ENCLOSURE

INITIAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBERS

50-348/92-18 AND 50-364/92-18

SOUTHERN NUCLEAR OPERATING COMPANY

JOSEPH M. FARLEY UNITS 1 AND 2

JANUARY 1, 1991 - MAY 30, 1992

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I. INTRODUCTION

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

An NRC SALP Board, composed of the staff members listed below, met on July 15, 1992, to review the observations and data on performance and to assess licensee performance in accordance with Manual Chapter NRC-0516, "Systematic Assessment of Licensee Performance." The Board's findings and recommendations were forwarded to the NRC Regional Administrator for approval and issuance.

This report is the NRC's assessment of the licensee's safety performance at the Joseph M. Farley Nuclear Plant, Units 1 and 2, for the period January 1, 1991, through May 30, 1992.

The SALP Board for Farley, Units 1 and 2, was composed of:

J. R. Johnson, Acting Director, Division of Reactor Projects (DRP), Region II (RII) Chairperson
E. W. Merschoff, Deputy Director, Division of Reactor Safety (DRS), RII
J. P. Stohr, Director, Division of Radiation Safety and Safeguards, RII
D. M. Verrelli, Chief, Reactor Projects Branch 1, DRP, RII
G. F. Maxwell, Senior Resident Inspector, Farley, DRP, RII
E. G. Adensam, Director, Project Directorate II-1, Division of Reactor Projects I/II (DRPE), Office of Nuclear Reactor Regulation (NRR)
S. T. Hoffman, Project Manager, Project Directorate II-1, DRPE, NRR

Attendees at SALP Board meeting:

F. S. Cantrell, Chief, Reactor Projects Section 1B, DRP, RII
T. R. Farnholtz, Project Engineer, Projects Section 1B, DRP, RII
M. T. Markley, Operations Engineer, Performance and Quality Evaluation Branch, NRR
M. J. Morgan, Resident Inspector - Farley, DRP, RII
J. T. Wiggins, Deputy Director, DRP, Region I
K. K. Bristow, Reactor Engineering Intern, NRR

II. SUMMARY OF RESULTS

During the assessment period, Farley demonstrated noteworthy performance in the area of Radiological Controls; the performance in Security improved to an excellent level. Performance in the areas of Emergency Preparedness and Engineering/Technical Support continued to be good with an improving trend observed in the area of Engineering/ Technical Support.

Although still at an acceptable level, a decline in performance was noted in the areas of Operations, Maintenance/Surveillance, and Safety Assessment/Quality Verification.

An increased number of personnel errors and configuration control problems contributed to a large increase in the number of reactor transients and a decline in Operations performance.

A decline in material condition, performance of plant equipment, and insufficient supervisory oversight in certain evolutions contributed to the decline in the Maintenance area.

Weaknesses in both the threshold to perform "root cause" analyses and the thoroughness of those analyses as well as insufficient actions to stem the decline in Operations and Maintenance/Surveillance areas contributed to the lowering of performance in the area of Safety Assessment/Quality Verification.

Overview

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

Functional Area	Rating Last Period 8/1/89 - 12/31/90	Rating This Period 1/1/91 - 5/30/92	
Plant Operations	1	2	
Radiological Controls	1	1	
Maintenance/Surveillance	1	2	
Emergency Preparedness	2	2	
Security and Safeguards	2	1	
Engineering/Technical Support	2	2	Improving
Safety Assessment/Quality Verification	1	2	

III. CRITERIA

The evaluation criteria which were used to assess each functional area are described in detail in NRC Manual Chapter 0516, which can be found in the Public Document Room. Therefore, these criteria are not repeated here, but will be presented in detail at the public meeting held with the licensee management.

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

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

Power Operations

Plant operations exhibited inconsistent performance throughout the assessment period and experienced an increased number of reactor protection system challenges and plant transients. During the rating period, Unit 1 experienced four automatic reactor trips while Unit 2 experienced seven. This total of 11 automatic reactor trips is an increase over the last assessment period total of 5. Also, Unit 1 experienced one manual trip; and Unit 2 experienced three. This is also an increase over the last assessment period total of two manual trips.

Two of the trips were attributable to lightning strikes, one was due to a design error, five were caused by component failures, and seven were caused by personnel errors. Of the trips due to personnel error, three were the result of operations activities and four resulted from maintenance activities.

Operator response to rapid changes during power operations was good, particularly with respect to system transients and trip response. Examples include the response of a control board operator to the loss of automatic feedwater regulating valve control and another operator's response to the failure of a pressurizer pressure transmitter. In both cases the resulting impact on the reactor systems was minimal and transients were well controlled. Quick response and corrective actions

involving a loss of vacuum through the Unit 1 gland seal system and the plugging of the leak was another example of personnel knowledge of the plant. Overall performance during such events indicated that the operators were well-trained and experienced.

Certain programmatic areas exhibited administrative control problems, including configuration control and procedural adherence issues. Events involving configuration control include the following: (1) improper valve lineup of the Unit 2 vessel flange leakoff detection system; (2) inappropriate manipulation of a containment spray pump breaker cubicle door (by a non-licensed operator); and (3) an inadvertent placement of an Emergency Diesel Generator (EDG) in an inoperable condition by isolating both air start headers.

Events involving problems with procedural adherence included failure to conduct a required audit of locked valve and key control check-out sheets and approval of maintenance on an EDG air compressor without a work request or clearance. Another example was the failure to follow a procedure which resulted in a misalignment of Boron Thermal Regenerative System valves.

Administrative controls to ensure proper control room demeanor and professionalism were in place. However, control room personnel inattentiveness and poor communications have resulted in plant transients. For example, the operations staff deenergized a "Solatron" power supply without verifying its function under the incorrect assumption that a "Selectron" power supply was being removed. This resulted in a reactor trip. Another example of operator inattentiveness and poor communications resulted in the inadvertent isolation of service water to the control room heating, ventilation and air conditioning system. This event also involved inadequate supervisory oversight. Emphasis has subsequently been placed on increased awareness of control room communications.

Access to the control room was limited to reduce congestion and operator distractions. Control room drawings were easily accessible, consistently up to date and legible. Operator logs were legible and identified most normal conditions,

special tests and events. However, the logs, at times, lacked detail and pertinent information. An example was the lack of an entry in the control room logs concerning the draining of approximately 4500 gallons of Refueling Water Storage Tank (RWST) water to the Unit 1 containment building. The licensee has emphasized the need for greater detail, especially when noting non-routine plant evolutions.

Station management continued to be involved in routine, daily activities. A new morning briefing format was initiated to improve communications and has enhanced the role of the shift supervisors in managing plant staff resources. The experience level of shift personnel and support staff was very high, and a very low operator turnover rate has resulted in retention of experienced personnel. Four of the six shift crews were staffed with extra reactor operators. Recent management planning resulted in a decrease in overtime.

During the previous assessment period, deficiencies were noted in the Emergency Operating Procedures (EOPs) and in control board ergonomics. During this assessment period, efforts made in reworking the procedures was evident and effective. Unit 1 human factor concerns with control board labeling and layout were also addressed by the licensee during this assessment period. Unit 2 control board modifications were completed during the previous SALP period.

Housekeeping was adequate and improving. The licensee has completed considerable painting and upgrading of the radiation control area, diesel generator, and turbine buildings. Plant lighting, however, continued to be poor with normal lighting insufficient in several areas, and burned out bulbs a frequent occurrence.

In order to increase operations department awareness of other plant operating techniques and practices, selected licensee management and operations staff visited other nuclear power stations during the evaluation period.

Shutdown Operations

During the period, the licensee's performance during outages declined as demonstrated by

personnel errors and lack of supervisory control. Examples of personnel errors during outages included the opening of a Unit 1 service water pump circuit breaker when a Unit 2 pump was supposed to be secured, and the deenergizing of the power supply for a Unit 1 residual heat removal system valve when a Unit 2 system valve was to be deenergized. Each of these errors occurred within a two week time period.

Events involving lack of supervisory control include inappropriate alignment of valves that connect the RWST to the Unit 1 reactor building which resulted in approximately 4500 gallons of water being drained to the reactor building and a rendering of the Unit 1 Turbine-Driven Auxiliary Feedwater pump (TDAFW) inoperable due to system misalignment.

Shutdown safety has been enhanced through an awareness program that was well publicized to the plant staff. During the latest Unit 2 refueling outage, the time in which the core was exposed to reduced Reactor Coolant System (RCS) inventory was minimized by completely unloading the core prior to going to mid-loop operations for installation of steam generator nozzle dams. A formal procedure was effectively developed and implemented for shutdown safety assessment. Critical safety functions such as reactivity conditions, power availability, residual heat removal and component cooling water system requirements, as well as spent fuel pool conditions were evaluated and posted at least once per shift.

Fire Protection Program

Significant management attention has been applied to correcting deficiencies in the fire protection system during the assessment period. Several yard loop piping and valve leaks were identified and repaired. The licensee has an on-going yard loop leak detection program which requires periodic surveys by fire protection personnel. These surveys have presented a heightened sensitivity to the declining conditions of the system.

Improvements made to the fire protection system included increased staffing in the fire protection group, completion of an extensive testing program for all site safety related fire dampers, and the

use of an improved program for control of movement of transient combustibles. However, continuing problems with the material condition of the diesel-driven and the motor-driven fire pumps have not been fully addressed.

Six violations including one Severity Level III violation were identified during the assessment period.

2. Performance Rating

Category: 2

3. Board Recommendations

A significant number of reactor trips, personnel errors, and equipment malfunctions were noted. Management attention is needed to reverse this trend and reduce the number of challenges to operators to respond to reactor transients. The Board also noted a number of events indicating a weakness in configuration control both at power and during shutdown conditions. Additional attention to these issues is warranted.

B. Radiological Controls

1. Analysis

This functional area addresses activities related to radiological controls, radioactive waste management, environmental monitoring, water chemistry, and transportation of radioactive materials.

The radiation protection program continued to be effective in controlling personnel exposure to radioactive materials and protecting the health and safety of plant personnel and the public.

The licensee continued to maintain a stable and well qualified health physics, environmental and chemistry organization. Personnel losses occurring during this period were promptly filled by experienced staff. Sufficient numbers of qualified technicians were available to support both outage and non-outage activities, and turnover among the technicians was low. The overall health physics, environmental, chemistry and radioactive waste training program was considered to be in-depth, as evidenced by a

comprehensive initial and retraining program and vendor supported specialized training. In addition, the licensee had a substantial number of technicians (14 of 38) certified by the National Registry of Radiation Protection Technicians. Special health physics training was provided for plant radiation workers in contamination control and use of a new dosimetry system to enhance worker awareness of problem areas and program changes.

The licensee's audits of the radiation protection, radioactive waste management, and radiological environmental monitoring programs were detailed and comprehensive, identified program weaknesses, and made recommendations for corrective actions. Actions on deficient areas were generally timely and appropriate.

During the assessment period, a weakness in the licensee's radiological incident reporting program was noted related to the documentation of root causes associated with radiological events. Because root causes were not always clearly specified, there was no evidence that adverse trends were being identified and corrective actions were being taken to prevent future radiological performance problems. Such a trend was identified by the NRC staff regarding the increase in personnel contamination events in 1992.

Overall, the licensee adequately controlled dose and outage planning and preparations were effective. Collective dose for the period was approximately 1080 person-rem which reflected activities for two outages. The licensee essentially met the 1991 established dose goal (648 versus 643 person-rem). Total exposure was commensurate with the work performed which included the expanded steam generator work. Implementation of lessons learned and the use of system mock-ups for training contributed to significantly lower doses for the Unit 2 Resistance Temperature Detector (RTD) removal and nozzle dam installation as compared to the same work during the 1991 Unit 1 outage. The licensee's cumulative exposure for 1992 through the end of the SALP period was approximately 43 person-rem, approximately 7 percent below the planned goal. A weakness was identified regarding the failure to properly label radioactive material

with the information necessary to minimize the potential for exposure; however, licensee corrective actions were effective.

Efforts to reduce external exposure during the period included the following initiatives: (1) full implementation of a computer based digital alarming dosimeter system; (2) development of a video tour of the Unit 2 containment which facilitated pre-job planning; (3) removal of the Unit 1 and 2 RTDs to reduce exposures inside containment; (4) purchase and robotic installation of newly designed steam generator nozzle dams; (5) improved crud burst methodology and filtration for the Unit 2 outage resulting in the removal of 1700 curies of Cobalt-58; and (6) construction of a barrier around the Unit 2 Regenerative Heat Exchanger to reduce the potential for personnel exposure to high dose rates.

The licensee's program for controlling contaminated surface area has improved during this assessment period with approximately 5-6 percent of the 138,000 square feet of radiological controlled area contaminated. Personnel contamination events for the period were 328, based on a lowered threshold of 1000 dpm/100 cm^2, with an increasing trend identified late in the period. Initial actions to identify and correct the cause for the increase were underway; however, the final evaluation has not been completed.

The health physics efforts in identifying and responding to the inadvertent spill of water from the refueling water storage tank to the containment building, on April 23, 1991, were prompt, and decontamination efforts were effective. No significant airborne radiological hazards, increased dose rates, or residual contaminated levels resulted from the spill.

The licensee's environmental monitoring program was effectively implemented. The program results for 1991 indicated that there was no significant radiological impact on the health and safety of the general public resulting from plant operations. Dose estimates calculated from environmental monitoring program data were in reasonable agreement with dose estimates calculated from effluent release data and were well within 40 CFR 190 limits.

The primary water chemistry was maintained well within Technical Specification (TS) requirements. Operation with a suspected pin-hole leak in the Unit 1 fuel (based on a small iodine (I-131) spike during power changes) did not result in the TS requirements being exceeded.

The licensee demonstrated that a good radiochemical analysis program was in place. All detectors were within calibration, calibration curves were in order and certificates of calibration were available and current. Daily source checks were properly documented. Procedures were adequate and consistently followed. Proper sampling techniques and health physics practices were utilized. A confirmatory measurements inspection conducted with the Region II mobile laboratory confirmed the adequacy of the licensee's program.

The licensee continued an aggressive effort to control the volume of radioactive waste shipped to the disposal site. For 1991, the volume of such material matched that of the previous year (about 5300 cubic feet).

The activities within the solidification and dewatering facility associated with filling and loading (onto the shipping vehicle) a Low Specific Activity shipment and a High Integrity Container were found to be well controlled and reflected the competence, training, and experience of the staff. Shipping documentation was thorough and well maintained.

One violation was identified during the assessment period.

2. Performance Rating

Category: 1

3. Board Recommendations

None.

C. Maintenance/Surveillance

1. Analysis

This functional area addresses those activities related to equipment condition, maintenance, surveillance performance, and equipment testing.

Overall, maintenance department support was improved by greater use of the Maintenance Engineering Support Group (MESG). This group was added in response to a need for a formalized process to address such items as: industry issues, incident report commitments, and predictive maintenance techniques. The MESG was staffed with skilled personnel with operations experience. MESG predictive maintenance and equipment monitoring was implemented in the areas of infrared thermography and equipment vibration analysis. MESG provided resources to shift crews in several areas including evaluation of equipment performance, procedure review, and scheduling. They were also directly involved in on-line motor fault testing, cable degradation testing, Motor Operated Valve (MOV) diagnostics, MOV refurbishment, and oil/wear-particle analysis.

The maintenance organization effectively applied its resources to significantly reduce and maintain a small corrective maintenance backlog and to conduct preventative maintenance. When needed, the permanent staff was supplemented with appropriate vendor and technical support personnel. When requested by the site, corporate management has been responsive and has provided maintenance support personnel.

The licensee has implemented a program which has improved the availability of tools for use inside the plant radiation control areas, particularly during plant outages. In addition, a reliability centered maintenance program was begun in July 1991. Service water, component cooling water, and residual heat removal system components were screened. Although the program has been initiated, it has not been fully effective in preventing equipment failures as indicated by the following discussions.

Declining equipment material conditions have adversely affected plant operations and five reactor trips occurred because of these

conditions. These included rod control card failures, recurring steam generator feedwater pump problems, a low voltage system transformer failure, and main turbine digital Electro-Hydraulic Control (EHC) system problems.

A number of EDG air start system problems have occurred during the evaluation period. To improve the reliability of the air start systems, the licensee conducted chemical cleaning and treatment of the air start reservoirs and associated air start header piping. As a result, the slow starting times which were earlier attributed to degraded air start piping and systems have improved.

A review of several events indicated a weakness in procedural adherence and supervisory oversight. Examples include improper termination of an electrical time-delay relay for the TDAFW pump; a RCS pressure reduction due to improper adjustment of a power-operated relief valve setpoint; a RCS pressure reduction during setpoint testing of a pressurizer code safety valve; inadvertent isolation of emergency diesel generator service water to the diesel generator building due to work being performed on the wrong unit flow transmitter; receipt of second degree burns by an electrician during transformer maintenance on energized equipment; and an unauthorized removal of control rod power to the stationary gripper coils.

The licensee maintained an adequate program for ensuring that surveillances, in general, were properly scheduled and conducted. Overall, surveillances were conducted with well-written procedures, adequate preplanning, and prompt resolution of discrepancies identified during testing.

Weaknesses in performance of surveillances were noted during the assessment period. These include leaving test switches in an improper position following testing of solid state protection system components, performance of a test on the wrong unit EDG service water flow transmitter, and a reactor trip caused by the failure of nuclear instrumentation control power fuses because of a poor test setup.

Overall, the in-service inspection program was implemented in a satisfactory manner. The Unit 2 ten-year reactor vessel internals inspection was conducted by well-trained and qualified personnel using state-of-the-art equipment. The licensee's technical procedures and administrative controls were consistent with code and regulatory requirements and were adequately implemented.

During the most recent Unit 2 outage, improvements for outage planning were evident. The improvements included: more realistic planning to complete outage tasks; improved coordination between the various work groups; rigid compliance with the general outage schedule even though certain tasks may have been completed ahead of schedule; and the scheduling of tasks to reduce the likelihood that both trains of safety-related equipment were out of service at the same time.

One violation was identified during the assessment period.

2. Performance Rating

Category: 2

3. Board Recommendations

Material condition, equipment performance, and instances of inadequate supervisory oversight have adversely affected plant operations. Special attention should be placed on addressing these concerns.

D. Emergency Preparedness

1. Analysis

This functional area includes evaluation of activities related to the implementation of the Emergency Plan (EP) and procedures, support and training of onsite and offsite emergency response organizations, licensee performance during emergency exercises and actual events.

Management support for the emergency preparedness program was evident during the period as the licensee continued to generally maintain (in a state of readiness) the basic emergency preparedness elements needed to identify promptly, classify correctly, and implement the EP. Program

strengths identified during inspection activity this assessment period included: maintenance of emergency equipment; thorough Emergency Preparedness program audits and a corrective action tracking system for findings from inspections, audits, and drill critiques; and a new auto dial system for notifications to staff response facilities.

Farley demonstrated sufficient preparation for dealing with site emergency situations during a full participation exercise in December 1991. During the exercise the licensee demonstrated it could implement the EP and take suitable actions to mitigate the onsite and offsite consequences of the accident scenario. Emergency classifications were correct as the scenario progressed and operations of the emergency response facilities and equipment observed during the annual exercise were good. However, two exercise weaknesses were identified concerning offsite notifications and failure to conduct a required personnel accountability determination within thirty minutes. The licensee has undertaken corrective action with respect to the exercise weaknesses. With the exception of these weaknesses, the overall exercise was judged to be successful.

During the SALP period, the licensee made appropriate revisions and upgrades of the EP and EP implementing procedures, conducted adequate drills and exercises, assured proper upkeep of EP equipment, and maintained coordination with offsite support groups. An additional position was also added to the existing EP staffing level.

NRC staff inspection of the licensee's emergency preparedness program disclosed several areas for potential improvement. The licensee was reviewing these areas for improvement and adoption, as appropriate, including: conducting operability tests of the emergency ventilation systems for the Technical Support Center and Emergency Operations Facility (EOF); conducting real-time activation drills to include the alternate EOF; and resolving recurring problems with delays in notification to on-call personnel during quarterly pager drills.

During the assessment period, all events appeared to have been classified correctly and no emergency declarations were made.

Two exercise weaknesses and no cited violations were identified during the assessment period.

2. Performance Rating

Category: 2

3. Board Recommendations

None.

E. Security

1. Analysis

This functional area addresses those security activities related to protection of vital plant systems and equipment, special nuclear material, and the Fitness For Duty Program.

During the assessment period, the licensee implemented and managed an excellent security program. The security program effectiveness has shown improvement since the previous evaluation period. A significant aspect of this improvement was the implementation of the security upgrade, which included physical barriers, detection and assessment aids, central and secondary alarm stations and the access control facilities. However, as noted in the previous SALP and the Regulatory Effectiveness Review conducted in 1986, there continued to be an insufficient number of cameras to provide adequate assessment in one area; therefore, a long term compensatory measure remained in effect.

Another aspect which contributed to the improvement was the proactive corporate, station, and security management team who were continuing to upgrade not only security equipment but also staffing. Security personnel enhancements were demonstrated with the recent addition of a full time training coordinator, who has rewritten and clarified the Training and Qualification Plan, lesson plans, security, qualification, and requalification tasks, and was developing a tactical response team training program. Additionally, the training coordinator has been designated to provide oversight of the training/requalification program to preclude any further requalification problems.

Although noted as a concern in the previous SALP, the licensee's shift and event reports were complete and well maintained during this assessment period. Security Incident Reports were being completed in a timely manner and security events requiring reports to the NRC were provided well within the time requirements. Additionally, the licensee had taken appropriate and timely action to remove the Safeguards Information from the forms and procedures referenced in the previous SALP report.

The licensee's independent security audit was timely, complete, and no programmatic problems were identified. The audit concluded that the security program was effectively implemented.

The required quarterly security drills were basic and were not challenging the security force's capability to respond to an outside threat. Additionally, the drill scenarios were being pre-announced and individual security force members' response actions were discussed before the drill. Therefore, the drills lost their effectiveness to determine if the security force was capable of adequately responding to an event during an emergency. The licensee is reviewing their method for the development and conduct of security drills.

The licensee's intrusion detection system has a high probability of detecting attempted penetrations. The exterior protected area and vital area barriers were found to be as defined in the Physical Security Plan. However, it was noted that the interior protected area barrier within the primary access portal was not clearly defined in the Physical Security Plan. The licensee is reviewing this issue.

The central and secondary alarm station and the associated alarm annunciators, assessment monitors and communication equipment functioned as described in the Physical Security Plan. The alarm station operators managed and controlled these stations efficiently and effectively.

During the SALP assessment period, the licensee submitted a complete revision of the physical security plan, contingency plan, and training and qualification plan. To aid in the NRC staff's evaluations of the plan submissions, the licensee

met with the staff to discuss the plan updates and to provide clarification as needed. This resulted in plans which better implemented regulatory requirements.

The licensee's program for control and accountability of special nuclear material was found to be properly implemented, was operationally functional, and personnel were highly cognizant of their assigned functions.

The licensee's Fitness For Duty Program was effective and continued to meet the objectives of a drug-free work place. The program was administered by a trained professional staff with aggressive audit and management oversight.

One violation was identified during the assessment period.

2. Performance Rating

Category: 1

3. Board Recommendations

None.

F. Engineering/Technical Support

1. Analysis

This functional area addresses those activities associated with the design of plant modifications, engineering and technical support for operations, outages, maintenance, testing and surveillance, and operator training.

Overall engineering and technical support was effective during this assessment period. Qualified and experienced licensee staff and contractors were available to provide engineering and technical support. Use of the contractors was generally effective and the technical adequacy of their work was good. The licensee normally demonstrated a good understanding of issues. Whenever technical issues were addressed, the appropriate knowledgeable personnel were involved who addressed the concern from a knowledge of NRC regulations, guidance, and generic issues.

Examples of effective engineering support included actions taken in response to NRC Generic Letter 89-13 which included implementing performance monitoring of service water flow to various safety related components. This and the previously implemented service water radiographic testing inspection program gave the licensee an effective program for monitoring service water piping degradation. Another example of effective engineering was the licensee's use of the work list revision priority system where proposed modification work was prioritized in accordance with weighting factors that were related to the nuclear safety significance of each modification. The scheduled dates for installing proposed plant modifications were commensurate with the safety significance of the work to be performed.

Examples of deficient engineering and a design control weakness were identified. One example concerned electrical drawings not being properly updated to show the as-wired condition prior to implementation of the RTD elimination modification and the failure to recognize that the technical specifcations required revision. The improper drawing was a primary contributor to an automatic reactor trip. This was an example of poor design control and evaluation of the completed RCS RTD bypass loop modification. Another example concerned the hydrostatic test performed for the RCS RTD bypass modification. This test did not meet the American Society of Mechanical Engineers (ASME) Code Section XI hydrostatic test criteria; however, the licensee discovered this problem before the reactor was returned to power operation. Other design control weaknesses included failure to ensure the incorporation of setpoint tolerances in drawings.

The licensee had an effective program of self-initiated safety assessments of plant safety systems. These ongoing self-evaluations, termed by the licensee as "Self-Initiated Safety System Assessments" (SSSA's) were performed to determine if the safety systems were capable of performing their design functions. A total of 13 systems have been identified for inclusion in the program. Functional System Descriptions (FSDs) have been completed and issued for six systems. The technical adequacy of the FSDs and their conformance with plant programs were evaluated by performing an SSSA upon completion of each FSD.

Discrepancies or open items identified during the SSSAs were dispositioned by use of a prioritization process which ensured resolution of problems from a nuclear safety standpoint.

The onsite MESG provided improved technical support for the operations and maintenance staffs during this assessment period. Areas which have been strengthened include the predictive maintenance program and the reliability centered maintenance program. The MESG also has responsibility for the onsite Generic Letter 89-10 MOV program. The licensee has implemented an acceptable MOV program although several weaknesses within the program were identified. The licensee failed to demonstrate that estimated minimum thrust requirements were conservative, and that thrust data taken from the differential pressure testing of MOVs at the site are applicable to other MOVs considered physically identical. Strengths within the licensee's Generic Letter 89-10 MOV program included the licensee's involvement with MOV industry groups, the thermal overload sizing and selection evaluations, and the technical support provided to the MOV maintenance program and maintenance training.

The licensee's training department continued to be effective in preparing operators for initial license examinations and in conducting their operator requalification program. Their success in preparing candidates for the Generic Fundamentals Examination was excellent. During this assessment period, two initial licensing examinations were conducted. Two of two reactor operators and eleven of twelve senior reactor operators passed. Two requalification examinations were conducted. Ten of ten reactor operators and twenty-nine of thirty senior reactor operators passed. During both requalification examinations administered, only minor modifications were required to the written and walkthrough portions of the exams submitted by the licensee. However, some weaknesses were noted in the areas of EOP usage and in crew communication.

Two violations were identified during the assessment period.

2. Performance Rating

Category: 2 (Improving)

3. Board Recommendations

None.

G. Safety Assessment/Quality Verification

1. Analysis

This functional area addresses those activities related to licensee implementation of safety policies; amendments, exemptions and relief requests; responses to Generic Letters, Bulletins and Information Notices; resolution of safety issues; reviews of plant modifications performed under 10 CFR 50.59; safety review committee activities, and use of feedback from self-assessment programs and activities.

The licensee continued to demonstrate a high level of corporate and station management involvement, control, and active participation in assuring quality in licensing activities. Management has been actively involved in licensing actions and their attention to schedules continued. Both corporate and site management, as appropriate, participated in discussions with the NRC staff concerning the resolution of issues, review of submittals, and responses to requests for additional information. Communications between the licensee's management and the NRC were effective in maintaining an understanding of the issues of importance to the NRC and the licensee.

A number of significant licensing actions were completed during the period including approval of interim steam generator tube plugging criteria, addition of Southern Nuclear Operating Company, Inc. to the licenses, use of VANTAGE-5 fuel, RTD bypass removal, and two leak-before-break analyses. An amendment request for steam generator tube alternate plugging criteria, which was the industry lead-plant submittal, was also received during the period. These actions utilized significant licensee resources, and the licensee's support for these actions was generally good. However, in the case of the VANTAGE-5 fuel and RTD bypass removal amendment for Unit 1, the application was incomplete in that the licensee failed to identify the need to revise a technical specification response time. This necessitated the issuance of a temporary waiver of compliance

and an emergency TS amendment to avoid a delay in plant startup.

Proposed licensing submittals and their schedules were normally coordinated with the staff in advance. In the rare cases where a delay in meeting committed submittal dates was necessary, the delay was discussed and agreed upon with the staff in advance of the due date. There was usually evidence of prior planning. However, not all activities had been adequately scheduled. For example, to support the Unit 2 Spring 1992 outage, expedited NRC reviews were required due to late requests for approval of inservice inspection relief requests, inservice testing relief requests, and approval of an ASME Code Case.

Licensee actions were generally conservative, thorough, and involved interaction with the NRC staff when appropriate. For example, although not strictly required by Unit 2 plant specifications, Unit 2 was maintained in a shutdown status for over one week in order to evaluate and eventually repair faulty rod control system components. Also, management required, on a routine basis, monthly control rod operability and main turbine governor valve testing at conservatively low power levels. Another example of a conservative action included identification and correction of residual heat removal suction valve automatic isolation test procedure deficiencies.

However, there have been situations where less conservative approaches were employed for plant activities. On occasion, decisions were made to work on or near CO2 fire protection actuation devices without implementing conservative tagout procedures or controls. Such actions resulted in the inadvertent release of CO2 during maintenance activities.

The licensee took adequate action in response to NRC Bulletin 89-02 for surveillance of check valves. This effort provided for an extensive review and evaluation of check valve performance in several of the plant piping systems.

The licensee effectively utilized the guidance of Generic Letter 90-05 to perform a temporary non-code repair of ASME Code Class 1, 2, and 3 Unit 2 service water return piping from the diesel generators. Plant general maintenance procedures

were reviewed to verify implementation of this guidance.

Licensee event reports (LERs) were timely and described the major aspects of various events, and included contributing factors. LERs met minimum requirements for root cause analyses.

Recurring events have raised NRC concerns about the depth of the licensee's root cause analyses. In many cases, corrective actions for procedural inadequacies, personnel errors and equipment failures tended to address effects rather than true cause. On occasion, proposed corrective actions were insufficient in evaluation and identification of root cause, as discussed in the Plant Operations and Maintenance/Surveillance sections of this report. Insufficient corrective actions have been taken to reverse the trend of an increase in the number of reactor plant transients.

The licensee's performance of audits and evaluations of various unit activities were adequate. Audits were often performed for routine surveillance testing and day-to-day plant operation. First-hand observations of outage activities were conducted. These actions and the use of more experienced personnel have, during the assessment period, enhanced the licensee's auditing and evaluation functions. In addition, as described in the Engineering/Technical Support functional area, the licensee had an effective program of self-initiated safety assessments of plant functional system descriptions.

Licensee Plant Operation Review Committee (PORC) meetings and recommendations were generally effective with respect to meeting safety objectives. The licensee's corporate assessment group, the Nuclear Operations Review Board (NORB), provided the required independent review and audit of various plant activities and NORB members received complete and detailed information prior to meetings. NORB and PORC meeting members appeared to be well-informed on agenda items, and meetings were conducted in a professional manner.

Two violations were identified during the assessment period.

2. Performance Rating

Category: 2

3. Board Recommendations

The Board noted a weakness in the threshold and thoroughness of root cause analyses. Special emphasis should be placed on corrective actions.

V. SUPPORTING DATA AND SUMMARIES

A. Licensee Activities

On May 16, 1992, Mr. D. Morey, Plant General Manager (Farley), assumed the position of General Plant Manager Nuclear Support and Mr. R. Hill, Assistant Plant General Manager (Farley), assumed the Plant General Manager position vacated by Mr. Morey.

During this assessment period, both units completed scheduled refueling outages. During the outages, up to 500 subcontractor personnel were required to accommodate outage activities. Outage activities included laser welding of sleeves on Unit 2 steam generator tubes, removal of RTD manifolds on both units coupled with the use of "quick-response" RTDs, and low pressure main turbine blading replacement on both units.

B. Direct Inspection and Review Activities

In addition to the 35 routine NRC inspections performed at Farley, 3 special and 2 reactive inspections were conducted as follows:

January 8, 1991	- Fitness for Duty (Special).
February 11-15, 1991	- Motor-Operated Valve Inspection (Special).
April 24 May 8, 1991	- Inadvertent dumping of RWST water to the Unit 1 containment building (Reactive).
July 23-24, 1991	- Changing operational modes while a Unit 1 valve in the flow path for the TDAFW pump was not in its correct position (Reactive).
December 16-20, 1991	- Emergency Operating Procedures (Special).

C. Escalated Enforcement Action

1. Orders

None.

2. Civil Penalties (CP)

A Severity Level III violation (EA91-102) was issued for not initiating an limiting condition for operation for an opened recirculation bypass valve which eventually rendered the TDAFW pump flowpath inoperable while changing from operational mode 2 to mode 1. ($25,000 CP)

D. Significant Licensee Conferences Held During The Appraisal Period

1/4/91 NRC Region II Office - Discussion of engineering and technical support activities at Farley.

1/11/91 NRC Headquarters Office - Discussion of Southern Nuclear Company corporate organization.

2/26/91 NRC Region II Office - Discussion of EP staff augmentation and technical support center and EOF activation.

3/26/91 Farley Site - NRC/Licensee Meeting of SALP Board Assessment.

8/22/91 NRC Region II Office - Enforcement conference to discuss NRC concerns associated with the restart of Unit 1 with an inoperable emergency feedwater pump.

9/12/91 NRC Region II Office - Discussion of operation with reduced safety margins, configuration control problems, poor work practices and inadequate supervisory oversight of station activities.

10/4/91 NRC Headquarters Office - Discussion of licensee plant AC electrical system design and Technical Specifications.

11/20/91 NRC Headquarters Office - Discussion of steam generator tube support plate alternate tube plugging criteria.

12/16/91 NRC Headquarters Office - Discussion of second ten-year interval inservice testing program relief requests.

12/18/91 NRC Headquarters Office - Licensee's appeal of the NRC's imposition of a backfit concerning operator overtime.

1/16/92 NRC Headquarters Office - Discussion of requested amendment for steam generator tube alternate plugging criteria.

2/6/92 NRC Headquarters Office - Discussion of potential amendment request for an interim steam generator tube plugging criteria.

E. Confirmation of Action Letters

None.

F. Reactor Trips

Unit 1

Four automatic and one manual reactor trip occurred:

On May 24, 1991: Automatic reactor trip from 78 percent power due to test error which resulted from plant electrical drawings not reflecting the "as wired" condition for a recently completed RCS RTD bypass loop modification.

On June 29, 1991: Automatic reactor trip from 100 percent power due to a failure of the "1B" Unit Auxiliary Transformer and a subsequent loss of voltage to the "1B" 4160V bus. The reactor trip was a result of a related turbine-generator trip.

On August 2, 1991: Automatic reactor trip from 100 percent power due to an inadvertent removal of power to the 1E voltage regulator Solatron. The Solatron power for the "C" reactor coolant pump breaker position indication was lost because of personnel error and poor communications between a plant system operator and a main control board operator.

On August 19, 1991: Automatic reactor trip from 100 percent power due to a lightning strike which cause an instantaneous overcurrent condition on phase 2 of the "1B" start-up transformer.

On October 3, 1991: Manual turbine trip and reactor trip from about 30 percent power due to the loss of both main feedwater pumps following a main feedwater system pressure transient. The transient was caused by a significant power reduction of about 70 percent due to a failure of the turbine EHC system. The transient produced a significant shrink in steam generator water levels.

Unit 2

Seven automatic and three manual reactor trips occurred:

On April 1, 1991: Automatic negative rate reactor trip from 100 percent due to rod control equipment power supply failure. The loss of power caused a dropped rod during operability testing of the bank "C" full-length control rods.

On April 9, 1991: Manual trip of the reactor from 34 percent power following a loss of the operating "2A" main feedwater pump, due to a EHC pipe fitting failure.

On April 20, 1991: Automatic reactor trip from 68 percent power due to a partial loss of main condenser vacuum and a subsequent automatic trip of the turbine-generator unit. This loss of vacuum was caused by personnel error during clean-up activities following maintenance.

On August 6, 1991: Automatic reactor trip from 100 percent power due to a lightning-induced power surge which momentarily created a transient in the unit rod control system.

On January 22, 1992: Manual reactor trip from 65 percent power performed by direction of management due to an exciter heat exchanger leak inside the main turbine generator exciter housing. This leak in the housing area was a result of a gasket installation error.

On March 6, 1992: Automatic reactor trip from about 10 percent power during a planned shutdown for normal refueling outage number 8. The trip was caused by end-of-life nuclear flux redistribution and related high flux effects on the intermediate range nuclear instrumentation and trip circuitry without adequate recalibration.

On May 12, 1992: Automatic reactor trip from 12 percent reactor power due a low steam generator water level. The transient was created during an attempt by the operators to dampen oscillations in reactor power, RCS average temperature, steam flow, and steam generator levels. A contributor to the event was the lack of sufficient operator training involving startup of the reactor with a positive moderator temperature coefficient. A subsequent low level condition in the "2C" steam generator was created.

On May 15, 1992: Automatic reactor trip from 34 percent power occurred when the control power fuses blew in instrumentation channels NI-41 and NI-43. The blown fuses were a result of inadequately evaluated test procedures and the use of unshielded versus shielded test leads.

On May 25, 1992: Manual reactor trip from 100 percent power was performed in response to a loss of the "2A" main feedwater pump. The pump loss was due to inadequate preventative maintenance of the pump's lube oil system.

On May 26, 1992: Automatic reactor trip from 45 percent power occurred when an electrician improperly deenergized the reactor control system power supply to the control rod drive system stationary gripper coils.

G. Review of Licensee Event Reports (LERs)

During the assessment period, 27 LERs were analyzed. Special reports were submitted during the period by the licensee but are not included in the table. The distribution of these events by cause, as determined by the NRC staff, was as follows:

Cause	Total	Unit 1	Unit 2	Both
Component Failure	6	3	3	-
Design/Procedures	1	1	-	-
Construction/Fabrication Installation	-	-	-	-
Personnel				
-Operating Activity	8	2	3	3
-Maintenance Activity	5	-	5	-
-Testing/Calibration Activity	-	-	-	-
-Other	3	1	1	1
Other	2	-	1	1
Totals	25	7	13	5

Notes:

1. Two LERs submitted during this assessment period were voluntary in nature and included reports made for temporary strainers found installed in the suction lines of the 1B and 1C charging pumps and the RWST water drained into the Unit 1 containment. These are not included in the above information.

2. With regard to the area of personnel, the NRC considers lack of procedures, inadequate procedures, and erroneous procedures to be classified as personnel error.

3. The Other category is comprised of LERs which were associated with lightning strikes.

4. The above information was derived from a review of LERs performed by the NRC staff and may not completely coincide with the licensee's cause assignments.

H. Licensing Activities

In addition to quality assurance and security plan submittals, there were approximately 78 active licensing actions for Farley, Units 1 and 2, during this SALP period (34 open at the end of the last SALP period plus 44 added during this period). Of these, 49 were completed. A total of 21 license amendment requests were submitted, and 13 were issued.

I. Enforcement Activity

FUNCTIONAL AREA	NO. OF VIOLATIONS IN SEVERITY LEVEL					
	Dev.	V	IV	III	II	I
			Unit 1/Unit 2			
- Plant Operations	-	-	5/3	1/0	-	-
- Radiological Controls	-	-	1/1	-	-	-
- Maintenance/Surveillance	-	-	1/1	-	-	-
- Emergency Preparedness	-	-	-	-	-	-
- Security	-	-	1/1	-	-	-
- Engineering/Technical Support	-	-	1/1	-	-	-
- Safety Assessment/ Quality Verification	-	-	-	-	-	-
TOTAL	-	-	9/7	1/0	-	-