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ENCLOSURE 3

SALP BOARD REPORT

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE  
INSPECTION REPORT NUMBER  
50-400/85-41

CAROLINA POWER AND LIGHT COMPANY  
SHEARON HARRIS UNIT 1  
MAY 1, 1984 THROUGH OCTOBER 31, 1985

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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 based upon this information. SALP is supplemental to normal regulatory processes used to determine compliance with NRC rules and regulations. SALP is intended to be sufficiently diagnostic to provide a rational basis for allocating NRC resources and to provide meaningful guidance to the licensee's management to promote quality and safety of plant construction and operation.

An NRC SALP Board, composed of the staff members listed below, met on December 17, 1985, to review the collection of performance observations and data to assess the licensee performance in accordance with the guidance in NRC Manual Chapter 0516, "Systematic Assessment of Licensee Performance." A summary of the guidance and evaluation criteria is provided in Section II of this report.

This report is the SALP Board's assessment of the licensee's safety performance at Shearon Harris for the period May 1, 1984 through October 31, 1985.

SALP Board for Shearon Harris:

- R. D. Walker, Director, Division of Reactor Projects (DRP), Region II (RII) (Chairman)
- J. P. Stohr, Director, Division of Radiation Safety and Safeguards (DRSS), RII
- A. F. Gibson, Director, Division of Reactor Safety (DRS), RII
- D. M. Verrelli, Chief, Projects Branch 1, DRP, RII
- J. P. Knight, Assistant Director for Technical Support, Division of Pressurized Water Reactor Licensing-A (PWR-A), Office of Nuclear Reactor Regulation (NRR)

Attendee's at SALP Board Meeting

- P. E. Fredrickson, Chief, Project Section 1C, DRP, RII
- G. F. Maxwell, Senior Resident Inspector, Harris, DRP, RII
- L. S. Mellen, Project Inspector, Projects Section 1C, DRP, RII
- B. C. Buckley, Senior Project Manager, PWR Project Directorate 2, PWR-A, NRR
- L. S. Rubenstein, Director, PWR Project Directorate 2, PWR-A, NRR
- J. J. Blake, Chief, Materials and Processes Section, DRS, RII
- R. W. Wright, Reactor Inspector, Quality Assurance Programs Section, DRS, RII
- G. A. Belisle, Acting Chief, Quality Assurance Program Section, DRS, RII
- M. D. Hunt, Reactor Inspector, Plant Systems Section, DRS, RII
- J. R. Harris, Reactor Inspector, Plant Systems Section, DRS, RII
- G. R. Wiseman, Reactor Inspector, Plant Systems Section, DRS, RII
- P. T. Burnett, Reactor Inspector, Test Programs Section, DRS, RII

D. M. Collins, Chief, Emergency Preparedness and Radiological Protection Branch, DRSS, RII

G. A. Pick, Technical Support Inspector, TSS, DRP, RII

D. B. Gruber, Technical Support Inspector, TSS, DRP, RII

## II. CRITERIA

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

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

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

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

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

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

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

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

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

The SALP Board has also categorized the performance trend over the course of the SALP assessment period. The trend is meant to describe the general or prevailing tendency (the performance gradient) during the SALP period. This categorization is not a comparison between the current and previous SALP rating; rather the categorization process involves a review of performance during the current SALP period and categorization of the trend of performance during that period only. The performance trends are defined as follows:

Improving: Licensee performance has generally improved over the course of the SALP assessment period.

Constant: Licensee performance has remained essentially constant over the course of the SALP assessment period.

Declining: Licensee performance has generally declined over the course of the SALP assessment period.

### III. SUMMARY OF RESULTS

#### Overall Facility Evaluation

The licensee continued to implement an effective construction project, with qualified and experienced personnel. During this assessment period, corporate and site management have continued their dedication to the improvement of overall plant performance.

Major strengths were identified in the areas of soils and foundations, structural steel, piping systems and fire protection. Significant weaknesses were identified in one area. The electrical equipment and cables area continued to be plagued by the need for rework and repetitious inspections to achieve acceptable quality. Too much reliance had been placed on inspection forces to identify deficiencies which should have been identified by the responsible craft supervision. The licensee placed additional management emphasis in this area and improvements have been made.

Changes have been implemented in the Quality Assurance/Quality Control (QA/QC) area which significantly improved the site overall. A "Quality Check" program was established to address employee concerns. The Construction Inspection (CI) organization was integrated into QC, creating one comprehensive and cohesive inspection program under one manager, which allowed the licensee to provide more uniform criteria and inspection program policy. The QA Surveillance organization was strengthened through improved staffing and training, and a more intense surveillance program had been implemented. Finally, to provide more comprehensive corrective action for

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nonconformance reports, the licensee formed a special nonconformance report review group which consists of QA and engineering personnel.

The operations staff was given control of manipulating system motors, valves and equipment to support the ongoing preoperational test program. Their participation in the test program provided an opportunity for the operators to gain plant experience and hands-on system knowledge.

<u>Functional Area</u>	<u>2/2/83 - 4/30/84</u>	<u>5/1/84 - 10/31/85</u>	<u>Trend During Latest SALP Period</u>
Soils and Foundations	1	1	Constant
Containment, Safety Related Structures and Major Steel Supports	1	1	Constant
Piping Systems and Supports	2	1	Improving
Safety Related Components - Mechanical	2	2	Constant
Auxiliary Systems	1	2	Improving
Electrical Equipment and Cables	2	3	Improving
Instrumentation	Not Rated	2	Constant
Quality Programs and Administrative Controls Affecting Quality	2	2	Improving
Licensing Activities	2	2	Improving
Architect/Engineer Design	--	2	Not Determined
Preoperational Testing	--	2	Not Determined
Emergency Preparedness	--	2	Improving
Radiological Controls	--	Not Rated	—

#### IV. Performance Analysis

##### A. Soils and Foundations

##### 1. Analysis

One onsite inspection was performed by a regional based inspector in this area. One additional inspection was performed by the Office of Inspection and Enforcement (IE) Construction Appraisal Team (CAT). These inspections included examination of design criteria, quality assurance implementing procedures and specifications, observation of backfill operations, examination of calibration controls on soil testing equipment and examination of quality records for ongoing backfill work in the power block. The inspections also included examination of procedures and quality records for the safety related dam inspection program and a walkdown inspection of safety related dams.

Examination of procedures and specifications, work activities, and quality records showed that the licensee has an excellent quality assurance program for control of backfill operations. The safety

related dam inspection program, procedures and specifications met NRC requirements and industry standards. Work activities were performed in accordance with the procedure and specification requirements. Review of design criteria showed that some of the proctor curves referenced in the FSAR which are used as a standard for controlling the compaction of the fill were not representative of proctor curves used to control compaction in the field. Discussions with responsible engineers and examination of records showed that these curves were not used to control the backfill and were inserted in the FSAR in error. The FSAR was amended to delete these curves. Quality records were well maintained and readily available. Discussions with QC inspectors indicated the inspectors were knowledgeable in specification and procedure requirements and were documenting their inspections on applicable documents. Management involvement and resolution of technical issues were thorough. Staffing in this area was appropriate for the level of activity involved. Construction activities in this area are essentially completed.

No violations or deviations were identified.

2. Conclusion

Rating: 1

Trend: Constant

3. Board Recommendations

Performance in this area was evaluated as Category 1 during the previous SALP assessment.

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

1. Analysis - Containment and Safety Related Structures

Five inspections were performed by regional inspectors in this area. One additional inspection was performed by the CAT. The inspections involved review of QA implementing procedures, specifications and drawings; observation of work activities for structural steel, concrete placements, rebar installation and masonry walls; and examination of records documenting results of QA/QC inspection of work activities.

The licensee QA/QC procedures and controls met NRC requirements, and work activities were performed in accordance with QA/QC controlling drawings, procedures, and specifications. Examination of QA records showed that the records were complete and well maintained. One violation was identified involving two examples of reinforcing steel not installed in accordance with design drawings. The violation was not indicative of a programmatic

breakdown, but was a result of failure to properly interpret drawing requirements. Review of the licensee's response and followup corrective actions taken showed that the problem was properly addressed and corrected by management.

Observation of the licensee's response to deficiencies identified demonstrated active management involvement in addressing and correcting problems. Observations and discussions with QC inspectors demonstrated that staffing and training were appropriate for work activities in progress.

One violation was identified:

Severity Level IV violation for failure to install reinforcing steel in accordance with design drawings. (400/85-11)

## 2. Analysis - Structural Steel and Steel Supports

Inspections were performed by the resident and regional inspection staffs during the assessment period. The inspections involved review of QA implementing procedures, observation of activities, and review of quality records related to installation, erection, welding, heat treatment, and inspection of the containment and other safety related structures.

Work activities were accomplished in accordance with procedures with two minor exceptions. One violation (a below) was identified in the steel area involving two examples of failure to follow procedures. A Welding Material Requisition (WMR) was improperly prepared and welding material other than that specified on the WMR was issued, both contrary to the requirements of the controlling procedure. It was later determined that the initial preparation of the WMR was in error and that the welding material issued was technically acceptable. Another violation (b below) was identified in the area of placement of grout under a steel support baseplate. During an NRC inspection of baseplates in the containment and auxiliary buildings, one baseplate was identified to have been inadequately inspected by the licensee in that several grouting voids behind the baseplate had not been identified and corrected during licensee inspection. This deficiency appeared to be an isolated problem.

The review of quality records indicated that records were well maintained and readily retrievable. Quality assurance/quality control personnel involved in this area were well qualified for their job functions and knowledgeable in procedural requirements. Staffing in this area was adequate for the level of construction activity in progress.

Two violations were identified:

- a. Severity Level V violation for failure to control welding consumables in accordance with documented procedures (400/85-22).
- b. Severity Level V violation for failure to follow grouting procedure for grouted baseplates (400/85-28).

3. Conclusion

Category: 1

Trend: Constant

4. Board Recommendations

Performance in this area was evaluated as Category 1 during the previous SALP assessment. No change in NRC inspection activity is recommended.

C. Piping Systems and Supports

1. Analysis

During this evaluation period, inspections were performed by the regional and resident inspection staffs. Inspections included reviews of procedures; observation of work activities; and review of records in the areas of pipe welding, pipe support installation and welding, welder qualification, welding filler material control, welding repair, pipe storage, and preservice inspection.

The licensee's program to control work and insure quality in the area underwent major revisions during the previous evaluation period. Continued strong management attention was evident during this assessment period. Significant changes were made in the engineering support area to shift design responsibility from the architectural engineer, EBASCO, to the onsite Harris Plant Engineering Staff (HPES). Stress analysis calculation responsibility was transferred from EBASCO to HPES to provide onsite resolution of field problems. Site engineering was staffed and had developed the capability to perform onsite original design of pipe supports and restraints. Engineering procured the use of Westinghouse's structural analysis mobile unit which allowed all Class 1 analysis to be performed on site. HPES and Harris Plant Construction Staff (HPCS) personnel were placed in the field to provide direct assistance to craft personnel and craft supervision, thereby, providing timely resolution of field installation problems. An engineering review of applicable work and inspection procedures strengthened and provided more consistent criteria in this area.

The licensee's QA surveillance group and corporate audit group monitored these program changes through their transition period to ensure timely identification and resolution of problems.

The preservice inspection program for piping and pipe welds was essentially completed during this period. The only significant problems identified were main steam piping welds that exhibited below minimum wall thickness readings. These have been corrected.

With one minor exception, procedures were appropriate for the work. A violation was identified in this functional area involving failure of a maintenance procedure to contain a specific welding requirement. It was later determined that earlier revisions of the procedure contained the specific requirement and further that the requirement was being enforced by the welding inspectors.

Quality assurance/quality control personnel were well qualified for their job functions and knowledgeable of procedural requirements. Staffing in this area was adequate for the level of construction activity. Records were generally complete, well maintained and retrievable.

One violation was identified:

Severity Level V violation for failure to establish adequate procedures for welding stainless steel pipe (400/85-22).

2. Conclusion

Category: 1

Trend: Improving

3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. Increased management attention had been effective in improving the quality of work in the area. Decreased NRC inspection effort in this area is recommended.

D. Safety Related Components - Mechanical

1. Analysis

During this assessment period, inspections were performed by the regional and resident inspection staffs. Inspections were conducted in the areas of: receipt inspection; equipment storage; installation of equipment; installation of reactor vessel head and internals; and preservation and maintenance of safety related equipment. The procedures and controls utilized by the licensee

during these observations demonstrated evidence of good planning and priority assignment by the licensee. Precautions commensurate with the potential for damage, which could occur to equipment and materials, were evident during these activities.

The licensee actively participated in the Transamerica Delaval Owners Group which researched and provided recommendations for resolution of generic problems associated with the emergency diesel generators at Harris. As a result of these studies, the diesel engines at Harris were dismantled and reinspected. The engines have had defective components repaired or replaced to meet the recommendations of the owners group, had successfully completed their post-repair runs, and are presently receiving the recommended post-run reinspections. The licensee exercised good judgement and planning in establishing a well-organized plan for this evolution, and supporting this task with a staff comprised of experienced licensee employees supplemented by technical consultants, as needed, to successfully complete this endeavor.

One violation was identified in this functional area. The violation identified failure to establish adequate measures to control storage and preservation of equipment to prevent damage. This failure resulted in numerous examples of unauthorized temporary construction loads applied to permanent plant equipment; including rigging, scaffolding, and live loads imposed by personnel. Several examples of equipment damage due to temporary loads were identified.

QA/QC personnel were well qualified for their job functions and knowledgeable of procedural requirements. Staffing in this area was adequate for the level of construction activity. Records were generally complete, well maintained and available.

One violation was identified:

Severity Level IV violation for failure to establish adequate measures to control the storage of permanent plant equipment.  
(400/85-38)

2. Conclusion

Category: 2

Trend: Constant

3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. No change in NRC inspection activity is recommended.

## E. Auxiliary Systems

### 1. Analysis

During this assessment period, routine inspections of the licensee's fire protection/prevention program; fire protection systems; and heating, ventilation, and air conditioning (HVAC) systems were performed by the regional and resident inspection staffs.

Early in the assessment period the design and construction activities related to the installation of plant fire protection features was minimal. Management interest and involvement in the implementation of the fire protection program was increased, as evidenced by a notable increase in the onsite fire protection staffing and the assignment of corporate fire protection and scheduling personnel to support the implementation of the fire protection program. As a result, work progressed rapidly over the course of the assessment period in the areas of installation of permanent fire detection and suppression systems; installation of fire doors and dampers; completion of fire barriers and walls; and penetration sealing. The licensee's fire protection program for construction continued to remain strong and exceeded industry requirements. Frequent construction activity safety inspections were conducted by the licensee to insure that fire protection equipment was operational and fire hazards were eliminated. The licensee conducted frequent fire and training drills for the construction fire brigade. The current staffing and training for the construction fire protection program was considered adequate for the present construction phase.

The permanent plant fire protection features reviewed include the fire pumps, main yard fire protection piping, fire hydrants, and the interior fire hose and standpipe system. The fire pumps and yard fire system have been turned over to startup and operations; however, the final acceptance preoperational tests had not been conducted. During this period routine maintenance was performed on this equipment by the licensee and no major discrepancies were noted.

An assessment of the licensee's design, installation and testing program for the interior plant hose standpipe system was not made; however, verification was made that the system has been constructed under the licensee's QA/QC program and that all of the required QC inspections were being performed.

The licensee assigned the operations fire protection staff to the site. The staff had implemented its fire protection/prevention program for the portions of the plant site and systems which had been turned over to operations. The resident inspectors evaluated the fire protection staff's training and qualification program and

found the program to be acceptable. Fire protection personnel actively participated in a site emergency preparedness exercise which was held during May 1985; their performance exceeded NRC requirements.

The licensee has established a fire protection training facility which is located near the off-site Carolina Power and Light Company Energy and Environmental Center. The training facility provides a classroom and hands-on training program for not only Shearon Harris fire brigade personnel, but also for other Carolina Power and Light sites and local Wake County firefighters. The facility was jointly established by Carolina Power and Light Company and the Wake County government to make available a location where local firefighters could receive training.

To achieve a more mobile site firefighting response team, the licensee purchased a fire engine. The engine is equipped with state-of-the-art firefighting equipment and hardware.

No violations in the area of fire protection were identified.

In the area of HVAC, routine inspections were conducted by the resident and regional inspection staffs. A significant amount of construction work occurred in this area. This area was reorganized during the assessment period with all areas (craft, field engineering, documentation initiation and review) placed under a single manager to provide stronger controls as work in the area accelerated. All work and inspection procedures were rewritten, and a package concept was developed to provide more organized controls over the work and inspection efforts. This area received strong management attention and has shown improvement in production and quality during this assessment period. The Quality Assurance Surveillance (QAS) team monitored changes to make management aware of any revisions needed for program improvement.

Two violations were identified in the HVAC area. The first violation (a below) identified a failure to follow procedure. Welders fabricating HVAC duct work were noted welding outside the welding filler material parameters for wire feed speed allowed by a welding procedure specification. The licensee corrected this violation by expanding the range of the wire feed speed. The second violation (b below) identified failure to perform adequate inspections. Approximately 17 deficiencies were identified, which included such things as loose nuts, missing lockwashers, bent flanges, bolts not staked, drawing and documentation deficiencies, and welds not in accordance with design requirements. No single identified item was considered of major significance, but the numbers alone indicate a weakness in installation and inspection practices.

Although quality assurance/quality control personnel were well qualified for their job functions and knowledgeable of procedural requirements, an apparent weakness as noted above, existed relating to HVAC inspections. Staffing in this area was adequate for the level of construction activity. Records were generally complete, well maintained and available.

Two violations were identified:

- a. Severity Level IV violation for failure to follow a welding procedure specification. (400/85-29)
- b. Severity Level V violation for inadequate QC inspection of HVAC ductwork. (400/85-30)

2. Conclusion

Category: 2

Trend: Improving

3. Board Recommendations

Performance in this area was evaluated as Category 1 during the previous SALP assessment. Significant strengths were observed in the fire protection area; however, QA involvement in HVAC installation should be increased to improve performance in that area. No change in NRC inspection activity is recommended.

F. Electrical Equipment and Cables

1. Analysis

During this assessment period, inspections were performed by the resident and regional inspection staffs. The areas inspected included: electrical equipment receipt, storage and installation; conduit/raceway and electrical cable installation; quality assurance records; training and qualification of craft and inspection personnel; and corrective actions for 10 CFR 50.55(e) and NRC identified items.

The installation of safety-related cables and conduit was the major activity conducted during this assessment period. The majority of work associated with installation of motors, transformers, motor control centers, switchgear, and batteries was essentially complete and many of these devices were tested, energized and turned over to operations.

Five violations were identified which were related to engineering activities. The findings related to the failure of engineering to adequately support construction installation activities. The five

violations (a, d, g, h, and i below) reflect a weakness that was repeatedly identified by the resident inspection staff. After identification of weakness in this area by the Integrated Design Inspection (IDI) team, corrective action was taken to strengthen this area with the addition of more qualified personnel and the integration of HPES and HPCS engineering staff. The changes and added support to the construction activities have led to an improving trend.

Two of the violations (e and f below) resulted from the failure of licensee inspection personnel to identify equipment deficiencies. The licensee required engineering to review the electrical inspection procedures to reduce the number of generic Field Change Requests (FCRs) required to be used as inspection criteria. An extensive program by engineering to incorporate outstanding FCRs into drawings, specifications and inspection procedures led to a reduction in the amount of material that licensee inspectors were required to keep current, and remain knowledgeable of, in order to accomplish their inspection task.

One violation (j below) identified a problem of maintaining the status of equipment after turnover to the startup group. Heaters for the 1B and 1C charging/safety injection pump motors were found deenergized/inoperative but were not identified as such. The corrective action taken by the licensee established a program for inspection and signoff to insure that equipment is stored and maintained as required.

One violation (b below) indicated a lack of training and supervision of craft personnel. This problem has plagued this discipline for a lengthy period. Too much reliance was placed on the inspection forces to identify deficiencies. Significant management attention was directed in this area during the latter portion of this assessment period, after realization that slow construction progress in this area was adversely impacting overall project schedule. Without further improvement in production and quality, this area will continue to impact other areas and preclude attainment of overall project schedule.

During this assessment period the licensee developed a QA Surveillance Program as a means for evaluating the adequacy and effectiveness of the QA/QC program. The program was established by Project Management and is not a regulatory requirement. The program consisting of attribute surveillance, routine product surveillance and QA program surveillance covers construction and start-up activities, providing various trend analyses related to progress and completion of the project. If used as intended, this program should provide management with an additional source of information for evaluation of the QC and engineering activities, as well as serving as a guide for taking effective corrective

actions. This program has not been in force long enough to provide a basis for evaluation.

Ten violations were identified:

- a. Severity Level IV violation for inadequate design control for raceway separation. (400/85-08)
- b. Severity Level IV violation for inadequate training and supervision of electrical craft personnel. (400/84-24)
- c. Severity Level IV violation for failure to protect electrical equipment during construction. (400/84-23)
- d. Severity Level V violation for inadequate design control. (400/84-31)
- e. Severity Level V violation for failure to document nonconformances. (400/84-49)
- f. Severity Level V violation for inadequate inspection for electrical separation. (400/85-04)
- g. Severity Level V violation for inadequate electrical design. (400/85-04)
- h. Severity Level V violation for failure to control design drawings. (400/84-23)
- i. Severity Level V violation for failure to follow procedure to control electrical field modifications. (400/85-16)
- j. Severity Level V violation for failure to maintain status of equipment. (400/85-32)

2. Conclusion

Category: 3

Trend: Improving

3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. Recent changes in project management and resource allocation should result in improvement in this area. No change in NRC inspection activity is recommended.

actions. This program has not been in force long enough to provide a basis for evaluation.

Ten violations were identified:

- a. Severity Level IV violation for inadequate design control for raceway separation. (400/85-08)
- b. Severity Level IV violation for inadequate training and supervision of electrical craft personnel. (400/84-24)
- c. Severity Level IV violation for failure to protect electrical equipment during construction. (400/84-23)
- d. Severity Level V violation for inadequate design control. (400/84-31)
- e. Severity Level V violation for failure to document nonconformances. (400/84-49)
- f. Severity Level V violation for inadequate inspection for electrical separation. (400/85-04)
- g. Severity Level V violation for inadequate electrical design. (400/85-04)
- h. Severity Level V violation for failure to control design drawings. (400/84-23)
- i. Severity Level V violation for failure to follow procedure to control electrical field modifications. (400/85-16)
- j. Severity Level V violation for failure to maintain status of equipment. (400/85-32)

## 2. Conclusion

Category: 3

Trend: Improving

## 3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. Recent changes in project management and resource allocation should result in improvement in this area. No change in NRC inspection activity is recommended.

## G. Instrumentation

### 1. Analysis

During this assessment period, routine inspections were performed by the resident and regional inspection staffs. These inspections covered the areas of: installation of tubing, tube supports, components, equipment panels, and associated wiring.

The licensee's engineering, management, and quality assurance organizations were consistently involved in this program. Each of the above organizations were directly involved in work and inspection procedure development and implementation. As a result of deficiencies identified by QA surveillance during the initial phase of equipment installation in 1984, the licensee voluntarily stopped work when preliminary indications were that problems existed in this area. Continued QA surveillance and management involvement in this area resulted in an intense effort to identify and resolve problems. This area's teamwork sets an example for other site disciplines.

There were two violations identified in this area during the assessment period. In one violation (a below), a licensee inspector failed to verify one required inspection attribute for a pressure indicator seismic support. This item did not indicate a programatic breakdown. Records indicated that the attribute was acceptable and was additionally verified during a welding discipline inspection.

The other violation (b below), was the result of personnel supporting startup activities failing to follow procedures for cleanliness of instrumentation lines. This was not a construction related violation.

Two violations were identified:

- a. Severity Level V violation for inadequate inspection of a seismic support for a pressure indicator. (400/84-31)
- b. Severity Level V violation for failure to close air lines and sensing lines after equipment removal. (400/85-39)

### 2. Conclusion

Category: 2

Trend: Constant

### 3. Board Recommendations

Performance in this area was not evaluated during the previous SALP assessment. No change in NRC inspection activity is recommended.

## H. Quality Programs and Administrative Controls Affecting Quality

### 1. Analysis

During this evaluation period, routine inspections were conducted by the resident and regional inspection staffs. Regional QA specialists specifically inspected the following areas: onsite design activities; nonconformance controls; procurement, receiving, and storage; release for test program; 10 CFR Part 21 requirements; QA program changes and interfaces; audits; licensee actions taken on construction deficiency reports; and previously identified inspector followup matters.

The licensee consistently demonstrated a sound technical approach toward resolving problems that could affect quality at the facility. They have implemented changes to upgrade the QA program and provide management with information needed to improve the site overall. These improvements are as follows: implementation of a "Quality Check" program to address employee concerns; integration of the Quality Control and Construction Inspection organization into one comprehensive and cohesive inspection organization under one manager (this allows the licensee to provide more consistent criteria and policy for all inspection activities); strengthening of the QA surveillance organization through improved staffing and training; implementation of a surveillance attribute inspection program to provide management with better data on work quality; implementation of an additional inspection trending program to cover those areas not previously addressed; and establishment of a nonconformance control group. The nonconformance control group consolidates QA and engineering personnel into a single unit under one manager to provide more timely resolution of nonconformances and more comprehensive corrective action. This program, by providing better corrective action, reduced processing of repetitious nonconformance reports (NCRs).

During this assessment period, six violations were identified, four of which were related to nonconformance control activities. Two violations (a and b below) resulted from failure to take adequate and timely corrective actions, respectively, on a previously identified NRC violation concerning certification of coating (painting) personnel. One violation (c below) identified a licensee nonconformance report which was prematurely closed, by QA surveillance, without receiving adequate review of the disposition and corrective action. One violation (e below) involved QA surveillance reports that documented significant nonconforming conditions as "concerns" rather than nonconformances in accordance with procedure CQA-3. One violation (f below) resulted from work being performed on a system without benefit of manufacturers instructions. Four of these violations (a, b, c, and e below) appear to have resulted from improper implementation

of nonconformance control procedures rather than from inadequate measures. The licensee's nonconformance control group was effective in improving this area, since the violations all occurred during 1984, and similar violations were not repeated during the 1985 interim assessment period. The licensee provided timely and acceptable resolutions to the violations. These problems were not indicative of a programmatic breakdown.

Design quality assurance audits continued to be complete, timely and technically thorough. The licensee continued to increase the number of personnel and design responsibilities of the onsite Plant Engineering Section with the intent that this section will eventually assume all design responsibility for the plant. Design activities examined were well controlled and verifiable.

Quality assurance/quality control personnel were generally well qualified for their job functions and knowledgeable of procedural requirements. Specifics are addressed in the various functional areas. Staffing of QA positions continued to be adequate for the status of construction. The QA positions and authorities were satisfactorily defined and had sufficient organizational independence from cost and scheduling.

Procurement, receiving, receipt inspection, and storage activities were reviewed and found to be well controlled, documented properly and in compliance with regulatory requirements.

The licensee was responsive in resolving NRC inspector identified concerns and in reporting significant construction deficiencies reportable under 10 CFR 50.55(e). These reportable events were reported in a timely manner, documented accurately, and corrective actions were satisfactory to preclude recurrence of similar problems.

The licensee has expanded efforts in the area of operations QA/QC. The site currently is staffed with approximately 20 personnel in the operations QA surveillance area and 20 in the operations QC area. Those assigned to the QA surveillance group have increased their emphasis on preoperational testing, receipt inspection, operator training, fire protection, maintenance, and systems or components requiring rework. The resident inspectors observed almost continuous active QA surveillance in the above areas by the operations QA surveillance personnel. The limited number of violations against operations programs reflects the effectiveness of the increased surveillance.

Six violations were identified:

- a. Severity Level IV violation for inadequate corrective action on a previous violation. (400/84-23)
- b. Severity Level IV violation for failure to complete corrective action on specified date. (400/84-23)

- c. Severity Level IV violation for failure to properly review and disposition NCRs. (400/84-24)
- d. Severity Level IV violation for the failure to provide interface procedures for organizations performing design activities. (400/84-27)
- e. Severity Level V violation for failure to document nonconforming conditions in accordance with prescribed procedural requirements. (400/84-49)
- f. Severity Level V violation for failure to require manufacturers instructions to be available on site prior to equipment installation. (400/84-23)

2. Conclusion

Category: 2

Trend: Improving

3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. The board recognizes the significant efforts of the licensee's QA staff and the effectiveness of the Quality Check Program; however, NRC inspectors identified numerous deficiencies in the area of Electrical Equipment and Cables, Auxiliary Systems, and Safety-Related Equipment - Mechanical, which should have been identified by the licensee staff. No change in NRC inspection activity is recommended.

I. Licensing Activities

1. Analysis

The basis for appraisal was the applicant's performance in support of licensing actions that were either completed or had a significant level of activity during the current evaluation period.

Licensee management was effective and instrumental in the resolution of many licensing issues and was actively participating in resolving remaining issues, such as the design of the containment sump.

Licensee management demonstrated an awareness of licensing issues by virtue of its experience in the industry, technical expertise, and active participation in Owners Groups. Management also consistently exercised firm control over its contractor's

activities and maintained good communication between the contractor, its own staff, and the NRC staff.

The licensee had a manager at the Vice President level stationed at the site who was responsible for managing the design, construction, startup, operation, and maintenance of the Harris Nuclear Project. Representatives of the Nuclear Engineering and Licensing Department were also stationed at the site. As a result, in regard to licensing activities, there was generally consistent evidence of prior planning and assignment of priorities, as well as frequent management involvement and review.

In cases where generic questions arose, the licensee utilized industry owners groups to develop acceptable resolutions.

The licensee management and staff usually demonstrated a sound understanding of the technical licensing issues, based on evaluations performed by NRC technical reviewers. The onsite location of the applicant's engineering department, and the stationing of representatives of the Nuclear Engineering and Licensing Department on site, provided assurance that most engineering work related to complex technical issues (either completed by the licensee or performed under its direction by contractors) was adequately addressed.

The licensee developed a tracking system for resolution of licensing issues, including all safety evaluation report (SER) outstanding and confirmation issues, proposed license conditions, and TMI NUREG-0737 issues. Also included are all licensing actions currently requiring technical resolution. This report was helpful in tracking and resolving the remaining licensing issues.

The licensee's staff demonstrated a good working knowledge of applicable regulations, guides, standards, and generic issues pertaining to their plant. This was evidenced by the applicant's positive attitude and responsiveness to the NRC staff in addressing unresolved SER issues.

The licensee's licensing staff was adequately manned, and included one licensing engineer assigned to coordinate the Environmental Qualification (EQ), Pump and Valve Operability Review Team (PVORT) and Seismic Qualification Review Team (SQRT) audits, and two other licensing engineers assigned to coordinate efforts associated with the preparation of the Technical Specifications.

## 2. Conclusion

Category: 2

Trend: Improving

### 3. Board Recommendations

Performance in this area was evaluated as Category 2 during the previous SALP assessment. No change in NRC inspection activity is recommended.

## J. Architect/Engineer Design

### 1. Analysis

An Integrated Design Inspection (IDI) was conducted at the Harris site; EBASCO Services Inc., and at the Westinghouse Electric Corporation in Pittsburgh, Pennsylvania. The inspection was conducted from December 1984 through February 1985.

As a result of the inspection, several technical areas in the Shearon Harris design indicated weaknesses in the design process and, therefore, raised the possibility that similar weaknesses would be found in systems other than those inspected by the team. These are identified below.

- a. Voltage drop considerations were not properly accounted for in a number of analyses.
- b. The design of the containment sump did not fully follow the guidance given in Regulatory Guide 1.82 in developing fluid approach velocity to the sump screen.
- c. Relay coordination was not effectively accomplished.
- d. The design of slender struts used to support piping systems did not address their dynamic excitation and eccentricity.
- e. Radiation protection analyses performed by EBASCO's Applied Physics Department had numerous non-conservatism and errors.
- f. Non-seismic piping, equipment, and components whose failure could effect seismic equipment analyses were incomplete and deficient, with a walkdown planned to resolve problems.

The IDI team identified some concerns which were common to more than one discipline. These included:

- a. The EBASCO verification process was ineffective, as indicated by the number and nature of the deficiencies found by the inspection. The team concluded that this indicated a lack of management attention to an important area of the design process.

- b. Certain deficiencies were found in the design performed on-site by Carolina Power and Light which required design and hardware changes.

None of the identified deficiencies, either collectively or individually, were such that the overall adequacy of the Harris plant design was called into question.

Carolina Power and Light Company (CP&L) responded to the IDI report and a followup inspection to the IDI was conducted by the Office of Inspection and Enforcement at the EBASCO offices. In addition, two public meetings were held and the licensee submitted a report to allow the NRC to review the adequacy of the recirculation sump design. An additional public meeting was held to address all other IDI items remaining open. This information enabled all IDI items to be closed out with the exception of the containment sump design which is currently being reviewed by NRC.

The licensee has been aggressive in responding to the IDI report and issues raised during the followup inspection. Responses to individual inspection findings were generally acceptable. Adequate numbers of qualified personnel were assigned to resolve IDI report items.

The licensee's corrective actions taken to resolve the IDI findings were comprehensive, responsive, and technically correct.

## 2. Conclusion

Category: 2

Trend: Not Determined

## 3. Board Recommendations

Performance in this area was not evaluated during the previous SALP assessment.

## K. Preoperational Testing

### 1. Analysis

During the evaluation period, routine inspections were performed by the resident and regional inspection staff. Region II management held a meeting with CP&L senior management to address major areas of inspection activities scheduled to occur during the preoperational and start-up testing phases. The areas discussed included test procedures, test witnessing, qualification and training of test personnel, and the licensee's administrative controls which govern the conduct of the preoperational test

program. The licensee completed ten percent of the preoperational test program with a fuel loading date scheduled for March 1986.

A major preoperational milestone test completed was the reactor coolant system cold hydrostatic test. Management involvement and control during the preparation and successful completion of the cold hydrostatic test of the reactor coolant system was evidenced by the well-coordinated effort displayed among various staff components.

The preoperational test program has several features which proved to be very positive controls, including such items as thorough construction checkout before the systems are turned over for preoperational testing. The checkout includes hydrostatic testing, system flushes, testing direction of rotation of motors, and the initial energizing of electrical equipment. The permanent plant operators have participated in these tests, thus allowing them to gain operational experience and knowledge of systems. The permanent plant maintenance staff also gained considerable experience and systems knowledge as a result of their involvement in the preoperational testing.

One violation was identified, which resulted from one of the start-up engineers failing to follow procedural requirements when isolating the suction and discharge flow paths for the 1A charging pump. The pump was started with both valves shut, resulting in damage to the pump. Following the pump's repair the test was conducted successfully. The licensee was responsive to NRC concerns in this area and initiated prompt corrective action.

One violation was identified:

Severity Level IV violation for failure to follow procedures to provide flow path for chemical and volume control system charging pump, resulting in pump damage. (400/85-24)

## 2. Conclusion

Category: 2

Trend: Not Determined

## 3. Board Recommendations

Performance in this area was not evaluated during the previous SALP assessment. No change in NRC inspection activity is recommended.

## L. Emergency Preparedness

### 1. Analysis

During the evaluation period, inspections were performed by the regional and resident inspection staffs. These included a special inspection, an emergency preparedness appraisal, and a full-scale exercise. The special inspection determined that the emergency preparedness program was sufficiently in place to conduct the emergency preparedness appraisal as scheduled.

The emergency preparedness appraisal identified one deficiency concerning inconsistent initiating conditions for Notification of Unusual Events. In addition, there were also 49 emergency preparedness incomplete items and 34 emergency preparedness improvement items identified during the appraisal. The licensee applied adequate resources to correct or complete the identified items and all are scheduled for completion in early February 1986. Prior to the closing of this evaluation period, the licensee had reported completion of 53 of the 84 identified items.

The emergency preparedness exercise conducted in May 1985 showed that the licensee was able to successfully implement the emergency plan. Adequate equipment and staffing were available to support the emergency response effort during the exercise. One exercise weakness was noted regarding the need to evaluate the aerial plume tracking system to determine if improvements were necessary.

The emergency response facilities were well designed as was demonstrated during both the appraisal and exercise.

### 2. Conclusion

Category: 2

Trend: Improving

### 3. Board Recommendations

Performance in this area was not evaluated during the previous SALP assessment. No change in NRC inspection activity is recommended.

## M. Radiological Controls

During the assessment period one inspection was performed, limited to a review of the radiological environmental monitoring program.

The radiological environmental monitoring program was adequately managed at both the plant and the corporate environmental monitoring laboratory. The licensee demonstrated evidence of prior planning and assignment of priorities with well defined procedures for the control

of activities. In general, policies were properly stated and understandable. The environmental sample and calibration records were accessible, complete, and adequately maintained. Corporate audits were complete and detailed. The decision making process was at a level that ensured adequate management control. Positions were identified, authorities and responsibilities defined, and individuals had qualified in most key positions. The initial training program was established and was progressing satisfactorily.

## 2. Conclusion

Category: Not Rated

Trend: Not Determined

## 3. Board Recommendations

Performance in this area was not evaluated during the previous SALP assessment. No change in NRC inspection activity is recommended.

# V. Supporting Data and Summaries

## A. Licensee Activities

Between May 1, 1984, and October 31, 1985, the construction project progressed from 84 to 93 percent complete. The construction organization staffing peaked in March 1985 at approximately 6900 personnel. Site staffing decreased as construction work neared completion in the civil and mechanical areas, and more emphasis was placed on preoperational testing and start-up. The present site staffing is approximately 6100 employees.

Significant construction progress was made in the areas of equipment installation, large and small bore piping, pipe supports, and electrical cable installation. The majority of work remaining is in the areas of electrical cable installation, instrumentation and control, pipe supports, HVAC, and fire protection.

Approximately ten percent of the preoperational tests have been completed. The reactor vessel head was installed, allowing the reactor coolant system to be hydrostatically tested. In addition, the secondary side of the steam generators was hydrostatically tested. Both of these tests were satisfactorily performed by start-up, operations, and permanent plant maintenance personnel.

The licensee implemented the operations on-site nuclear safety unit. The unit's major role is the development of safety-related operations programs and procedures.

The operational regulatory compliance unit increased its development and scope of responsibilities during this evaluation period. This was accomplished by the acquisition of new personnel.

The licensee had implemented procedures which shift the maintenance responsibility for equipment to the Harris Plant Operations Staff (HPOS) once construction installation has occurred.

Operations security placed contract security personnel on-site for administrative preparations and site orientation. The industrial security force was expanded as the site work force increased. A training program for the Nuclear Security personnel was started.

The Institute of Nuclear Power Operations conducted two evaluations during this assessment period, one related to construction and design and the other to operational readiness. The construction evaluation was conducted during the weeks of August 13, 20 and September 3, 1984. The operations evaluation was conducted during the weeks of June 17 and 24, 1985.

#### B. Inspection Activities

During this assessment period, the routine inspection program was conducted by resident and regional inspection staffs. Special inspections were conducted by the Construction Appraisal Team and Integrated Design Inspection Team. A full-scale emergency preparedness exercise was conducted which involved full NRC participation.

#### C. Licensing Activities

Significant licensing issues addressed during this evaluation period included resolution of issues as reported in Supplement 2 to the SER; evaluation of intermediate arbitrary pipe breaks; and an amendment granted for exemption from General Design Criterion 4.

##### NRR/Licensee Meetings

Drug abuse contention - September, 1985  
 Containment sump design - August, 1985  
 Caseload Forecast Panel - June, 1985

##### NRR Site Visits

Chilled Water System Walkdown - September, 1985  
 Caseload Forecast Panel - June, 1985

#### D. Investigation and Allegation Review

Twenty-two allegations were reviewed during the assessment period. Eight were closed as not being substantiated, two concerned possible drug use, two were critical of the engineering department, two were brought forward at the Atomic Safety and Licensing Board hearings during in-camera sessions, and the remaining eight concerned general construction practices.

## E. Escalated Enforcement Actions

None.

## F. Management Conferences Held During this Assessment Period

A management meeting was held on August 9, 1984 to discuss Emergency Plans, Emergency Action Levels and their relationship to Emergency Operating Procedures.

A management meeting was held on July 23, 1985, to discuss the Licensed Operator Qualification Program.

## G. Confirmation of Action Letters

None.

## H. Review of Construction Deficiency Reports submitted by the Licensee

There were 26 construction deficiency reports submitted during this evaluation period. The distribution of these deficiencies was as follows:

Materials	5
Mechanical	4
Electrical	10
Design	5
Welding	2

## I. Enforcement Activity

FUNCTIONAL AREA	NO. OF DEVIATIONS AND VIOLATIONS IN EACH SEVERITY LEVEL					
	D	V	IV	III	II	I
Soils and Foundations						
Containment, Safety Related Structures, and Major Steel Supports		2	1			
Piping Systems and Supports		1				
Safety Related Components - Mechanical			1			
Auxiliary Systems		1	1			
Electrical Equipment and Cables		7	3			
Instrumentation		2				
Quality Programs and Administrative Controls Affecting Quality		2	4			
Licensing Activities						
Architect/Engineer Design						
Preoperational Testing			1			
Emergency Preparedness						
Radiological Controls						
TOTAL		15	11			