ENCLOSURE

INITIAL SALP REPORT

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

INSPECTION REPORT NUMBER

50-400/89-33

CAROLINA POWER AND LIGHT COMPANY (CP&L)

SHEARON HARRIS 1

JULY 1, 1988 - NOVEMBER 30, 1989

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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 the licensee's management regarding the NRC's assessment of their facility's performance in each functional area.

An NRC SALP Board, composed of the staff members listed below, met on January 18, 1990, to review the observations and data on performance, and to assess licensee performance in accordance with the guidance in NRC Manual Chapter NRC-0516, "Systematic Assessment of Licensee Performance". The guidance and evaluation criteria are summarized in Section III of this report. 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 Shearon Harris Unit 1 for the period July 1, 1988 through November 30, 1989.

The SALP Board was composed of:

J. P. Stohr, Director, Division of Radiation Safety and Safeguards (DRSS), RII (Chairman)
L. A. Reyes, Director, Division of Reactor Projects (DRP), Region II (RII)
E. G. Adensam, Acting Deputy Director, Division of Reactor Safety, RII
D. M. Verrelli, Chief, Reactor Projects Branch 1, DRP, RII
J. E. Tedrow, Senior Resident Inspector, DRP, RII
R. A. Becker, Senior Project Manager, Project Directorate II-1, Office of Nuclear Reactor Regulation (NRR)

Attendees at SALP Board Meeting:

R. E. Carroll, Jr., Project Engineer, Project Section 1A, DRP, RII
M. C. Shannon, Resident Inspector, DRP, RII
T. Foley, Operations Engineer, Division of Licensee Performance and Quality Evaluation, NRR

II. SUMMARY OF RESULTS

Shearon Harris has been operated in an overall safe and effective manner during the assessment period. Major strengths were identified in the areas of plant operations, radiological controls, emergency preparedness, engineering/technical support, and safety assessment/quality verification. There were no major weaknesses identified in any functional area.

Increased management involvement in day to day activities was the major contributor to improved performance in the plant operations area. Overall, operations were performed in a professional manner by a motivated and well qualified staff. The shift turnover process and plant housekeeping continue to be strengths. Interface with other site organizations was excellent, resulting in effective resolution of system operating problems and increased safety system availability. Although a new on-line plant record of 208 days was established, further improvement centers on continued management attention to the secondary plant, since all eight reactor trips during this assessment period (the last of which ended the plant's continuous on-line record) resulted from transients on the secondary plant. The fire brigade has a professional staff and a sound, effective training program.

Harris has developed a good health physics program. Overall, the staff and management successfully met the challenge of two refueling outages and the receipt of spent fuel from Brunswick. Although some personnel contaminations occurred from improper controls and system operation, appreciable improvements were noted in the personnel contamination control program. Additionally, improvements in the radiation monitoring system were made which increased system reliability. Primary and secondary chemistry control programs were considered a strength.

The maintenance/surveillance area exhibited many strengths, which include the automated maintenance management system, maintenance planning feedback system, materials control system, instrument and control program, and the switch gear preventative maintenance program. Although this area generally produced good results, several occurrences of inadequate maintenance activities and surveillance procedural related deficiencies resulted in such significant events as three reactor trips, inoperable safety related equipment, and injection of reactor coolant system water into the instrument air system. Additionally, weaknesses were identified involving such areas as maintenance training documentation and inclusion of vendor recommendations.

Performance in the emergency preparedness area improved this assessment period. Strengths included comprehensive and detailed audits, strong management commitment, an effective tracking system, and a well trained and adequately staffed onsite emergency organization.

A decline in performance from the previous assessment period occurred in the area of security, due to deficiencies in the program for maintaining adequate barriers, several occurrences of security officer inattentiveness, and numerous failures to control access of personnel and packages. During this assessment period, there were also several positive initiatives which enhanced the protection of the station facilities.

The engineering/technical support area was considered to be a strength primarily due to the effectiveness of the technical support group and a strong design change development program. Effectiveness of the environmental qualification (EQ) program and coordinated efforts of

corporate and onsite engineering resources was also demonstrated. Weaknesses were identified and improvements made in the areas of EQ training and commercial grade procurement dedication. Results of operator examinations administered this assessment period indicate that related training programs are satisfactory.

Management involvement in the safety assessment/quality verification area was good. The licensee demonstrated a strong safety culture in its responses to safety concerns, making good use of oversight groups to identify and resolve various safety significant issues. Evaluations made in conjunction with the Human Performance Evaluation System and 10 CFR 50.59 were considered to be strong. Additionally, good root cause investigation was demonstrated and onsite quality assurance activities were properly focused. An area for improvement was identified with respect to following changes to external hazards.

Overview

The specific assigned ratings for the last rating period and the current period are shown in the following table. This table reflects the new listing of functional areas. Those areas shown in parentheses were the functional areas evaluated during the previous SALP period. In some cases, more than one functional area of the previous period are now combined into a new functional area. That is the reason for more than one rating being shown for the previous period.

Functional Area	Rating Last Period 7/1/87 - 6/30/88	Rating This Period 7/1/88 - 11/30/89
Plant Operations (Operations and Fire Protection)	2 (Improving)/2	1
Radiological Controls	2	1
Maintenance/Surveillance	1/1	2
Emergency Preparedness	2	1
Security	1	2
Engineering/Technical Support (Engineering, Training & Outages)	2 (Improving)/1/1	1
Safety Assessment/ Quality Verification (Quality Programs & Licensing)	2/2 (Improving)	1

III. CRITERIA

Licensee performance is assessed in the functional areas shown above. Functional areas normally represent areas significant to nuclear safety and the environment. Special areas may be added to highlight significant observations.

The evaluation criteria which were used, as applicable, to assess each functional area are described in detail in NRC Manual Chapter 0516. This chapter is in the Public Document Room files. Therefore, these criteria

are not repeated here, but will be presented in detail at the public meeting to be held with licensee management on February 20, 1990. However, the NRC is not limited to these criteria and others may have been used, where appropriate.

On the basis of the NRC assessment, each functional area evaluated is rated according to three performance categories. The definitions of these performance categories are shown below:

1. Category 1. Licensee management attention and involvement are readily evident and place emphasis on superior performance of nuclear safety or safeguards activities, with the resulting performance substantially exceeding regulatory requirements. Licensee resources are ample and effectively used so that a high level of plant and personnel performance is being achieved. Reduced NRC attention may be appropriate.

B. Category 2. Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are good. The licensee has attained a level of performance above that needed to meet regulatory requirements. Licensee resources are adequate and reasonably allocated so that good plant and personnel performance is being achieved. NRC attention may be maintained at normal levels.

C. Category 3. Licensee management attention to and involvement in the performance of nuclear safety or safeguards activities are not sufficient. The licensee's performance does not significantly exceed that needed to meet minimal regulatory requirements. Licensee resources appear to be strained or not effectively used. NRC attention should be increased above normal levels.

IV. PERFORMANCE ANALYSIS

A. Plant Operations

1. Analysis

This functional area addresses the control and performance of activities directly related to operating the unit, as well as fire protection. In addition to routine inspections conducted by the NRC staff, an Operational Performance Assessment (OPA) team inspection and a special inspection of an October 9, 1989 main generator and main transformer fire were performed.

The OPA inspection was performed during a three week period in which the licensee was completing its first refueling outage and continued up through entry into mode 4. During this period of coordinating a large number of activities, the Operations Department was observed to be in full control of all post maintenance testing and startup activities.

The performance of the operating staff continued to strengthen during the assessment period. Operations were performed in a professional, dedicated, and conscientious manner. After initial difficulties following the first refueling outage, the plant completed a 208 day continuous run. The plant experienced eight reactor trips, six were automatic and two were manual. All eight of the trips, which are described in Section V.H., were initiated from transients on the secondary plant. One trip was due to maintenance surveillance testing (MST), two were due to maintenance activities, one was due to non-licensed personnel error, and four were due to equipment failures. Corrective actions taken with respect to each trip were appropriate, and included such actions as: establishment of a review program for MSTs not previously performed at power; implementation of equipment design changes; retraining of personnel; and implementation of special inspection activities.

The operations staff continued to perform well during off-normal and transient conditions. An example of operator alertness occurred on September 21, 1989, at 2:15 a.m., when an auxiliary operator found and isolated an electro-hydraulic control system oil leak, which could have resulted in an unnecessary plant trip. Another example occurred during a test of the main feedwater isolation valves in which one of these valves fully closed. Prior to performing the test, the shift foreman reviewed the procedure with the operating crew and discussed possible system challenges which could occur. As a result, operators were able to take quick action and reopen the valve from the control room, thereby avoiding another unnecessary plant trip. An exception to the good performance during off-normal and transient conditions involved weaknesses in secondary plant knowledge that were identified following the first refueling outage. A maintenance related secondary transient eventually resulted in a manual reactor trip on October 30, 1988, due to inadequate operator knowledge of the secondary plant and multiple inappropriate operator actions. As indicated above, appropriate corrective actions were taken following the trip to improve the identified weaknesses.

The operations group, which is staffed with a large number of licensed personnel, functions well. The operations staff has had a low turnover rate which has resulted in an increasing experience level. Five senior licensed individuals were placed in one year rotational assignments to other site organizations, which included outage planning, maintenance planning, simulator support, licensed operator training, and operations procedures. The purpose of these rotational assignments is to broaden the operators' level of knowledge and strengthen overall plant operations.

The shift turnover process continues to be a strength in the operations area. Detailed pre-shift and post-shift turnover briefs are conducted by the operating crews. The offgoing shift foreman briefs all oncoming watchstanders on plant status, previous changes, and expected evolutions. After this, a standard one-on-one watch station relief takes place followed by an oncoming crew meeting in the control room where each watchstander discusses the activities planned for their watch station. This process has been effective in ensuring that all of the operators are aware of plant conditions and that any conflicting information is identified and resolved.

Administrative controls regarding control room access, posting of watchstander assignments, and uniform attire were effective in establishing control room professionalism. The operators maintain a professional demeanor, and their responses to alarms are taken without delay. The operators have adopted an "Operator Code of Ethics" to promote the high standards desired and expected to ensure safe plant operation.

Control room drawings are easily accessible, accurate, legible and maintained in good condition with Mylar protective coating. Key controls for operator access are well organized and maintained by the clearance center. The licensee utilizes an emergency procedure flowchart to conform to the Westinghouse owners group guidelines.

Shift foremen were in control of activities and demonstrated confidence of supervisory duties. The control room crews worked well together and train together as a crew. The clearance center removes much of the administrative burden from the shift foreman and also reduces unnecessary personnel access into the control room. Although much of the necessary approval/review burden is removed from the shift foreman by the clearance center, effective communications between the two groups keeps the shift foreman informed of plant status. The clearance center uses a specification appraisal computer program to determine system operability. A subprogram of this system is used for equipment clearances and each component that is tagged is entered into the specification appraisal system to determine which systems are affected. An equipment inoperable record (hardcopy file) is also maintained by the clearance center.

During the previous assessment period, three reactor trips were due to personnel errors. In an effort to reduce personnel errors, the licensee has increased management involvement in day to day activities. Shift foremen make daily detailed tours of plant areas monitoring performance of plant activities and auxiliary operator rounds. An off-shift shift foreman is assigned to make a weekly tour with an auxiliary operator from a different shift. The operations supervisor also performs

detailed inspections/tours of plant areas and observes the performance of all operating shifts in the control room on a periodic basis. The operations supervisor accompanies each of the auxiliary operators on rounds and occasionally conducts observations of backshift activities. Overall, this increase in management involvement appears to be effective.

Good management control and interface were noted at plant status and refueling outage meetings. Corporate interest and oversight were evident from the site visits and plant tours by senior management. Senior management knowledge of daily operations was gained by actually performing activities under the direction of qualified individuals. Activities with senior management involvement included mechanical maintenance, auxiliary operator rounds, and chemistry and health physics.

Plant housekeeping and materials condition continue to be a strength with only minor discrepancies noted in outlying areas. Equipment is clearly tagged and missing tags are promptly identified and replaced. Deficiencies are promptly identified, prioritized, and reviewed for system operability by the clearance center SRO (shift foreman designee). Additionally, site management, including all area managers, conducted routine plant and control room tours and performed a weekly building/area/level walkdown to identify housekeeping deficiencies.

Management involvement towards obtaining a "Black Board" control board annunciator status, is vigorous. The status of lit annuniciators is reported daily to management. The status report is reviewed, changes discussed, and corrective action conducted. Because of such management attention, the licensee anticipates having only about ten of the 745 annunciators lit following restart from the October 1989 refueling outage.

Operations interface with other site organizations was excellent. Technical support system engineers are relied upon to aid in solving system operating problems. Maintenance planning is assisted by the dedication of an SRO to the maintenance planning organization on a one year rotation. A shift foreman is also dedicated to the outage planning organization. Plant management has placed special emphasis on coordinating maintenance activities which has reduced the down time on safety related systems. This resulted in a safety system availability of 98.7 percent in 1989.

Licensee management has a clear understanding of NRC fire protection requirements and is responsive to NRC initiatives. Successful fire brigade performance was confirmed through observation of an unannounced drill and through followup inspections of the licensee's response to and investigation of fires which occurred in three areas in the Turbine building on

October 9, 1989. The licensee's fire fighting operations limited the fire damage to the points of origin and prevented the fire from spreading to adjacent equipment. The NRC staff attributed this to a sound fire brigade training program and the professionalism demonstrated by the fire brigade members. Assistance in extinguishing the October 9, 1989 fires was also provided by two offsite fire departments. The licensee's well-defined training program had provided the offsite firefighters with a good understanding of fire fighting procedures at the plant. This was demonstrated by their excellent response, coordination, and support during the October 9, 1989 fires. The licensee's use of fire watches has been personnel intensive, with some problems being identified in this area early in the assessment period. Although these problems appear to have been adequately corrected, little progress occurred in reducing the number of fire watches through the completion of fire suppression and detection systems.

Four violations were identified.

2. Performance Rating

Category: 1

3. Recommendations

None

B. Radiological Controls

1. Analysis

This functional area addresses those activities directly related to radiological controls. In addition to the routine inspections conducted throughout the assessment period, various aspects of the radiation protection program were also reviewed during the maintenance team inspection conducted in July/ August 1989. Overall, the licensee's radiation protection program effectively protected the health and safety of the workers and the public. Performance during the facility's first two refueling outages was effective in controlling worker dose. however there were continuing problems with personnel contaminations. Radwaste was effectively managed and controlled, and work towards improving monitor reliability continued.

Staffing was adequate and remained at a steady level. At the end of the assessment period, the licensee's health physics (HP) staff included 56 employees, 42 of which were HP technicians. Seventy percent of the HP technicians currently have more than three years of experience. The staff continued to experience a low turnover rate. The experience level of the staff continued

to increase during the assessment period, and the licensee was able to reduce its dependance upon vendor HP personnel in routine operations. The licensee's outage staffing levels were sufficient to monitor radiological conditions and provide the necessary support to implement the radiation protection program.

The licensee has approximately 462,000 square feet (ft^2) of floor space included in its contamination control plan. The licensee's goal was to maintain the total area contaminated to less than 9,000 ft^2. At the end of the assessment period, the licensee was in a refueling outage and had less than 6,000 ft^2 as a contaminated area. The licensee's efforts to minimize the contaminated area floor space is a program strength.

The licensee improved its personnel contamination control program during the assessment period, including good use of strippable coating for hot particle control. There were, however, continued examples of personnel contaminations resulting from improper controls and system operations. At the end of the assessment period, the licensee had recorded approximately 60 personnel skin and clothing radioactive material contamination events for 1989. This total is lower than the total documented in the previous year, in which the licensee documented 191 personnel contaminations. Several personnel contaminations occurred due to a failure to assess radiological contamination hazards. Additionally, personnel contaminations also resulted from improper system operations that caused non-contaminated areas to become unknowingly contaminated.

With respect to maintaining occupational exposures as low as reasonably achievable (ALARA), the licensee has set challenging goals. The station's 1987, 1988, and 1989 collective dose goals were established at 100, 360, and 150 person-rem, respectively. The licensee met the goals in 1987 and 1988 with collective doses of 33.5 and 169 person-rem. By the end of the assessment period, the licensee had accumulated 110 person-rem in 1989. (During this assessment period, the licensee had approximately 130 refueling days.) The licensee added two permanent ALARA technician positions on the staff during the assessment period. The licensee also assigned experienced vendor HP personnel to the ALARA staff during the second refueling outage.

Gaseous and liquid effluent releases were well within limits. Gaseous effluents showed no significant trends between 1987 and the first half of 1989. Liquid tritium and gross alpha releases also showed no significant trend into 1989. There was one unplanned gaseous release during the period (March 1989). This release was properly quantified by the licensee and determined to be well within Technical Specification effluent release and dose limitations. Projected offsite radiation doses for 1988

were a small fraction of the permissible release restrictions established by the Technical Specifications; 10 CFR 50, Appendix I; and 40 CFR 190.

Steam generator chemistry improved significantly during the assessment period. The improvements in steam generator sulfates, sodium, chloride, and conductivity could be directly attributed to improved condensate polisher operation, regeneration techniques, and improved steam generator blowdown operation. Reactor coolant chemistry parameters for the assessment period indicated good fuel cladding integrity, which is directly reflected by the liquid and gaseous effluent totals. Additionally, confirmatory measurements comparison conducted during January 1989 for Tritium, Strontium-89, Strontium-90, and Iron-55 showed acceptable agreement with the NRC's results.

The use of a vendor supplied liquid radwaste demineralizer package instead of the permanently installed radwaste system resulted in a significant reduction in solid radwaste generation. Operation of the vendor unit did result in some increased radiation exposure to operations personnel because of required manual system manipulations. However, little maintenance was required; therefore, the higher operator dose was offset by lower maintenance personnel dose.

The licensee experienced several problems with the radiation monitoring system (RMS) during the beginning of the assessment period. The RMS provides the plant with area radiation monitoring, airborne radiation monitoring, and process and effluent monitoring. The problems included excessive durations and numbers of inoperable monitors, computer unreliability, design problems, and several missed Technical Specification compensatory actions. Although only 39 of the 160 monitors in this system are Technical Specification related, the inoperability of several of these monitors had kept the licensee in continuous Technical Specification action statements, and numerous licensee event reports had been written regarding the operational problems associated with this system. The licensee formed a task force to correct these problems and undertook aggressive corrective action which included the redevelopment of the system design criteria, system simplification and reduction in the number of monitors, upgrade of system and compensatory action procedures, changes to computer software, assignment of a dedicated maintenance crew, establishment of higher maintenance priorities for Technical Specification monitors, and additional training both onsite and at vendor facilities. These actions have resulted in higher reliability for the monitors. The licensee continues to make improvements in this area.

Five violations were identified.

2. Performance Rating

Category: 1

3. Recommendations

None

C. Maintenance/Surveillance

1. Analysis

This functional area addresses those activities related to maintenance and surveillance. In addition to the routine inspections conducted during this assessment period, a maintenance team inspection was conducted in July/August 1989, which was directed toward the evaluation of equipment conditions, observation of in-process maintenance activities, review of equipment histories and records, and evaluation of maintenance control procedures and the overall maintenance program.

The maintenance organization is adequately staffed. All maintenance management and supervisory positions are staffed with permanent utility personnel. The worker/supervisor ratio is appropriate. During outages, CP&L traveling maintenance crews supplement the regular onsite maintenance forces. The licensee has a clearly established set of practical goals for the maintenance organization. One goal, the minimization of dependence on overtime, was not met during the 1988 refueling outage. A violation was identified concerning at least 34 instances where the Technical Specification overtime limits were exceeded without the required authorization.

The licensee's training and qualification program for maintenance personnel is adequate. The licensee has a formal training and qualification program which was accredited by INPO in December 1985. Observation of maintenance activities indicated that individuals performing maintenance functions were well qualified. However, the NRC staff did identify weaknesses concerning the lack of documented training for performance of some specialized tasks; the low number of individuals who completed the documented training program in some disciplines; and "grand fathering" some experienced craftsmen in the recertification process without requiring the individuals to complete refresher training.

The licensee's maintenance facilities are adequate. Maintenance shops are well organized and contain adequate equipment. Tool rooms (contaminated and non-contaminated) are clean, orderly, and well equipped. The licensee's materials control system is

considered a strength, contributing positively to the maintenance program. The licensee utilizes a bar code system to control issuance of parts and to control inventory which is tracked on a data base.

The licensee's automated maintenance management system (AMMS) is considered as a strength. AMMS provides a data base system to process work requests and authorizations (WR&As) and is interfaced with the equipment data base system to obtain specific information on the component needing maintenance. Maintenance records are stored in AMMS and are readily accessed for use by maintenance personnel.

The licensee's program to control the maintenance backlog is adequate. The licensee trends and controls the backlog as part of their performance indicator program, and performs important maintenance in a timely manner. The licensee significantly reduced the WR&A backlog from approximately 2500 in September 1988 to approximately 1500 in June 1989, and has recently implemented a program to further reduce and control the WR&A backlog.

The licensee's instrument and control program, the preventive maintenance program for switch gear, and the feedback system in planning maintenance activities were identified as strengths in the licensee's maintenance program. Weaknesses identified by the NRC staff were failure to include vendor recommendations in some equipment maintenance programs, failure to include all ASME Code Section XI standby equipment in the vibrational analysis predictive maintenance program, and the failure to address ASME Section XI Subsection IWA 7220 suitability analysis requirements for non-pressure retaining replacement parts, such as bearings, bushing, spring, stems, disks, and shafts. Another weakness was the failure to identify/specify consumables such as solvents, adhesives, and thread sealers in work packages to assure compatibility of the consumables used with the equipment and components affected by work.

Some examples of poor maintenance performance were evident. After performing maintenance on a feedwater heater, a sheet of plywood was left in the heater. The sheet of plywood caused a feedwater transient and eventual reactor trip. Maintenance activities performed on a bus duct cooling damper were attributed to the cause of the turbine fire discussed previously in Section IV.A. Specifically, damaged parts were inadvertently left in the bus duct, causing the ground fault which resulted in the turbine fire. Excessive seat leakage through main steam containment isolation valves to the turbine driven emergency feedwater pump occurred following maintenance on the valves. The inadequate maintenance resulted in a forced plant cooldown to repair the valves. Another instance of poor maintenance,

which was the subject of a violation, occurred when a motor to an emergency exhaust fan was not properly connected following work. The motor and fan were inoperable during the subsequent plant startup and power operation. This problem was compounded by the failure of post maintenance testing to detect the error.

Overall, the licensee's surveillance procedures were adequate. There were however, procedural deficiencies identified which resulted in several test inadequacies, injection of reactor coolant system water into the instrument air system, and the inadvertant starting of an auxiliary feedwater pump.

Observation of surveillance test activities in progress indicated that personnel conducting the tests were technically knowledgeable and were effective in coordinating test activities with ongoing plant operations. The licensee effectively controlled/tracked the performance of TS related surveillances through their surveillance tracking and scheduling system. One problem was noted, however, when the performance of an 18-month maintenance surveillance test (MST) at power, rather than during an outage, resulted in a plant trip. Inadequate review of the test procedure resulted in performing a portion of the MST which should not have been performed during power operations. This has been the only reactor trip caused by an MST since initial plant startup. After this event, a program requiring multiple discipline review of any MST not previously performed at power was implemented.

Post-refueling startup tests, thermal power monitoring, core performance and nuclear instrument calibration were reviewed. Minor weaknesses were identified by the staff concerning changes needed in procedures and hardware to improve the reliability of core power measurements and performance of confirmatory measurements.

The inservice inspection (ISI) and testing (IST) programs were also examined. These inspections included review of implementing procedures, observation of inspection and testing activities, and review of ISI and IST records. The NRC staff concluded that these programs were adequate.

Six violations and one deviation were identified.

2. Performance Rating

Category: 2

3. Recommendations

Increased management attention is warranted due to problems stemming from inadequate maintenance activities and surveillance

procedural deficiencies which resulted in the decrease in performance in this area during this period.

D. Emergency Preparedness

1. Analysis

This functional area addresses those licensee emergency preparedness activities observed during an exercise in September 1989, during responses to actual events, and during routine inspections. Overall, these observations showed an emergency preparedness program that is receiving management support. The licensee maintained the basic elements needed to promptly identify, correctly classify, adequately staff, and effectively implement the key elements of the Radiological Emergency Plan.

Inspection activity during this period identified several program strengths: (1) independent audits were detailed and comprehensive; (2) a strong management commitment for the emergency response program; (3) effective tracking systems known as the "Corrective Action Program," and the "Emergency Preparedness Action Items" were maintained for ensuring that prompt and adequate corrective actions were taken on items identified during independent audits and exercises; and (4) an onsite emergency organization that was adequately staffed and trained in accordance with the Emergency Plan Implementing Procedures. Particularly noteworthy was a "Nuclear Education Tracking System" used to ensure all Emergency Preparedness training was provided in a timely manner.

The first routine inspection in August 1988 noted that the licensee's emergency preparedness program was being effectively maintained in a state of operational readiness. The licensee maintained adequate emergency equipment, as well as a staff effectively trained for responding to an emergency. Noteworthy are good emergency response facilities which continue to be maintained in a dedicated manner. During an evaluation of operations staff capabilities to correctly identify and classify an event, it was found that the interviewees were prompt and technically correct in the event classification and in the subsequent actions taken in response to the postulated event. Additionally, seven emergency declarations made during the period were reviewed. In each case, the event was properly classified, and prompt notification of offsite authorities was made.

The second inspection in June 1989 noted that the licensee's emergency preparedness program appeared to be well organized and effectively managed with the emergency facilities and equipment being maintained in a high state of readiness. A senior control

operator demonstrated a thorough understanding of Emergency Action Levels concepts.

The annual emergency exercise in September 1989 demonstrated that the licensee could implement the Emergency Plan and procedures. The licensee demonstrated effective assignment of emergency response organization responsibilities; took appropriate actions to mitigate the plant casualty; initiated prompt activation and staffing of the emergency response facilities; and made the appropriate protective action recommendations. Overall, the exercise was considered successful; no exercise weaknesses were identified. The only finding identified was the need for the Site Emergency Coordinator and staff to be more involved in interactive problem solving between the Operations Support Center and Technical Support Center Accident Assessment Team in order to facilitate timely repairs.

The licensee continued to maintain an effective emergency notification and communication system, consisting of procedures, equipment, and trained staff to make appropriate notifications of offsite agencies. These systems included the Emergency Notification System; a dedicated Selective Signaling System; and backup equipment that included radio, a private telephone exchange, a microwave system, and commercial telephones. The public prompt notification system, consisting of sirens and tone-alert radios, was well maintained and tested.

The licensee continued to maintain an effective system for assuring appropriate onsite staffing and for augmenting onsite staff in the event of an emergency. The licensee's unannounced drill of shift augmentations showed that the staff could arrive onsite within the time requirements of the emergency plan.

The licensee continued to maintain an effective emergency preparedness program as evidenced by response to simulated and actual emergency events. An October 9, 1989, the emergency plan was implemented for an ALERT declaration resulting from turbine building fires and a subsequent flammable gas leak inside the turbine building. Emergency procedures were effectively implemented in controlling the fires successfully and offsite emergency support activities were effective and timely in their response. During a post accident review of this event, the licensee identified that certain specific requirements for achieving timely augmentation were not met and initiated prompt corrective action in the form of additional training.

No violations were identified.

2. Performance Rating

Category: 1

3. Recommendations

None

E. Security

1. Analysis

This functional area addresses those security activities related to protecting plant vital systems and equipment, as viewed during inspections and observations throughout the assessment period.

Security force staffing levels appeared to be adequate, however, the security staff has experienced a high turnover rate during this assessment period. Training was generally adequate, contributing to a general understanding of security duties. However, it fell short in the access control area as evidenced by problems noted below. The licensee implemented a retraining effort to improve the officers' skills in identifying contraband, weapons and explosives at the access control facility. This special training was in response to an incident during this assessment period when a weapon was introduced into the protected area and was not detected at the protected area portal by the officers. Programmatically, the performance of security officers was marginal as evidenced by numerous failures to control access of personnel and packages, and, in several examples, officers being found inattentive to their duties. These events indicate that the majority of these problems are individual performance problems representing a lack of sensitivity to regulatory commitments on the part of security shift supervisors.

With respect to the management of the security program, there appears to be adequate corporate and site involvement in support of the security organization. There is strong interface among the licensee's security programs at each of its three nuclear facilities and at its Corporate level. The licensee has allocated its resources reasonably to insure adequate security program staffing. Site self-assessments have been adequate and in some cases have led to upgrades and improvements. The licensee demonstrated initiative in its resolutions of the many technical issues raised by Generic Letter No. 89-07 relative to protecting its facility from a vehicle bomb threat. The licensee's approach to this issue was sound, effective and timely, and reflected innovation and creativity.

Deficiencies were noted in the licensee's program for maintaining adequate barriers. One Severity Level III violation, with an associated Civil Penalty, was issued relative to a degraded vital area barrier found by the licensee's

security force. Further investigation by the licensee found additional barrier deficiencies. An additional violation, a Severity Level IV, was issued because of a failure to report the barrier degradation event to the NRC within one hour. In response to this violation the licensee reevaluated its vital area barriers and revised the plant modification procedure to highlight barrier boundary criteria. Also, personnel responsible for reporting safeguards events were readvised as to their duties.

During this assessment period, problems were also noted with regard to some instances of inadequate camera assessment. The licensee continues to rely on long term compensatory measures (i.e., dedicated responding officer)in lieu of required camera assessment. However, the quality and effectiveness of the detection devices used at the protected area barrier were more than adequate.

The licensee was proactive in identifying certain operational conditions that would require additional protection for some safety related equipment. The licensee voluntarily provided all the appropriate security components and personnel to protect the area. This effort was well coordinated within the licensee's organization, as well as with the NRC.

Six violations were identified.

2. Performance Rating

Category: 2

3. Recommendations

The lower rating this assessment period is primarily the result of several examples of problems associated with poor security force personnel performance and an apparent lack of effective first level supervision. Additional management attention should be given to this area to effect improvement.

F. Engineering/Technical Support

1. Analysis

The engineering/technical support functional area addresses the adequacy of engineering and technical support for all plant activities. It includes licensee activities associated with plant modifications, technical support provided for operations, maintenance, testing and surveillances, licensed operator training, and configuration management. This evaluation was based on routine and special inspections conducted in this area and related functional areas. With the exception of commercial

grade procurement dedication deficiencies identified, effective engineering and technical support have been provided to the plant during this assessment period.

The licensee has established a strong design change development program. Its strength was attributable to clearly defined interfaces and a high quality information resource for design activity. The adequate and timely closeout of design change packages following physical implementation, demonstrated that program controls were being effectively utilized. Program procedures were updated to reference design groups and their responsibilities. Maintenance of clearly defined interfaces minimized the impact of the engineering reorganization associated with the transition from construction and pre-operational support to support of an operating plant. The reorganization was completed this assessment period and included the transfer of design functions offsite to the corporate nuclear engineering organization and consolidation of onsite engineering support functions. Corporate engineering for CP&L was reorganized from a discipline oriented resource to a site specific dedicated resource. Additionally, a small contingent of corporate design engineers was established onsite to improve the corporate interface with plant organizations and corporate involvement in site activities. Information from construction activity, system performance testing, and design basis was well documented and provided a reliable reference for design development activity. A computerized equipment data base system provided effective accessibility and retrievability of system and component information. The system descriptions were well maintained and accurate, contributing additional quality reference information for design activity.

Effective coordination of corporate and onsite engineering resources was demonstrated on major plant issues. Evaluation and resolution of plant structural steel design concerns identified this assessment period was conservative, timely, and comprehensive. The engineering involvement in evaluation of the main generator isophase short circuit, related fire, and resulting corrective actions demonstrated engineering support of plant events. Design changes implemented this assessment period which contributed to increased plant reliability included the reactor coolant system standpipe for midloop operations and a seal water system for startup of circulating water system pumps. Intensive engineering involvement was evident on cycle 2 and 3 reload amendments and the end-of-cycle moderator temperature coefficient revision. Interface with the NRC on these issues demonstrated good technical development and effective coordination between corporate and site technical organizations.

The effectiveness of the onsite technical support group was demonstrated by the high level of involvement of the engineering

staff and management in plant activities. Technical Support embarked on a spent fuel shipment program to receive spent fuel from the other CP&L plants. Five such shipments were received during the assessment period, with more expected in 1990. The system engineering organization has demonstrated effective support by their routine involvement in plant activities including maintenance, testing, and design change implementation. System engineers were frequently at job sites interfacing with other plant organizations and have developed a good working relationship throughout the plant. System engineers duties and responsibilities were clearly defined, focussing primarily on monitoring system performance and evaluating system problems. Component engineers provided additional onsite technical support. The quality of onsite engineering and technical support enabled management to interface effectively with the NRC on technical issues.

The licensee's environmental qualification (EQ) program for electrical equipment has been effective in resolving identified equipment and programmatic deficiencies. Design changes were implemented to comply with EQ guidelines. The plant staff was responsive to NRC initiatives in this area and responses were thorough. Licensee initiatives included action to improve plant interfaces with the EQ group, engineering system walkdowns, and surveys to monitor equipment degradation mechanisms. As a result of licensee self assessment activities, a program deficiency related to inadequate incorporation of EQ considerations as design inputs in the design change development process was identified and corrected. An exception to the overall adequate EQ program performance was a weakness identified early in the assessment period involving craft training on EQ issues. This weakness in EQ training contributed to several instances of inadequate maintenance activity which resulted in compromising the qualified status of Limitorque valve operators. Subsequent to the identification of this weakness, the licensee conducted a review of all EQ related maintenance procedures and completed the development/implementation of the formalized EQ training program for craft personnel.

Engineering performance related to commercial grade procurement dedication activities was generally adequate with the following identified exceptions. Limit switch rotors on containment spray system valves were replaced with commercial grade components without engineering evaluation or certifying documentation regarding suitability of use. The licensee took action to acquire certifying documentation for the installed rotors following identification by the NRC. Commercial grade ITE molded case circuit breakers were installed in safety-related electrical systems without adequate review for suitability and were demonstrated inadequate for the application. Receipt inspection testing did not require adequate verification of

component critical characteristics. Accordingly, applicable receipt inspection procedures were revised to ensure adequate quality verification and the inadequate circuit breakers were subsequently identified and replaced. In the rotor example, the licensee was not conservative in application of commercial grade procurement dedication controls. In the breaker example, applied commercial grade dedication controls were deficient in identifying components unsuitable for safety related applications.

Replacement examinations were administered to seven ROs during this assessment period. Six candidates passed the examination, and no specific weaknesses were identified. Requalification examinations were administered during the latter portion of the assessment period. The examinations involved 16 SROs and eight ROs with six crews being evaluated. The performance of two ROs, two SROs, and one crew was unsatisfactory. Performance weaknesses identified included crew communications and verification of control board indications. Additionally, the event classification procedures were identified as being difficult for operators to interpret for implementation. The individual and crew failures were removed from licensed duties, retrained and successfully reexamined prior to returning to licensed duty. An ongoing facility review of event classification procedures addressed identified procedural deficiencies.

Two violations were identified.

2. Performance Rating

Category: 1

3. Recommendations

None

G. Safety Assessment/Quality Verification

1. Analysis

This functional area includes a review of licensee implementation of safety policies, activities related to license amendments, exemption and relief requests; responses to generic letters, bulletins, and information notices; and resolution of TMI items and other regulatory initiatives. Also included were reviews of licensee resolution of safety issues, 10 CFR 50.59 evaluations, 10 CFR 21 assessments, safety review committee and self assessment activities, industry's operational experience, root cause analysis of plant events, use of feedback from quality assurance, and self assessment programs.

Management involvement in safety reviews is good. Management places a high priority on the assessment of industry experience and plant events for improving plant safety and performance. An operating experience feedback program has been in operation since initial fuel load which reviews industry experience identified in NRC Information Notices, Vendor Technical Bulletins, industry events, licensee event reports, and events at other CP&L sites. New items are discussed in weekly meetings and action items tracked by the site's Corrective Action Program.

The licensee has demonstrated a strong safety culture in its responses to safety concerns. Oversight groups were effectively utilized by the licensee to identify and resolve various safety significant areas of concern. Examples of this include: (1) a detailed review of the service water system that identified many concerns which were subsequently resolved through special testing performed by technical support and the nuclear engineering department; (2) a task force which was successful in resolving the overspeed tripping problem of the turbine driven auxiliary feedwater pump; (3) an assessment of the plant radiation monitoring system problems to develop actions which have made the system more reliable; (4) an assessment of the October 9, 1989 isolated phase bus duct faults and fires to verify root cause and event sequence; and (5) an extensive review of various relay testing which determined that a specific relay was not being tested properly. Additionally, a detailed review of the safety injection system was in progress at the end of the assessment period.

Selected plant nuclear safety committee meetings were observed. Good participation from committee members and good advance preparation by members for those items discussed were noted. Minutes from the meetings contained accurate documentation of the committee's activities.

The licensee's performance of 10 CFR 50.59 reviews was considered to be strong. The same can be said for the evaluations that were made in conjunction with the Human Performance Evaluation System (HPES) that was implemented during this assessment period.

Onsite Quality Assurance (QA) activities were being focused on activities which provided more meaningful information. An increased trend toward performance based QA surveillances was evident. The licensee required system/craft training of QA personnel, and two individuals completed six months of cross-training while assigned to the maintenance instrumentation and control group.

The licensee demonstrated good root cause investigation through use of the Plant Incident Report Program. Items included and documented in this program were plant trips, major equipment failures, and significant operator errors. Descriptions of events were detailed, root cause investigation and documentation were extensive, corrective actions were identified, and people/organizations responsible for resolution were identified. Other extensive root cause investigations have been performed and were effective in resolving issues in the areas of Conax connector failures, Kapton wiring failures, a thermography survey of containment, EQ limit switch problems with Target Rock valves, and the failure of an under-voltage lockout relay in a vital bus test circuit.

In general, the licensee's responses to Bulletins and Generic Letters (GL) demonstrates consistent evidence of prior planning and assignment of priorities. The licensee maintains current status of Bulletins and GLs, and the status is readily retrievable. Deadlines were met, and the resolution of issues was timely. This was demonstrated, in part, by the limited number of Bulletins and GLs remaining open. Evaluations required by Bulletins or GLs were generally technically adequate, with actions taken in response to Bulletin 88-10 (Nonconforming Molded-Case Circuit Breakers) exceeding Bulletin recommendations. However, the licensee's response to GL 88-17 (Loss of Decay Heat Removal) lacked adequate detail.

In the area of license amendment applications, the licensee exhibits consistent evidence of prior planning and proper assignment of priorities. For example, the licensee controls and schedules license amendments over the course of the year. Amendments are submitted well in advance of their need. Improvement in the licensee's "No Significant Hazards Consideration" (NSHC) determinations supporting amendment requests was noted during the assessment period. NSHC determination was noted as an area for improvement in the last assessment period. Engineering evaluations are consistently technically adequate and approaches are sound and thorough in almost all cases, demonstrating good engineering support as noted in that section. The reload amendment for cycle 3, utilizing 5.0 percent enriched VANTAGE 5 fuel for the first time at Harris, was an example. Another example is the amendment in support of Regulatory Guide 1.99, Revision 2, and Appendix G calculations to calculate, among other things, a new nil-ductility temperature and new heatup and cooldown curves. The staff concluded that significant quality control was evident in the preparation of the pressure-temperature limits calculations.

The licensee has demonstrated responsiveness to closing out TMI items. The resolution of items has been timely, technically sound and thorough in almost all cases. This responsiveness is

demonstrated by the fact that all TMI items, but one, which is under NRC review, are closed. The licensee's resolution of safety issues is generally viable, sound and thorough. For example, all but three of the Unresolved Safety Issues (USI) are complete for the Harris plant. However, the resolution of all safety issues is not consistent. Continuing evaluation of external plant hazards is one of those inconsistencies. For example, the removal of the Chlorine detection system from the technical specifications, when the reduction of internal and external hazards supported its removal, was diligently implemented. However, a proposed new Wakesouth airport in close proximity to the Harris plant was disclosed to the NRC by local development discussions rather than by the licensee. These disparities imply the absence of a systematic and consistent program to follow the changes in external hazards. When the airport issue was brought to the licensee's attention, the licensee pursued the evaluation aggressively. The airport issue is still being studied by the licensee.

Licensing personnel continued to demonstrate a strong technical understanding of technical issues and plant events, and effectively communicated with the staff on a daily basis. This interaction with the NRC staff resulted in clear understanding of plant events and safety issues.

No violations were identified.

2. Performance Rating

Category: 1

3. Recommendations

None

V. SUPPORTING DATA SUMMARIES

A. Licensee Activities

The plant established a new plant record for remaining on-line (208 days) during this assessment period. Also, the plant completed its first refueling outage and was near the completion of its second refueling outage at the end of this assessment period. Outages of short duration occurred on October 20, 1988, for turbine governor valve work, and on December 19, 1988, for work on auxiliary feedwater and pressurizer spray valves. Each of these outages was initiated by a controlled shutdown of the plant.

Eight reactor trips occurred. Two of these trips were manually initiated by control room operators in response to secondary plant

transients. The other six reactor trips, which occurred automatically, were also the result of secondary plant transients.

At the beginning of the assessment period, a new plant manager was in place. Additional changes during the second half of the assessment period included a new Harris Nuclear Project Manager and the outplacement of 25 employees resulting from CP&L's company wide organizational analysis (OA). In part, the OA consolidated the design function (offsite) and standardized onsite facility organizations for the licensee's three nuclear facilities.

B. Direct Inspection and Review Activities

Besides the routine inspections performed at the Harris facility by the NRC staff, special team inspections were conducted as follows:

- September 19-23 and October 3-7, 1988; Operational Performance Assessment to evaluate performance in the area of plant operations.
- July 31-August 4 and August 14-18, 1989; Maintenance team inspection to perform an indepth review of the maintenance program and its implementation.
- October 9-11, 1989; Reactive inspection associated with the main generator and main transformer fire.

C. Escalated Enforcement Action

1. Civil Penalties

Severity Level III violation issued on September 12, 1988, for a firearm in the protected area. (No CP)

Severity Level III violation issued on December 28, 1988, for vital area breaches. ($25,000 CP)

2. Orders

None

D. Management Conferences

August 16, 1988	Enforcement Conference at Region II to discuss a security access control problem.
September 27, 1988	Management Meeting at the Harris site to discuss SALP results.
November 18, 1988	Enforcement Conference at Region II to discuss the failure to provide vital area barriers.

E. Confirmation of Action Letters

None

F. Review of Licensee Event Reports (LERs)

During the assessment period 36 LERs were analyzed. The LERs were well written and issued in a timely manner. The distribution of these events by cause as determined by the licensee was as follows:

Cause	Unit 1
Component Failure	9
Design, Procedures	11
Construction, Fabrication, or Installation	0
Personnel	
- Operating Activity	4
- Maintenance Activity	4
- Test/Calibration Activity	1
- Other	7
Other	0
Total	36

G. Licensing Activities

In support of licensing activities, meetings were held with the licensee to address licensing and other technical issues. Nine license amendments were issued, the most significant of which involved: cycle 2 operation; reduced surveillance on, and then removal of, the chlorine detection system from the Technical Specifications; end-of-cycle moderator temperature coefficient revision; storage and handling authorization for 5.0 percent enriched fuel; reduction of residual heat removal pump flow for mid-loop operation; and cycle 3 operation with 5.0 percent VANTAGE fuel. In addition, a safety evaluation was issued (not associated with an Amendment request) concerning compliance with the ATWS Rule, 10 CFR 50.62.

H. Reactor Trips

During this assessment period, the plant experienced seven reactor trips with reactor power greater than 15 percent:

October 30, 1988 - Manual reactor trip following a feedwater transient at 98 percent power due to plywood debris left in the 3A feedwater heater.

January 16, 1989 - Automatic turbine/reactor trip from full power due to improper valve position causing low condenser vacuum.

February 6, 1989 - Automatic reactor trip from full power due to low-low steam generator water level following a main feedwater pump shaft shear.

February 7, 1989 - Automatic turbine/reactor trip from 47 percent power due to low condenser vacuum following a loss of circulating water pumps.

February 22, 1989 - Automatic reactor trip from full power due to a steam flow/feed flow mismatch coincident with low steam generator water level that was caused by the inappropriate performance of a maintenance surveillance test procedure.

March 14, 1989 - Automatic reactor trip from full power due to low-low steam generator water level following the trip of the 1B main feedwater pump after its motor junction box was sprayed by an inadvertent actuation of the fire sprinkler system.

October 9, 1989 - Automatic turbine/reactor trip from full power due to faults to ground occurring in a main output transformer and the main generator isophase bus duct.

One reactor trip occurred with reactor power less than 15 percent:

October 14, 1988 - Manual reactor trip from 14 percent power following the loss of operating condensate pumps due to inadequate condenser hotwell level.

I. Enforcement Activity

FUNCTIONAL AREA	NO. OF DEVIATIONS AND VIOLATIONS IN EACH SEVERITY LEVEL					
	Dev.	V	IV	III	II	I
Plant Operations	-	-	4	-	-	-
Radiological Controls	-	-	5	-	-	-
Maintenance Surveillance	1	-	6	-	-	-
Emergency Preparedness	-	-	-	-	-	-
Security	-	-	4	2	-	-
Engineering/Technical Support	-	-	2	-	-	-
Safety Assessment/Quality Verification	-	-	-	-	-	-
TOTAL	1	0	21	2	0	0