions of the results obtained, in both graphical and tabular form.

The following violations were identified:

a. Severity Level IV for failure to establish an adequate procedure to calculate RCS Leak Rate (50-424/87-24-01).

b. Severity Level IV for failure to recognize that negative leakrates were not possible and the overall procedure was inadequate to meet technical specification requirements (50-424/87-27-02).

2. Conclusion

Category: 2

3. Recommendations

None

V. PERFORMANCE ANALYSIS - CONSTRUCTION (UNIT 2)

A. Soils and Foundations

1. Analysis

Unit 2 Soils and Foundation work progressed from 85% to 98% complete during the assessment period.

Regional and resident inspections performed during this period consisted of a review of quality assurance implementing procedures and specifications, observation of backfill operations, examinations of calibration controls on soil testing equipment, reviews of quality records documenting inspection and testing activities; and discussions of backfill operations with QC inspectors to verify that they understood specification and procedure requirements. The inspections also included the settlement survey program utilized by the licensee to monitor settlement of Category I and other major structures and review of followup action taken by the licensee with regard to CDR 84-61, Nuclear Service Cooling Water Tower Crossover Piping. Specifications and procedures being used to control the backfill met FSAR commitments and industry standards. Work activities were performed in accordance with procedure and specification requirements, and testing was accomplished with equipment having current calibration data. Discussions with QC inspectors demonstrated that the inspectors understood and were knowledgeable in specification and procedure requirements and that they were documenting their inspections on appropriate documents. The ongoing settlement monitoring program is being accomplished with precision instrumentation and First Order Class 2 survey methods, a technique which exceeds normal industry practices. Review of CDR 84-61, which identified that the crossover piping had been routed into a portion of Category I backfill that may be affected by potential liquifaction showed that proper corrective action was taken to resolve this item. The corrective action included rerouting pipelines into acceptable backfill areas and revising drawings to show acceptable areas.

NRC inspectors found that management involvement, resolution of technical issues and staffing were adequate for the level of activity involved. Licensee improvements were demonstrated by corrective actions and incorporation of Unit 1 readiness review findings, and the implementation of lessons learned from Unit 1.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

None

B. Containment, Safety Related Structures, and Major Steel Supports

1. Analysis

Unit 2 concrete placement was completed during this assessment period. The NRC inspectors performed numerous inspections monitoring concrete mixing, transportation, handling, and final placement. Inspection included procedure review for inclusion of all necessary technical specification requirements, on-line adherence to procedure requirements during handling and placement; and proper participation by personnel in accordance with requirements. The inspectors also monitored quality control inspector involvement in regard to adequacy and diligence. Concrete forms, embedments, rebar installations, and cadweld rebar splices were inspected. Other areas inspected included various systems and numerous inner building walls and block-outs.

Unit 2 containment post tensioning operations were completed during the assessment period. Random inspections of the Unit 2 post tensioning process were performed to examine tendon installation cable stressing operations, greasing operations and quality records on the installation of tendons. Procedure and technical specification review was performed to ensure regulatory requirement implementation and compliance. The inspectors found that the contractor and quality control effort in this area was adequate.

Unit 2 structural steel is approximately 90% complete. Random daily inspections were performed in the area of welding and installation of structural steel inside containment and other safety related buildings. Additional inspections consisted of but were not limited to: proper handling, identification of material, fit-up alignment, and ensuring that tolerances and clearances were in accordance with specification and drawings. Inspections also included monitoring of structural steel welding processes during various stages of weld completion to ensure adherence to weld procedures and process sheets; materials were as specified; cleanliness and weld technique was correct; and that welds were visually acceptable and were without apparent indications of imperfections. Inspectors monitored the participation and adequacy of quality control inspection in the area of structural steel welding. Site contractor installation and inspection effort in this area was found to be acceptable.

Concerns identified to the NRC regarding problems with concrete and coatings were reviewed and evaluated to determine if there were any violations of licensee requirements. Discussions with QC inspectors demonstrated that the QC inspectors understood and were knowledgeable of specification and procedure requirements and that they were documenting their inspections on appropriate documents. The inspection of concerns regarding improper use of concrete tools which resulted in damage to concrete and improper coating applications involved review of drawings, specifications, procedures, records, interviews with QC inspectors and craft personnel, and observation of ongoing and completed work in these areas. Inspection results indicate that management involvement, resolution of technical issues, and staffing were adequate for the level of activity involved. Licensee improvement was demonstrated by reduced reject rates, increased management participation in the field, and better management control of contractors.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

None

C. Piping Systems and Supports

1. Analysis

Unit 2 primary Reactor Coolant System (RCS) piping and supports were 100% complete, and other safety related piping and large supports were approximately 85% complete at the end of this SALP period.

The resident and regional inspectors performed numerous random inspections during the assessment period of Reactor Coolant Pressure Boundary and other safety related system piping. Inspections included material certification, handling, identification, and cleanliness control. Inspections also included piping fit-ups, alignments, clearances, and locations to ensure compliance with specifications and drawings. Specific random welding inspections were performed during the many phases of pipe installation. Technique and process variables were inspected as were finished welds for imperfections. Welders and quality control inspectors were monitored for proper certifications and activities. Periodic inspections were also conducted to observe the installation of pipe supports and

restraints. These inspections included position settings of hangers, deformations, shear lug position, support locations, and installation welds.

Licensee improvement has been noted in the areas of lower reject rates, readiness review feedback implementation, in-field problem resolution, and tighter management control of the contractor activities. These improvements can be attributed to management involvement in the areas of resolution of technical issues and providing adequate staffing in the areas of quality assurance and quality control.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

None

D. Safety Related Components

1. Analysis

During this assessment period resident and regional inspections were made of the installed reactor vessel, mechanical components, electrical components, integrated head packages, and internals when installed and/or in their storage position. Additional inspections were conducted to determine that proper storage and cleanliness protection practices were in place. The inspectors also monitored the milling of the internal vessel guide slots for proper adherence to procedure and specification. Daily plant tours were taken to observe the storage, handling, protection, installation, rework, and preventive maintenance of safety related mechanical and electrical components to ensure compliance with applicable codes, specifications, and drawings. The inspectors detected one area of violation (a. below) when monitoring the disassembly of a Chemical and Volume Control System (CVCS) charging pump. A field engineer was performing the visual acceptance work required of a QC inspector. Check sheet and procedures required revision to ensure separation of field engineer and quality control duties.

In general, housekeeping and equipment protection has improved, this is due, in part, to weekly site tours conducted by the construction vice president and his project director. In addition, management involvement and resolution of violations and corrective action to preclude recurrence were adequate in this area.

The following violation and deviation were identified:

a. Severity Level IV violation for failure to follow procedures for Quality Control inspection of a CVCS charging pump (50-425/87-36-01).

b. Deviation for discrepancy in capacity ratings for safety-related batteries as stated in the FSAR and as installed (50-424/86-93-03)*.

2. Conclusion

Category: 1

3. Recommendations

None

E. Auxiliary Systems

1. Analysis

NRC inspectors performed numerous daily walkdowns of Unit 2 plant buildings to insure proper fire protection for ongoing activities. Areas were inspected to determine the adequacy of: presence of combustible waste material storage; flammable liquid storage; cutting and welding operations authorized by burning permits; and, workable fire suppression equipment in the immediate work area.

Construction activities in the fire protection area were found to be satisfactory.

At the time of this assessment Unit 2 HVAC systems were essentially complete. The inspector conducted periodic and random plant inspections of safety related HVAC installations. Areas were inspected to determine the adequacy of: material identification; duct support installation; and, support steel welding. Inspections were conducted throughout the control building, diesel generator building, auxiliary building and containment building. The inspectors also performed followup inspections in regard to allegations of improper nonconformance closure.

In general, the licensee has shown improvement in the areas of fire protection with the implementation of a Zero Defect program, improvement in the control of penetration seal installation, and the incorporation of lessons learned from Unit 1 experiences.

*This item applies to Unit 1 construction activity in this functional area.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

None

F. Electrical Equipment and Cables

1. Analysis

During this assessment period inspections were performed by the resident and regional staffs in the following areas: cable installation, cable terminations, records and procedures, and closure of open items. During this period, 11 employee concerns were investigated; nine of these concerns were substantiated. Of these, five resulted in three violations, b., c., d. below, in the material use, design and inspection of specific electrical splices. Of the remaining concerns substantiated, the licensee had taken adequate action to correct them.

As a result of these three violations, the licensee instituted a retraining program and revised the construction specifications according to instructions from the vendor.

The cable installation inspections resulted in violation d. below, in the area of cable weight calculations for cable installed in electrical penetrations. The licensee readily acknowledged the violation at the time it was identified and took immediate corrective action.

During this assessment period, it was noted that the content of licensee reports and closeout actions improved. Certain licensee actions taken in the electrical engineering section has resulted in a better coordinated program between the field installation, inspection and engineering personnel.

Periodic random inspections were conducted by NRC inspectors to verify that proper storage, installation and preventive maintenance was performed on electrical components, cable, and raceways. Inspections were performed to ensure cable and conduit installation practices were in accordance with regulatory requirements. Termination installations were inspected for compliance with procedures and drawings. The inspectors found that licensee and contractor efforts in this area were satisfactory.

Overall, the licensee has shown marked improvement in the electrical area with the implementation of a decreasing defect rate, an improved cable installation plan, a pre-packed conduit installation program, and improved protection of electrical equipment. Cable installation footage has increased, yet quality concerns have decreased.

The following violations were identified:

a. Severity Level IV violation for failure to follow procedures for processing Field Change Requests and incorporating Design Change Notices into design drawings (50-424/86-95-01 and 50-425/86-45-01).

b. Severity Level IV violation for failure to provide training for Electrical Engineering on the use of Raychem Products (50-424/86-95-02 and 50-425/86-45-02).

c. Severity Level IV violation for inadequate inspection of Nuclear Service Cooling Water (NSCW) cable splices (50-424/86-95-03 and 50-425/86-45-03).

d. Severity Level IV violation for using inaccurate values for electrical penetration assemblies loading calculations (50-424/86-109-01).*

e. Severity Level IV violation for failure to accomplish adequate corrective action in that uncontrolled documents were used to complete work on a class 1E electrical support (50-425/87-10-02).

f. Severity Level IV violation for failure to protect plant equipment. Cable trays were used as work platforms without meeting requirements (50-425/87-05-01)

g. Severity Level IV violation for failure to protect plant equipment. Uncontrolled leakage was allowed into uncovered and powered electrical instrumentation penetrations (50-424/86-93-01).*

h. Severity Level V violation for failure to follow procedures for control of welding activities (50-425/87-10-03).

2. Conclusion

Category: 2

*These items apply to Unit 1 construction activity in this functional area.

3. Recommendations

None

G. Instrumentation

1. Analysis

During this evaluation period routine NRC inspections were performed of instrumentation installation which consisted of but were not limited to: tubing and support installation, mounting plate and structural support member installation, and transmitter assembly mounting. Mechanical instrumentation installation activities inspected were verified to be in compliance with applicable construction specifications, and ANSI and ASME piping codes. Inspections in this area also encompassed the installation of control panels such as the main control board, solid state protection system, process control panel, and HVAC panels in the main control room and electrical instruments. Electrical instrumentation installation activities inspected were verified to be in compliance with applicable construction specifications and ANSI and IEE standard.

Unit 2 instrumentation was approximately 55% complete at the end of the SALP assessment period. The licensee has incorporated lessons learned from the Unit 1 program such as pre-installation walkdowns to include tubing slope criteria for tubing installation and to engineer tubing routing up front rather than field route. Also, Unit 2 instrumentation installation was started at an earlier phase than on Unit 1 to reduce the number of interferences associated with routing tubing at a later phase in construction.

The licensee has incorporated a "lessons learned program" from known Unit 1 problems into the Unit 2 on-going construction process. A unique aspect of this program is that it has been implemented. Hundreds of lessons learned were divided up for action by separate managers. The managers were held accountable for item implementation and their performance was measured and had direct feedback to their performance appraisals. One of the lessons learned was the implementation of pre-installation walkdowns of planned instrumentation assemblies. Management and engineering walked the areas before installation and found many areas of potential interferences, therefore, saving many hours of drawing correction effort. Walkdowns also included predicted tubing slope criteria to ensure implementations of the slope and to prevent mechanical interference. Another lesson learned was the pre-implementation of the engineering drawing packages in lieu of construction field-run installation of instrumentation

tubing. Lessons from Unit 1 proved it was cheaper and more accurate to issue engineering drawings for installation of instrumentation tubing and assemblies before hand, and not after construction field installation (field run). The number of quality concerns and allegations in the instrumentation area have decreased indicating that management has been and is involved in assuring the quality of the instrumentation area.

In summary, inspections during this period indicated that the licensee's actions in this area have been effective. Relative to resolution of technical issues from a safety standpoint, the licensee routinely exhibits conservatism. Management is involved in quality assurance as evidenced by prior planning and assignment of priorities.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

None

H. Quality Programs and Administrative Controls Affecting Quality (Construction)

1. Analysis

During this assessment period, regional and resident inspections were performed. These inspections involved reviews of: QA program; onsite design activities; procurement, receiving and storage; civil and electrical work activities; 10 CFR 21 implementation; verification of as-built construction conditions; an employee concern involving traceability of materials; licensee action on previous enforcement matters; and licensee action on previously identified inspection findings.

Two violations were identified in the above inspection areas; neither was repetitive, nor were they indicative of any QA programmatic breakdown. Violation a. below, involved an auxiliary building structural steel platform connection (beam to column) which was not erected in accordance with current approved as-built drawings.

Decision making is at a level that ensures appropriate management review. Corporate management is accessible, exists on the job site and is very active in plant construction

activities and assuring quality. QA positions and authorities were well defined and have organizational independence to implement an effective program. Both the licensee's and architect engineer's onsite design activities were found to be conducted in compliance with the technical and QA requirements described in the SAR. The licensee utilizes quality contractor services to perform in-depth audits of these design activities and to assist in technical reviews.

Inspectors reviewed controlling QA/QC procedures for storage and maintenance. The site warehouses, laydown areas, containment and auxiliary buildings were examined for adequacy of equipment class A-D storage. All storage areas examined (warehouses, laydown area, in-place storage) were found to be controlled, well organized and exceptionally clean. Materials and equipment were provided with the necessary protection from debris, damage, and indications were evident that a good construction storage and maintenance program was in place. In addition, construction procurement and receiving activities were satisfactory.

The licensee has been responsive to NRC initiatives. Violations and inspector followup items in the QA areas were adequately addressed by the licensee. No significant weaknesses were identified in management controls affecting construction quality this period.

The licensee improved that Unit 2 programs based on lessons learned from Unit 1. The Lessons Learned program has contributed to a lower defect rate and improved quality.

The licensee has continued to maintain a successful quality concern program. Employees appear to be aware of the program and are not afraid to use it to voice concerns. The scope of the program is not limited to safety-related items, and all areas of the project are open for address. During this assessment period, Quality Concerns opened a separate office in the Unit 1 area due to the physical separation of Units 1 and 2. All concerns emanating from Unit 1 are still being processed by the parent quality concerns complex in Unit 2.

Inspectors performed periodic inspections of the Unit 1 and 2 Quality concerns program. Inspections included employee awareness and satisfaction; depth and accuracy of investigations; backlog and timeliness of responses; and staffing levels and qualifications.

The inspectors found the program to be well managed and effective in dealing with site concerns.

The following violations were identified:

a. Severity Level IV violation for failure to erect an auxiliary building structural steel platform connection (beam to column) in accordance with current approved as-built drawings (50-425/86-60-01).

b. Severity Level IV violation for failure to provide adequate report of a significance construction deficiency (424/87-11-02 and 425/87-07-02).

c. Severity Level V violation for failure to mark materials with purchase order number and item number (50-425/86-54-01).

2. Conclusion

Category: 1

3. Recommendations

None

I. Preoperational Testing

1. Analysis

The Unit 2 initial test program started in May 1987 and is 15% complete. Inspections in this area included procedure review, observation of flushing, construction acceptance, preoperational testing activities, and evaluation of completed test results. Management awareness of problems and close involvement with the test program ensures that decision making receives adequate management attention. Prior planning and assignment of priorities was evidenced by detailed test schedules. Prior planning was considered to be a major contributor to the satisfactory completion of plant energization. The startup manual, which controls the conduct of the initial test program has been updated to reflect Unit 1 lessons learned and contains well stated and understandable policies. Observation of the testing in progress indicated that procedures were strictly adhered to and rarely violated. The documentation associated with tests was complete, well maintained, and readily available when requested.

The licensee was responsive to NRC initiatives in the preoperational area and the resolutions of technical issues were technically sound and acceptable. Corrective actions programs were adequate in that problems identified through the course of testing were promptly documented, repaired and retested.

The initial test program was conducted with extensive involvement of permanent plant personnel during testing activities. Component testing was performed by licensee maintenance personnel to the maximum extent possible. The majority of positions, such as startup manager, lead test supervisor, and test supervisor positions, were filled with licensee employees with preoperational test experience from Vogtle Unit 1. Equipment, systems, and major test evolutions requiring extensive experience (such as diesel generators and nuclear steam supply systems) were supplemented with qualified contractor startup personnel.

In addition, periodic inspections were conducted of control room operations to assess plant condition and conduct of shift personnel. Control room operations were conducted in an orderly and professional manner. Shift personnel were knowledgeable of plant conditions, i.e., ongoing testing, equipment in or out of service, and alarm annunciator status. Shift turnovers were observed on various occasions to verify the continuity of plant testing, operational problems, and other pertinent plant information during the turnovers. Control room logs were reviewed for detail of events and found to be adequate for the present phase of plant operations.

The Project Director conducts a weekly integrated system evaluation meeting to identify and address design changes, critical material issues, and any schedules problems. These meetings were effective in the early identification and resolution of the problems.

No violations or deviations were identified.

2. Conclusion

Category: 1

3. Recommendations

VI. SUPPORTING DATA & SUMMARIES

A. Licensee Activities

Between October 1, 1986 and September 30, 1987, Unit 1 completed the preoperational test program and commenced initial fuel loading on January 17, 1987. The power ascension test program began with fuel loading and was conducted in a safe, controlled manner using a series of increasing power levels at which various testing was completed. Unit 1 was declared to be in commercial operation on May 31, 1987, following completion of the 100-hour endurance run at 100 percent power.

Pertinent dates of the test program are shown in the following table:

Event	Date	Time (Days)
Revised Low Power Licensee	1/16/87	0
Commenced Fuel Load	1/17/87	1
Completed Fuel Load	1/28/87	12
Commenced Pre-Critical Testing	2/1/87	16
Initial Criticality	3/9/87	51
Received 100% Operating License	3/16/87	58
Initial Synchronization to Grid	3/27/87	69
Achieved 30% Power	3/31/87	73
Achieved 50% Power	4/15/87	88
Achieved 75% Power	4/22/87	95
Achieved 100% Power	5/12/87	115
Commercial Operation	5/31/87	134

The Unit 2 initial test program started in May 1987 and is 15% complete. This program consists of flushing, construction acceptance testing, preoperational testing, and releasing systems to operations. The overall flushing program was 45% complete with NSSS flushing 70% complete. Construction acceptance testing was 22% complete and preoperational testing was 5% complete.

The Unit 2 energization milestone was completed ahead of schedule on August 23, 1987. To date the 13.8 kv switchgear, 4160 volt switchgear, and all 480 volt motor control centers have been energized. Relative to construction acceptance, testing pump runs have been progressing satisfactorily on schedule with successful operation of the auxiliary component cooling water pumps, five of six nuclear service cooling water pumps, and condensate return pumps. Relative to the preoperational testing program the diesel generator air start and sequencer preoperational tests are essentially complete; the diesel generators fuel oil flush and the safety injection pumps' lube oil flush were in progress; the main turbine lube oil flush has been completed and the turbine is on its turning gear; and 44% of the preoperational test procedures have been approved by the Plant Review Board.

During the SALP period, Unit 2 construction progressed from 66% to 72% complete. Concrete placement; large bore and small bore pipe; HVAC duct; cable tray; and PVC conduit installations were essentially complete. Large hangers, tubing, mechanical instrument stands, and rigid conduit installations were approximately 80% complete. Small bore pipe hangers, tubing hangers, mechanical instruments and tubing; wire and cable and concrete coating installations were approximately 48% complete. Electrical terminations were approximately 23% complete.

GPC has taken a number of initiatives to improve the construction and preoperational testing process based on lessons learned from Unit 1 readiness review program and subsequent startup. The lessons learned program encompassed the civil, mechanical, electrical, engineering, and preoperational testing disciplines.

GPC has committed to develop and execute a modified readiness review program on Unit 2 based on changes from the Unit 1 construction program. In addition a readiness review will be conducted in the security area which was not performed on Unit 1. Significant resources have been applied to increase the assurance that Vogtle design, construction, and preoperational testing processes have been carried out in a high quality manner and that the plant is ready to operate in accordance with the requirements.

Senior management attention and participation in project activities was demonstrated, with direct participation by the Project Director in such activities as the daily work status meetings, lessons learned program execution, critical problem resolutions, and the day-to-day oversight of test program restraints.

Early in the period prior to Unit 1 initial fuel load, a site reorganization occurred which aligned management responsibilities so as to effectively manage an operating unit and the upcoming startup of Unit 2. This reorganization consisted of bringing an individual in from plant Hatch with current operating plant experience to fulfill the role of plant manager and creating a new position of plant support manager. Under the new organizational structure these two positions report directly to the plant general manager. The Plant Manager's functional responsibilities were redefined to focus on those activities strictly related to day-to-day plant operation (operations, maintenance, health physics and chemistry), while the plant support type functions (engineering, security, outage and planning activities, and the startup activities for Unit 2) are the responsibility of the Plant Support Manager.

Subsequently, more organizational enhancements were made by creating two new management positions (Chemistry and Health Physics manager and technical assistant to the Plant Manager) in order to improve the effectiveness of the implementation of existing programs. These positions were filled with experienced management personnel.

B. Inspection Activities

The routine inspection program was performed during this period, with special inspections conducted to augment the program as follows:

September 29 to October 3, 1986 and October 20-24, 1986, in the areas of employees concerns relating to the use of Raychem Products.

September 29 to October 3, 1986, in the areas of licensee action on previous enforcement matters (Units 1 & 2), housekeeping (Units 1 & 2), materials control (Units 1 & 2), reactor vessel internals (Unit 1), reactor coolant piping (Unit 2), and safety related piping (Unit 2).

October 6-10, 1986, in the areas of fire protection and the licensee's action regarding the implementation of the plant safe shutdown guidance provided in Standard Review Plan 9.5.1 positions c.5.b and c.5.c.

November 4-7, 1986, involved evaluation of the applicant's responses and corrective actions addressing improvement an incomplete items identified during the Radiological Emergency Appraisal conducted March 10-21, 1986.

December 15-19, 1986, to assess the applicant's responses to Generic Letter 83-28 "Required Actions Based on Generic Implications of SALEM ATWS." Areas inspected included post trip review, equipment classification, vendor interface, post maintenance testing and reactor trip system reliability.

January 12-16, 1987, in the areas of fire protection, followup on previously identified items, and worker's concerns with regard to fire suppression system installation and removal of fire barrier energy shields.

January 12-16, 1987, in the areas of electrical items that could impact fuel load which included licensee identified items, inspector followup items, enforcement items identified on previous inspections and I.E. Bulletins.

February 17-20, 1987, involving a programmatic review of Georgia Power Company's Quality Concern Program (QCP) at Vogtle.

March 9-12, 1987, involving a review of items related to the licensee's application for a full power licensee.

March 5-11, 1987, involving the evaluation of the licensees responses and corrective actions addressing the remaining items identified during the Radiological Emergency Preparedness Appraisal conducted March 10-21, 1986.

March 11-12, 1987, involving observation of the licensee's training drill conducted in conjunction with Savannah River Plant emergency exercise and the evaluation of the licensee's action on the Unit 2 siren system.

May 18-22 in the areas of allegation followup and startup shield verification radiation surveys.

June 8-10, 1987 and June 22-25, 1987, to assess the causes of reactor trips since licensing, and the licensees efforts to evaluate the trips and reduce the frequency of such events.

C. Investigations

None.

D. Escalated Enforcement Actions

1. Civil Penalties

a. On September 3, 1987, a $50,000 civil penalty was issued for one severity level III problem with two violations involving the operability of both the RHR system and reactor trip breakers, and failure to identify deficiencies promptly.

b. On September 4, 1987, a $200,000 civil penalty was issued for 3 severity level III problems with many violations of the security program. Additionally, one severity level III violation was issued without a civil penalty.

2. Orders

None

E. Licensee Conferences Held During Appraisal Period

1. A management meeting was held at the Region II office on December 2, 1986, to brief the NRC on continued progress, ongoing activities, fuel load status, and completion of Unit 1.

2. A management meeting was held at the NRC Region II office on December 19, 1986, to present to Georgia Power Company (SALP) and also to discuss the full load status of Vogtle Unit 1.

3. A management meeting was held at the NRC Region II office on February 2, 1987, to discuss with the NRC the Department of Labor protected activities cases (DOL 210).

4. A management meeting was held at the NRC Region II office on March 24, 1987, to present the Georgia Power Company's proposed Readiness Review Program for the Vogtle Unit 2 facility, using the lessons learned from Unit 1.

5. A management meeting was held at the NRC Region II office on April 2, 1987, to discuss overall security program and improvements.

6. A management meeting was held at the NRC Region II office on May 14, 1987, to discuss with the NRC the Vogtle Construction and Engineering program for Unit 2.

7. An Enforcement Conference was held at the Region II office on May 5, 1987 to discuss our findings relative to inspection report 50-424-87/30, 50-424-87/27, and 50-424-87/12 involving proper system alignment and attention to detail.

8. A management meeting was held at the Region II office on June 11, 1987, to discuss specific actions taken by Georgia Power Company to correct conditions resulting in three reactor trips during the weekend of June 6, 1987.

9. An enforcement conference was held at the NRC Region II office on June 17, 1987, to discuss findings relative to security.

10. An enforcement conference was held at the Vogtle site on June 30, 1987, to discuss the corrective actions taken to reduce the high reactor trip rate and to address other programmatic problems.

11. An enforcement conference and a management meeting was held at the site on July 1, 1987, to discuss the construction status of Unit 2, the readiness review program and repetitive failures of the security program.

12. An enforcement conference was held at the NRC Region II office on August 20, 1987, to discuss NRC findings relative to security.

F. Confirmation of Action Letters

None

G. Licensee Event Report Analysis

During the evaluation period, 54 LERs were evaluated by the NRC staff to determine the event cause. The distribiution of these events were as follows:

CAUSE		NUMBER
Component Failure		10
Design		3
Construction/Fabrication/ Installation		6
Personnel		31
Operating Activity	7	
Maintenance Activity	8	
Test/Calibration Activity	11	
Other	5	
Out of Calibration		1
Other		3
TOTAL		54

H. Licensing Activities

1. NRR Site Visits and Meetings

October 6, 1986, Meeting to discuss SER open item 1, "Equipment Qualification."

October 8-9, 1986, Meeting to discuss inservice testing of pumps and valves(SER confirmatory item 13).

October 16, 1986, Meeting to discuss ESF/HVAC system in the fuel handling building and the mechanical room.

October 16, 1986, Meeting to discuss electrical separation criteria.

October 20-24, 1986, Meeting to discuss Technical Specifications.

November 4, 1986, Meeting to discuss fire protection issues.

November 12, 1986, Meeting at site to discuss details of proposed alternate radwaste facility.

November 13, 1986, Electrical, Instrumentation and Control Systems Branch site visit to review configurations in the electrical power systems area.

November 17, 1986, Meeting to discuss the use of plastic tie wraps as vertical cable supports.

November 18, 1986, Meeting to discuss containment temperature profile for environmental equipment qualification.

November 24, 1986, Meeting to discuss Technical Specification issues.

November 25, 1986, Meeting to discuss thermal lag analysis related to environmental equipment qualification.

December 3, 1986, Meeting to audit cable documentation regarding chlorinated polyethylene in response to Contention 10.3.

December 3-4, 1986, Meeting at site to discuss safety parameter display system (SER open item 14b).

December 10-11, 1986, Meeting to discuss readiness for operation.

December 15, 1986, Meeting to discuss multiple response spectrum methodology.

December 15, 1986, Meeting to discuss nuclear service cooling water waterhammer issue.

December 18, 1986, Meeting to discuss the responses to staff questions on vertical cable supports.

December 18-19, and 22-23, 1986, Meetings to discuss remaining Technical Specification issues.

April 17, 1987, Meeting to discuss Unit 2 steam generator snubber reduction and leak-before-break application.

April 28, 1987, Meeting at site to discuss Unit 1 operating history.

May 22, 1987, Meeting to discuss status of outstanding licensing actions on Vogtle and Hatch.

June 4, 1987, Meeting to discuss Unit 2 steam generator snubber reduction and leak-before-break technology applied to the surge line.

June 29-30, 1987, Meeting at Westinghouse offices to audit the plant safety monitoring system verification and validation program.

September 15, 1987, Meeting at GPC offices to discuss outstanding licensing actions on Vogtle and Hatch.

2. Commission Briefing

March 12, 1987, Commission Briefing for Full-Power License on Unit 1.

3. Reliefs from Technical Specifications

SSER 4, December 1986 several reliefs granted with respect to preservice inspection for Unit 1.

SSER 6, March 1987, several reliefs granted with respect to inservice testing of pumps and valves for Unit 1.

September 22, 1987, several reliefs granted with respect to inservice testing of pumps and valves for Unit 1.

4. Exemptions Granted

January 16, 1987, to 10 CFR 70.24; 10 CFR 50, Appendix J, III.D.2(b)ii; and a schedular exemption from 10 CFR 50.34(b)(2)(i) as it pertains to GDC 2, 61, and 62 of Appendix A to 10 CFR 50, issued with low-power license.

March 16, 1987, to 10 CFR 70.24; 10 CFR 50, Appendix J, III.D.2(b)ii; and a schedular exemption from 10 CFR 50.34(b)(2)(i) as it pertains to GDC 2, 61, and 62 of Appendix A to 10 CFR 50, issued with full-power license.

5. Licenses Issued

January 16, 1987, Low-Power License for Unit 1

March 16, 1987, Full-Power License for Unit 1

6. License Amendments Issued

Amendment 1, issued June 23, 1987, to increase the shutdown margin requirements shown in Figure 3.1-2 and to change the title of that figure.

Amendment 2, issued July 23, 1987, to delete the containment isolation function of the containment area high-range radiation monitors.

7. Emergency/Exigent Technical Specifications

Amendment 2, issued July 23, 1987, to delete the containment isolation function of the containment area high-range radiation monitors.

8. Discretionary Enforcement Actions

Four discretionary enforcement actions have been granted to the licensee during the rating period.

I. Enforcement Activity

1. Violations Per Functional Area

UNIT 1 SUMMARY (Operations)

	Functional Area	No. of Deviations and Violations in Each Severity Level					
		D	V	IV	III	II	I
A.	Plant Operations			6	2		
B.	Radiological Controls			6			
C.	Maintenance			1			
D.	Surveillance						
E.	Fire Protection			2			
F.	Emergency Preparedness		1	1			
G.	Security				4		
H.	Outages						
I.	Quality Programs and Administrative Controls		1	1			
J.	Licensing Activities						
K.	Training and Qualification Effectiveness						
L.	Preoperational Testing		1	3			
M.	Startup Testing			2			
TOTAL			3	22	6		

UNIT 2 SUMMARY (Construction)

	Functional Area	No. of Deviations and Violations in Each Severity Level					
		D	V	IV	III	II	I
A.	Soils and Foundations						
B.	Containment, Safety Related, and Major Steel Supports						
C.	Piping Systems and Supports						
D.	Safety Related Components	1*		1			
E.	Auxiliary Systems						
F.	Electrical Equipment and Cables		1	7*			
G.	Instrumentation						
H.	Quality Programs and Administrative Controls Affecting Quality		1	2			
I.	Preoperational Testing						
TOTAL		1	2	10			

2. Number and Severity Level of Violations

Severity Level	Unit 1	Unit 2
Severity level III	6	0
Severity level IV	22	10*
Severity level V	3	2
Deviations	0	1*
Totals	31	13

*Includes items which apply to Unit 1 construction activity.

J. Reactor Trips

1. March 19, 1987 - Reactor trip from 2.5% power on high rate startup following a one step rod pull during low power physics testing.

2. March 20, 1987 - Reactor trip from 3% power on lo-lo Steam Generator (SG) level after operators, using Main Feedwater (MFW) regulating bypass valves, underfed the SGs.

3. March 21, 1987 - Reactor trip on lo-lo SG level after too much steam was dumped and operators could not restore SG level. Turbine also tripped.

4. March 23, 1987 - Reactor trip from 4% power on lo-lo SG level due to operators having difficulty controlling Auxiliary Feedwater (AFW) following a MFW isolation on high SG level.

5. March 24, 1987 - Reactor trip from 7% power on lo-lo SG level caused by insufficient flow from bypass feedwater regulating valve in auto exacerbated by a malfunction in the steam dump control which caused a sudden SG shrink.

6. March 27, 1987 - Reactor trip from 11% power on lo-lo SG level caused by MFW pump trip on low suction pressure which was caused by condensate pump cavitation due to a low hot well level which was caused when water was diverted to the CST after a hot well level indicator failed high.

7. April 5, 1987 - Reactor trip from 20% power on lo-lo SG level caused by turbine generator trip which caused a hi-hi SG level and resulting level fluctuations which operators were unable to control.

8. April 10, 1987 - Reactor trip from 30% power on lo-lo SG. A main feedwater regulating valve was overfeeding the #2 SG and operators could not close it manually. MFW pump trip occurred on hi-hi SG level and reactor trip followed.

9. April 11, 1987 - Reactor trip from 20% power on lo-lo SG level. During transfer from the bypass to the AFW regulating valve, a problem in the AFW reg valve caused hi-hi SG level and then MFW pump trip. Reactor trip followed.

10. April 29, 1987 - Reactor trip from 73% power. Channel IV bistables were in tripped positions because pressurizer pressure indicator had failed. Channel II flashed on and off giving a 2 out of 4 logic and the trip.

11. May 4, 1987 - Reactor trip from 76% power on a overtemperature delta temperature and overpower delta temperature signal. Faulty test card was determined as source of spurious signals.

12. May 9, 1987 - Reactor trip from 80% power on lo-lo SG level. The unit was undergoing a step load swing startup test and the turbine controller load demand overshot to 80% with only 1 MFW pump in service. The cause was not correctly setting the load demand setpoint on the turbine controller.

13. May 13, 1987 - Reactor trip from 90% on lo-lo SG level. One of two Main Steam Isolation Valves (MSIV's) for #1 SG closed while maintenance was in progress. Personnel attempted to mechanically block valve instead of isolating closing signal to MSIV solenoid valves.

14. May 24, 1987 - Reactor trip from 7% power due to lo-lo SG level caused by the bypass feed reg isolation valve being in the closed position.

15. June 3, 1987 - Reactor trip from 100% power due to a turbine trip. A lightning strike caused automatic turbine trip.

16. June 6, 1987 - Reactor trip while performing startup on a neutron high flux spike. Operator trainee didn't realize reactor was critical and continued to pull rods.

17. June 7, 1987, - Reactor trip from 18.5% power on lo-lo level on SG#4. During transition from bypass to main feed regulating valves (MFRV). The MFRV was held open too long and SG#2 was overfeed resulting in hi-hi level trip causing a turbine trip, MFW trip and AFW actuation. Consequently, a lo-lo level was received on SG#4 causing the reactor trip.

18. June 7, 1987 - Reactor trip from 4% power on SG lo-lo level.

19. June 14, 1987 - Reactor trip from 97% power on SG lo-lo. This occurred when "A" Main Feed Pump went to Zero Demand on Speed Controllers resulting in a feed flow/steam flow mismatch. Possible Speed Controller failure.

20. June 20, 1987 - Reactor manually tripped while in Mode 3 after receipt of an "RPI Urgent Alarm" annunciator on indicated failure of the Digital Rod Position Indicator (DRPI).

21. June 23, 1987 - Reactor trip from 94% power due to generator trip. The cause was unknown, however, it was believed to be associated with the voltage regulator.

22. June 25, 1987 - Reactor manually tripped while in Mode 3 after an indicated failure to the DRPI due to a failed card.

23. July 8, 1987 - Reactor trip from 100% on a turbine trip due to loss of main generator stator cooling.

24. July 22, 1987 - Reactor trip from 100% power on a turbine trip due to main generator stator cooling outlet temperator switch failure.

25. July 28, 1987 - Reactor trip from 100% power on a turbine trip due to a technician improperly connecting test equipment to the generator.

K. Effluent Summary for Vogtle Electric Generating Plant

Insufficient data available.