UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-400/94-23

Licensee: Carolina Power and Light Company
P. O. Box 1551
Raleigh, NC 27602

Docket No.: 50-400 License No.: NPF-63

Facility Name: Shearon Harris Unit 1

Inspection Conducted: November 13 - December 3, 1994

Inspectors: _____ Dec 7, 1994
S. Elrod, Senior Resident Inspector Date Signed

_____ 12/7/94
D. Roberts, Resident Inspector Date Signed

Approved by: _____ 12/7/94
H. Christensen, Chief Date Signed
Reactor Projects Section 1A
Division of Reactor Projects

SUMMARY

Scope:

This routine inspection was conducted by two resident inspectors in the areas of plant operations, review of nonconformance reports, followup of onsite events, maintenance observation, surveillance observation, design changes and modifications, plant housekeeping, radiological controls, security, fire protection, review of licensee event reports, and licensee action on previous inspection items. Numerous facility tours were conducted and facility operations observed. Backshifts tours and observations were conducted on November 21, 22, 25, 28, and 30, 1994.

Results:

Operational Safety

An apparent violation was identified involving the failure to maintain required control room shift staffing levels, paragraph 3.a.(2).

Additional management attention is warranted in the area of control room shift supervisor logs, paragraph 3.a.(1).

With the approach of Winter, the licensee has recently taken an aggressive approach in reducing the open item backlog of cold weather protection system items, paragraph 3.c.

The inspector considered the licensee's internal NAS audit of the plant's cold weather protection program to be thorough, paragraph 3.c.

Maintenance

A violation was identified involving failure to maintain the 1B-SB emergency battery operable, paragraph 4.c.

An inspector followup item was identified to track the licensee's efforts to enhance the on-line maintenance process, paragraph 4.d.

Engineering Activities

Engineering efforts in determining operability of a 59-cell configuration for the 1B-SB emergency battery were appropriate, paragraph 5.

Plant Support

A weakness was identified concerning the delayed notification to the plant of a coastal hurricane warning. The licensee had initiated corrective action by the end of the report period. paragraph 6.e.

REPORT DETAILS

1. PERSONS CONTACTED

Licensee Employees

D. Batton, Manager, Work Control
D. Braund, Manager, Security
*B. Christiansen, Manager, Maintenance
*J. Collins, Manager, Training
J. Dobbs, Manager, Outages
*J. Donahue, General Manager, Harris Plant
*R. Duncan, Manager, Technical Support
M. Hamby, Manager, Regulatory Compliance
D. McCarthy, Manager, Regulatory Affairs
*R. Prunty, Manager, Licensing & Regulatory Programs
W. Robinson, Vice President, Harris Plant
*G. Rolfson, Manager, Harris Engineering Support Services
H. Smith, Manager, Radwaste Operation
*B. White, Manager, Environmental and Radiation Control
A. Williams, Manager, Operations

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation and corporate personnel.

NRC Personnel

*S. Elrod, Senior Resident Inspector, Shearon Harris
*D. Roberts, Resident Inspector, Shearon Harris

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. PLANT STATUS AND ACTIVITIES

a. The plant continued in power operation (Mode 1) for the duration of this inspection period, ending the period in day 25 of power operation since startup on November 8.

b. M. Lengerich of the National Interagency Fire Center in Boise, Idaho, accompanied by J. Hufham of NRC Region II, was at the site on December 2 to conduct a telecommunications survey. This survey will be used in developing an emergency telecommunications deployment plan to support the NRC with communications in the event of a nuclear emergency. No other NRC inspections or meetings occurred at the site during this inspection period.

3. OPERATIONS

a. Plant Operations (71707)

(1) Shift Logs and Facility Records

The inspector reviewed records and discussed various entries with operations personnel to verify compliance with the Technical Specifications (TS) and the licensee's administrative procedures. The following records were reviewed: shift supervisor's log; control operator's log; night order book; equipment inoperable record; active clearance log; grounding device log; temporary modification log; chemistry daily reports; shift turnover checklist; and selected radwaste logs. In addition, the inspector independently verified clearance order tagouts.

During a review of the shift supervisor's log book in the MCR, the inspector noted that a TS LCO action statement entry for the "A" containment spray pump was not logged for November 30. The inspector had previously noted that on November 24 and 25, entries into TS LCO action statements for the "A" EDG and then again on November 27 and 28 for the "B" EDG were not logged. The EDGs were inoperable for a short time to allow for post-run barring-over evolutions. Previous examples of inadequate shift supervisor logs have been discussed in NRC Inspection Reports 400/94-21 and 94-15. In all of the cases, the information missing from the shift supervisor's logs was available from other sources. However, the latest examples indicate that more management attention is warranted in this area.

The inspectors found the logs to be legible and well organized. Except as noted above, the logs provided sufficient information on plant status and events. Clearance tagouts were found to be properly implemented. No violations or deviations were identified.

(2) Facility Tours and Observations

Throughout the inspection period, facility tours were conducted to observe activities in progress. Some of these observations were conducted during backshifts. Also, during this inspection period, licensee meetings were attended by the inspectors to observe planning and management activities. The facility tours and observations encompassed the following areas: security perimeter fence; main control room; emergency diesel generator building; reactor auxiliary building; waste processing building; turbine building; fuel handling building; emergency service water building; battery rooms; electrical switchgear rooms; and the technical support center.

During these tours, observations were made regarding monitoring instrumentation which included equipment operating status, electrical system lineup, reactor operating parameters, and auxiliary equipment operating parameters. Indicated parameters were verified to be in accordance with the TS for the current operational mode. The inspectors also verified that operating shift staffing was in accordance with TS requirements and that control room operations were being conducted in an orderly and professional manner. In addition, the inspector observed shift turnovers on various occasions to verify the continuity of plant status, operational problems, and other pertinent plant information during these turnovers.

Inadequate MCR Shift Staffing

On November 28, the inspector was notified that shift staffing in the MCR had fallen below TS requirements for a brief period earlier that afternoon. Specifically, only one licensed SRO and no licensed ROs were in the MCR. This condition existed for about four minutes before licensee personnel identified the situation and corrected it.

The normal MCR shift staffing level during Mode 1 operations at Harris consists of two SCOs (NRC SRO licensed), two COs (NRC RO licensed), and one STA. One of the SCOs has the position of Shift Supervisor - Nuclear (SSN). The other SCO generally directs the control board activities conducted by each of the two COs. One of the two COs attends to the balance of plant (BOP) controls while the other is considered to be the Reactor Operator (RO) who attends to the NSSS controls. Both TS and Licensee procedures require that at least one licensed SCO and one licensed CO remain in the MCR during Modes 1 through 4.

Sometime after 12:00 noon on November 28, the SSN exited the MCR to have lunch and attend a meeting. Later during the hour, the BOP operator left the MCR to get lunch from a kitchen located outside of the MCR and about 30 feet away. He apparently announced to the RO and the SCO that he was exiting the MCR, but did not get an acknowledgement. Subsequently, but prior to the BOP operator's return, the RO announced to the SCO that he was leaving the MCR for the work control (clearance) center to initiate a work ticket. The RO received SCO acknowledgement as he was exiting the MCR. After the RO left, the MCR was staffed with the sole remaining SCO, the on-shift STA (non-licensed), and three non-licensed trainees [two auxiliary operators (AO) and an STA]. The trainees were receiving on-the-job training in preparation for initial operator licensing exams to be taken next year. They were stationed at the RO and BOP controls

and at the SCO's desk to perform licensed duties under the direct supervision of a licensed operator. Although not performing licensed activities at the time, the trainee at the BOP controls realized he was without direct supervision and alerted the SCO. The SCO then paged the RO to return to the MCR. The RO had reportedly entered the MCR on his own before the SCO could finish paging him. The RO and the SCO were not aware during the event that they were violating TS.

Security records indicated that the RO had been out of the MCR for approximately four minutes between 12:35 and 12:39 p.m. No security records were obtained for the BOP operator because his kitchen visit did not require that he exit through a security door. The BOP operator indicated, however, that he did not return to the MCR until after the violation had occurred.

TS 6.2.2.b requires that at least one licensed Operator shall be in the control room when fuel is in the reactor and, with the unit in Mode 1, 2, 3, or 4, at least one licensed Senior Operator shall be in the control room. Licensee procedure OMM-001, Operations - Conduct of Operations, Section 3.3.1 implements the TS requirement and restates it with minor word changes. The licensee's failure to maintain adequate MCR shift staffing on November 28 is contrary to the above requirements and is considered to be an apparent violation.

Apparent Violation (400/94-23-01): Failure to maintain required control room shift staffing levels.

This apparent violation is similar to an event which occurred at another of the licensee's plants earlier this year. Discussions with plant personnel indicated that the operators involved in this event had been made aware of the previous event prior to November 28. The licensee has considered that this event was probably caused by a communication breakdown between the board operators and/or with the SCO, combined with a false perception of adequate shift staffing due to the trainees in the MCR. Immediate corrective actions included discussing the event in control room Night Orders, shift turnover meetings, and having the involved operators discuss the event with other shifts. At the close of the inspection period, the licensee was also looking into the program for the turnover of operator responsibilities within the MCR.

Except for the above event, performance in this area of plant operations was satisfactory. One apparent violation was identified.

b. Effectiveness of Licensee Control in Identifying, Resolving, and Preventing Problems (40500)

The inspectors reviewed Adverse Condition and Feedback Reports (ACFRs) to verify that TS were complied with, corrective actions and generic items were identified, and items were reported as required by 10 CFR 50.73. ACFRs were reviewed for the MCR shift staffing and hurricane warning issues noted above. ACFRs were also reviewed for an emergency battery inoperability issue and a failure of the "A" motor-driven AFW pump to start. These items are discussed in report section 4, "Maintenance". The licensee presently intends to document both the battery inoperability and the MCR shift staffing violations in future LERs.

ACFR 94-03510 was generated on November 30 to document a failure of the "A" containment spray pump breaker to close during testing following a system outage. This occurred while the breaker was racked to the "test" position and cycled as part of a post maintenance test requirement. Like all of the other safety-related "A" train 480 VAC breakers, the containment spray pump breaker is a Siemens 480 VAC model which was installed during the last refueling outage as part of an overall Brown Boveri LK-16 replacement effort. The ACFR noted previous problems with Siemens breaker closing springs only being partially recharged following an open/close cycle. This was initially believed to be the cause of the above failure. An appropriate block on the ACFR form was checked noting that the failure was repetitive in nature. Licensee personnel later attempted to cycle the breaker following troubleshooting efforts in which no maintenance was performed. The latter attempts were successful in closing the breaker and it was determined that operability of the system was not affected. The pump was declared operable and the LCO action statement was exited.

c. Cold Weather Preparations (71714)

The inspector assessed the licensee's program for protecting systems against extreme cold weather. This included a review of the licensee's corrective actions for previously identified problems; a walkdown of plant areas; a review of the backlog associated with heat trace systems; a review of procedures, including operator rounds guidance; and a review of an internal audit conducted by the licensee's Nuclear Assessment Section (formerly NAD) for Harris.

The inspector identified no major problems with cold weather preparations. Plant tours included the RAB (specifically those rooms containing portions of the CVCS boric acid system), the turbine building, the emergency service water structures, and the EDG building. Electric unit heaters and heat trace systems in these buildings were generally functional. Additionally, heaters installed in instrument cabinets located in the turbine building

were functional. Tents and heaters have been installed in the turbine building for the instrument air system.

In most cases, minor deficiencies associated with some of the heat trace and temperature maintenance panels had been identified and tagged by licensee personnel. However, the inspector identified a few circuit failures that did not have deficiency tags. These circuits were in temperature maintenance panels HT-18753-BB and 18753-C in the RAB. The inspector notified the on-shift SSN who had work tickets initiated. Because these panels were observed daily by operators during rounds, the inspector concluded that these deficiencies should have been identified by licensee personnel.

The heat trace, temperature maintenance, and electric unit heater work backlog has been reduced since last Winter. The licensee has assigned a task force the responsibility of further reducing this backlog prior to the upcoming Winter season. A team of maintenance technicians has been dedicated to working on backlog items and emergent problems. The licensee tracks cold weather protection deficiencies as "AP-301 Concerns" both in the work control process and in the daily schedule and morning managers meetings. Procedure AP-301, Adverse Weather Operations, describes actions performed by operations personnel when ambient temperatures fall to 35 degrees Fahrenheit or lower. Temperatures have already fallen to that level in recent months - requiring operators to take actions per the procedure.

The inspector reviewed an internal NAS audit of the plant's cold weather preparations. This audit was thorough in identifying deficiencies in licensee corrective actions for problems identified last Winter. The inspector also reviewed the plant's response to the audit and encouraged licensee personnel to follow through with stated corrective actions.

The inspectors' overall conclusion was that plant operations were conducted in an effective manner. An apparent violation regarding MCR shift staffing was identified. Additionally, management attention is warranted in the area of MCR shift supervisor logs. The licensee has recently taken an aggressive approach in reducing the cold weather protection system work backlog. The internal NAS audit of the plant's cold weather protection program was thorough.

4. MAINTENANCE

a. Maintenance Observation (62703)

The inspector observed/reviewed maintenance activities to verify that correct equipment clearances were in effect; work requests and fire prevention work permits were issued and TS requirements were being followed. Maintenance was observed and work packages were reviewed for the following maintenance activities:

WR/JO 94-APQT1, Troubleshoot failure of the "A" AFW pump to start. During a surveillance test on November 30, the pump failed to start following three attempts from the main MCR. During the second and third attempts that night, an operator stationed at the pump observed that the shaft did rotate about six or seven times indicating that the pump breaker initially closed and then immediately reopened. The inspector witnessed some of the subsequent troubleshooting efforts which generally focused on the breaker and its associated circuitry. Troubleshooting included testing various relays, bridging and meggering the motor, and cycling the breaker while racked to the "test" position. The inspector observed that leads were landed and lifted and that technicians used the proper techniques for independent verification. The breaker was also racked in and out using proper self-checks on the status of control power fuses and actual breaker position. The pump was declared operable after licensee personnel replaced a faulty signal processing card in the pump low suction pressure trip circuitry.

WR/JO 94-ANXA1, Repair/Replace Shuttle Valve on the Front of EDG 1B. This three-port logic valve in the pneumatic engine control system had been found to leak through. Troubleshooting involved instrumentation technicians, the system engineer, and plant operators. The WR/JO was properly planned, the repair parts were on hand, and the technicians were highly knowledgeable of the system. Work practices observed included both workmanship and independent verification of component and tubing removal and installation, use of diagrams in troubleshooting, and foreign material exclusion practices. The repair was successful.

In general, the performance of work was satisfactory with proper documentation of removed components and independent verification of the reinstallation. No violations or deviations were identified.

b. Surveillance Observation (61726)

Surveillance tests were observed to verify that approved procedures were being used; qualified personnel were conducting the tests; tests were adequate to verify equipment operability; calibrated equipment was utilized; and TS requirements were followed. The following tests were observed and/or data reviewed:

- MST-I0131, Main Steamline Pressure, Loop 3 (P-0494), Operational Test.

- OST-1315, Emergency Service Water Valve Remote Position Indication Test, Two Year Interval. This test was observed by the inspectors on valve 1SW-270. As discussed in NRC Inspection Report 400/94-21, this "A" train ESW return header discharge valve was the subject of a single failure vulnerability in which the valve's failure to open during a

LOCA/LOSP event could ultimately cause a loss of high head safety injection capability. The inspectors observed that 1SW-270, which is a 30-inch diameter, motor-operated butterfly valve, stroked smoothly to the open and closed positions. The inspectors noted a valve stroke time of about 50 seconds in each direction. The inspector also noted that some system water flow was still audible after the valve was closed indicating that the valve may not have fully seated. However, licensee personnel determined this portion of OST-1315 to be satisfactory using valve stroke time as a criterion based on valve position indication in the MCR.

- OST-1214, Emergency Service Water System Operability - Train A, Quarterly Interval. The inspector observed the portion of this surveillance test which stroked valves 1SW-39 and 1SW-275. These valves are the interface between normal service water and the "A" train ESW supply and return headers, respectively. The inspector observed that the valves stroked successfully.

- OST-1411, Auxiliary Feedwater Pump 1X-SAB Operability Test, Quarterly Interval. This test was one of many performed on the turbine-driven AFW pump since its overspeed events discussed in NRC inspection report 400/94-22. The inspector observed that the pump ran smoothly and that operators recorded data as required.

The inspector judged procedure performance to be satisfactory with proper use of calibrated test equipment, necessary communications established, notification/authorization of MCR personnel, and knowledgeable personnel having performed the tasks. No violations or deviations were observed.

c. Followup - Maintenance (92902)

(Closed) URI 400/94-21-04: Adequacy of procedures and procedure adherence in the area of battery surveillance.

On November 16, during a monthly performance of MST-E0011, IE Battery Quarterly Test, technicians recorded an individual cell voltage (ICV) of 2.071 VDC for cell #50 on the 1B-SB emergency battery. While the 2.071 VDC reading did meet the Category B minimum allowable value of 2.07 VDC contained in Table 4.8.2 of the applicable TS, it failed to meet the Category B limit of 2.13 VDC minimum float voltage. Technical Specification 4.8.2 allows the emergency batteries to remain operable under this condition provided Category B parameters are restored to within their limits within seven days. Following the technician's discovery of the

low cell voltage on November 16, actions were taken to place cell #50 on a single cell equalizing charge to restore its ICV to above 2.13 VDC. All ICV values are corrected for average electrolyte temperature.

During a subsequent review of data sheets for the prior month's tests, licensee personnel discovered that, during the October 19 performance of MST-E0011, an ICV of 2.072 VDC had been recorded for the same battery cell. Following the October 19 test, no actions had been taken to restore the voltage on cell #50 to above 2.13 VDC within 7 days as required by the TS. As a result, the 1B-SB emergency battery was determined to have been inoperable from 2:00 p.m., on October 26, seven days after the MST was completed, to 2:30 a.m., on November 17, by which time two hours of a single cell equalization charge had been performed to return the cell voltage to above 2.13 VDC; and also an engineering evaluation had been completed to demonstrate operability. This and other engineering evaluations associated with the 1B-SB emergency battery are further discussed in the Engineering section of this report (Section 5).

The licensee discovered that the TS requirement was missed in October because of a procedural inadequacy. MST-E0011 contains a step which asks technicians whether all ICVs are within the allowable limits ($\geq$2.13 VDC) or allowable value (>2.07 VDC). The procedure contains no further steps detailing what actions to pursue if the ICV is recorded to be between 2.13 and 2.07 VDC. As a result, technicians were led to sign off the procedure as satisfactory with all acceptance criteria being met. During investigations into previous tests under this procedure, licensee personnel found several other similar misses. Two of the most recent instances in July and August of this year involved the same cell on the 1B battery. Other examples involving different battery cells were discovered for tests as far back as 1988.

Technical Specification 3.8.2.1 requires, in part, that the 125-volt emergency battery bank 1B-SB shall be operable in Modes 1 through 4. Technical Specification 4.8.2.1b.1 requires, in part, that each 125-volt emergency battery shall be demonstrated operable at least once per 92 days by verifying that the parameters in Table 4.8-2 meet the Category B limits. Technical Specification Table 4.8-2, Battery Surveillance Requirements, lists these limits and specifies a Category B float voltage limit of $\geq$2.13 volts and an allowable value of >2.07 volts for each connected cell. The applicable table notation states that, for any Category B parameter outside the limit shown, the battery may be considered operable provided that the Category B parameters are within their allowable values and provided the Category B parameters are restored to within limits within 7 days.

The licensee's failure to take appropriate actions to restore the ICV above 2.13 VDC for cell #50 following the October 19 test rendered the battery inoperable for approximately three weeks and is contrary to the above requirements. Although the incident discussed in the above paragraphs was identified by the licensee, the inspectors considered that the above violation was the latest in several issues involving missed surveillance requirements, both in-general and specifically for the batteries. (Reference NRC Inspection Reports 50-400/94-21 and 50-400/94-22)

Violation (400/94-23-02): Failure to maintain emergency battery bank 1B-SB operable.

The inspector concluded that even with the procedural inadequacy, there were prior opportunities to identify the low voltage readings. Copies of the test data sheets are required to be sent to Technical Support for review and trending purposes. This requirement is contained as a step to be initialed by the technician during close out of the procedure. The step had been initialed during recent performances of the surveillance test, but that did not guarantee that the data sheets were actually received by a cognizant technical support engineer in a timely fashion. Licensee personnel indicated that some of the most recent data sheets had just been received by the battery system engineer. The completed procedure was also reviewed and approved by the technicians' supervisor or designee. It should be noted, however, that the procedure was not required to be reviewed by the MCR shift supervisor unless an allowable limit surveillance requirement is exceeded (or not met).

The licensee initiated an Event Review Team to determine the root cause and recommend corrective actions for the procedural deficiency.

d. (Closed) TI-2515/126, Evaluation of On-line Maintenance

Licensee's Program

The inspector reviewed several aspects of the licensee's program for scheduling on-line maintenance. This program was primarily driven by plant procedure PLP-710, Work Management Process, although other procedures, such as MMM-036, Multi Discipline Team Work Process (Fix it Now Team); and MMM-027, Troubleshooting Guide, describe how and when maintenance and troubleshooting activities can be performed on plant equipment. Procedure PLP-710 outlines the responsibilities of management, supervisory and working level personnel involved in the planning and scheduling process. Various desk top guides are also assigned to planners, schedulers, and operators in the work control center (formerly known as the clearance center) to convey management expectations for implementing the program.

The work management process incorporates a rolling 12-week schedule against which work is systematically planned; i.e., each plant system is assigned a specific week in the 12-week schedule. Additionally, the weeks are either "A" or "B" train specific. During an "A" train week, work is not planned for "B" train equipment and vice-versa. Scheduled preventive or corrective maintenance does not always involve safety system unavailability time, but in the event that it does, anticipated work is further scheduled against the long-term "HNP Safety System Unavailability LCO Schedule". This color coded chart allowed plant personnel to schedule work on specific safety system trains during a particular week in the year.

Multi-system Outages

Typically, much of the work that involves system outages is scheduled during the same week, and in many cases, the same day according to the Safety System Unavailability LCO Schedule. In past cases, train outages occurred in which five or six systems involving LCO entries were out of service simultaneously. For example, on August 31, 1994, LCO action statements were entered for the "A" ESW, EDG, CCW, RHR, and charging/high head safety injection systems to allow for scheduled maintenance. The "A" ESCWS system was later added to the outage. This outage did not violate any TS LCO requirements as it only involved "A" train equipment and the outage was complete within 24 hours. However, it did not incorporate any formal risk assessment processes to evaluate the cumulative effect of having the systems within the same safety train out of service simultaneously. Neither did it formally consider the risk aspects of existing degraded equipment.

Risk Factors Impacted By On-line Maintenance

The TI referenced three factors which could be considered by licensees in their evaluation of risks associated with removing non-safety or safety-related equipment from service. These include the probability of an initiating event, such as a LOCA, turbine trip, or LOSP; the probability of being able to mitigate the event using core damage prevention as a measure of success; or the probability of being able to mitigate the event using containment integrity preservation as a measure of success. These factors were not formally considered by the licensee's process for scheduling on-line work. However, safety nets were built into the licensee's long-term LCO schedule which prevented at least two of the above risk factors from being greatly impacted simultaneously. Specifically, the LCO schedule did not allow the AFW system and the Containment Spray system in a particular train to be removed from service concurrent with the other safety systems in that train. This resulted in at least one means of providing core cooling and one method of preserving containment integrity during the train outages.

The licensee has very recently developed a "Matrix of Risk-Significant Combinations". This matrix lists various plant systems along both axes and cross-references one system in a row to another in each column and concludes whether or not the two systems can be removed from service simultaneously. The matrix is limited, however, to one-to-one system comparisons and does not consider the combination of taking three or more systems out simultaneously. The matrix was developed by personnel involved in developing the plant PRA and was backed by a qualitative analysis of those systems which are contributors to the same accident sequences in the PRA. A quantitative analysis of the calculated increase in risk associated with simultaneously removing two or more of the systems from service was not considered in developing this matrix. The matrix was not incorporated into any plant procedures, but was available to schedulers as a reference guide until a future revision could be completed. The licensee indicated plans to incorporate this matrix or a variation of it into the work control process both on the front end during scheduling, and on the back end in the work control center. Its availability in the work control center could aid operators in better determining which system unavailability combinations impacted risk the most, especially for short-notice emergent work situations.

Attributes of the Licensee's Process

While the licensee's process did not formally incorporate a risk-based evaluation of scheduled maintenance, it did contain other attributes which the inspector considered beneficial to the work control effort. The program limited the amount of time that LCO work could be scheduled to 75% of the TS LCO time. It stipulated that the work schedule for LCOs of equal to or less than 72 hours shall be 24 hours/day until equipment is returned to operability. High priority work items that require ECCS system outages were scheduled in forced outage fragnets that could be implemented on short notice. The inspectors observed these fragnets for some of the recent safety train outages. Weekly work schedules are approved by eight unit managers including the managers of Work Control and Operations, both of whom have held NRC operator licenses. Work packages must be reviewed and signed by a licensed SRO in the work control center or the MCR shift supervisor. Changes to the scope of any ongoing maintenance may be reviewed and approved by the same licensed SROs.

Knowledge of Supervisory and Working Level Personnel

Section 4 of PLP-710 included a paragraph pertaining to equipment unavailability assessments. It stated that during schedule development and implementation, an assessment of the total plant equipment that is out-of service should be taken into account. The assessment was to be performed on an ongoing basis and was intended to consider the cumulative impact of the out-of-service

equipment to insure that the plant was not placed in a risk significant configuration. According to the procedure, those assessments could range anywhere from simple deterministic judgements to the use of an on-line living PRA.

The inspector determined that this assessment has been primarily based on deterministic judgement in the past, and not always on behalf of individuals with operations experience. Many of the key individuals involved in the work control process, including managers, schedulers, and plant operators, have not been formally trained on the plant PRA or risk assessment techniques in general. The licensee has indicated plans to train appropriate personnel in this area in the future.

Conclusion

The inspector concluded that, while the licensee personnel have performed equipment and system outages successfully in the past, the program does not currently require formal evaluations of increased risk caused by on-line maintenance. The inspectors will continue to follow the licensee's progress in providing training and formalizing risk assessment techniques associated with scheduling on-line maintenance.

Inspector Followup Item (400/94-23-03): Follow the licensee's activities to enhance the on-line maintenance scheduling process.

Overall, for the maintenance functional area, the inspectors concluded that maintenance activities were performed satisfactorily. However, recent examples of problems involving missed surveillance requirements warrant further management attention. One violation was identified.

5. ENGINEERING

Onsite Engineering - Design/Installation/Testing of Modifications (37551)

Engineering Service Requests (ESR) involving the installation of new or modified systems were inspected to verify that the changes were reviewed and approved in accordance with 10 CFR 50.59, that the changes were performed in accordance with technically adequate and approved procedures, and that appropriate drawings and facility procedures were revised as necessary. ESRs documenting engineering evaluations were also reviewed. The following engineering evaluations, modifications and/or testing in progress were inspected.

- ESR 9400434, Battery 1B-SB Cell #50 Operability Review. ESR 9400434 provided an operability determination for the 1B-SB emergency battery after it was identified on November 16 that the voltage of cell #50 had dropped below the limit of 2.13 VDC. This operability determination considered that all other parameters of the cell were maintained within TS requirements and that the cell

had been placed on a single cell charge and returned to within the TS limit. Also provided as a basis was the fact that, following a two hour equalizing charge, the cell was allowed to stabilize for approximately 15 minutes at greater than 2.13 VDC. The cell subsequently remained on single cell charge for a total of 24 hours.

- ESR 9400436, Battery 1B-SB 59 Cell Evaluation.

  ESR 9400436 was performed to evaluate the acceptability of using 59 cells (instead of 60) in the 1B-SB emergency battery. This evaluation considered the most recent battery performance test results (performed in October, 1992) which demonstrated the capacity of the battery to be 99 percent. The evaluation compared calculations of minimum allowable cell voltages for a 59-cell battery with calculations of expected cell voltages using the results of the last performance test of the 1B battery. Licensee personnel considered battery voltage, battery charger float and equalizing voltage settings, undervoltage alarm setpoints, short circuit currents, and impact to the plant FSAR and TS. The ESR concluded that the battery would meet its load profile requirements with one cell jumpered out for LOCA/LOSP and Station Blackout scenarios.

- ESR 9400470, Battery 1B-SB Cell #50 Voltage Less Than 2.13 Volts.

  ESR 9400470 provided an operability determination for the 1B battery in the condition that existed from October 26 - November 17 (cell voltage less 2.13 VDC). It concluded that the battery would have performed its design basis function with the connected low voltage cell. This evaluation coupled the results of ESR 9400436 with a determination that the low cell would not have reached the point of reverse polarity. It stated that, according to IEEE standards, an individual cell approaches polarity reversal at +1 volt or less, at which point the cell #50 would have become an additional load on the remaining cells in the battery bank. Through a series of calculations considering minimum expected voltage per 1B battery cell and the highest typical float voltage per cell, licensee personnel determined that the final cell #50 voltage during a design basis event would equal 1.60 VDC, well above the polarity reversal voltage.

Overall, the licensee's development of these evaluations was satisfactory. The inspector concluded that the development of an ESR to determine battery operability with 59 cells was appropriate considering the plant's previous history involving LCO entries due to low cell voltage readings. No violations or deviations were identified.

6. PLANT SUPPORT

a. Plant Housekeeping Conditions (71707) - Storage of material and components, and cleanliness conditions of various areas throughout the facility were observed to determine whether safety and/or fire hazards existed.

b. Radiological Protection Program (71750) - Radiation protection control activities were observed to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements. The inspectors also verified that selected doors which controlled access to very high radiation areas were appropriately locked. Radiological postings were likewise spot checked for adequacy.

c. Security Control (71750) - The performance of various shifts of the security force was observed in the conduct of daily activities which included: protected and vital area access controls; searching of personnel, packages, and vehicles; badge issuance and retrieval; escorting of visitors; patrols; and compensatory posts. In addition, the inspector observed the operational status of closed circuit television monitors, the intrusion detection system in the central and secondary alarm stations, protected area lighting, protected and vital area barrier integrity, and the security organization interface with operations and maintenance.

d. Fire Protection (71750) - Fire protection activities, staffing and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable. During plant tours, areas were inspected to ensure fire hazards did not exist.

e. Emergency Preparedness (71750) - Emergency response facilities were toured to verify availability for emergency operation. Duty rosters were reviewed to verify appropriate staffing levels were maintained. As applicable, emergency preparedness exercises and drills were observed to verify response personnel were adequately trained.

On November 17, 1994, at approximately 11:30 p.m., a hurricane warning was issued by the National Weather Service for the coastal areas of North Carolina. Because hurricane warnings are generally only issued for coastal areas, plant procedures require that certain precautionary measures be taken at that time to help mitigate the effects of one which could produce hurricane force winds in inland areas. Administrative procedure AP-301, Adverse Weather Operations, requires that, upon notification of a coastal hurricane warning, operations personnel must plot the hurricane's path on an attached map, and take action to shut down the plant within two hours of the hurricane's predicted arrival at the site.

The shift supervisor is also required to transition to the emergency plan and declare an Unusual Event upon the arrival of hurricane force winds in Wake County.

While reviewing the Shift Supervisor's MCR logs on November 18, the inspector noted an entry stating that the SSN had contacted the National Weather Service at 4:40 a.m., to learn of the hurricane warning for the first time. The shift supervisor then initiated actions in accordance with AP-301. Because the hurricane warning had been in effect since before midnight, an ACFR was generated to document the notification delay. MCR logs showed that an independent commercial weather service was later contacted to determine why the Harris MCR was not notified of the hurricane warning. This independent service had a contract with the licensee to provide immediate notification to the CP&L plants of weather conditions which could adversely affect their operations. The independent weather service's response to the main MCR was that there was no requirement for it to notify the Harris plant for a coastal hurricane warning.

The inspector recalled that a similar situation occurred earlier in the year in which there was a two-hour delay in notifying the MCR of a tornado watch affecting Wake County. As discussed in NRC IR 400/94-06, this delayed completion of actions per the same administrative procedure. In the earlier situation, MCR personnel relied on information from the corporate load dispatcher in order to take precautions for the Tornado Watch.

While the two notification delays may not have involved the same entities, the inspector concluded that a weakness existed in this area. The safety significance surrounding these incidents were minor since the storms never materialized near the Harris plant. However, considering the number of actions required by AP-301 following notification of hurricane warnings or tornado watches, the unpredictable nature in which these storms can travel, and the potential for damage to plant equipment, the inspector concluded that the weakness warrants additional management attention. At the end of the inspection, the licensee was in-fact addressing the situation with the contract weather service.

The inspectors found plant housekeeping and material condition of components to be satisfactory. The licensee's adherence to radiological controls, security controls, fire protection requirements, emergency preparedness requirements and TS requirements in these areas was satisfactory. No violations or deviations were identified.

7. EXIT INTERVIEW (30703)

The inspectors met with licensee representatives denoted in paragraph 1 at the conclusion of the inspection on December 2, 1994. During this meeting, the inspectors summarized the scope and findings of the inspection as they are detailed in this report, with particular emphasis

on the Violations and Inspector Follow-up Item addressed below. The licensee representatives acknowledged the inspector's comments and did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection. No dissenting comments from the licensee were received.

Item Number	Description and Reference
400/94-23-01	Apparent Violation: Failure to maintain required control room shift staffing levels, paragraph 3.a.(2).
400/94-23-02	Violation: Failure to maintain emergency battery bank 1B-SB operable, paragraph 4.c.
400/94-23-03	Inspector Followup Item: Follow the licensee's activities to enhance the on-line maintenance scheduling process, paragraph 4.d.

8. ACRONYMS AND INITIALISMS

ACFR - Adverse Condition and Feedback Report
AFW - Auxiliary Feedwater
AO - Auxiliary Operator
BOP - Balance of Plant
CCW - Component Cooling Water
CFR - Code of Federal Regulations
CO - Control Operator
CP&L - Carolina Power and Light Company
CVCS - Chemical and Volume Control System
ECCS - Emergency Core Cooling System
EDG - Emergency Diesel Generator
ESCWS - Essential Services Chilled Water System
ESR - Engineering Service Request
ESW - Emergency Service Water
FR - Federal Register
FSAR - Final Safety Analysis Report
HNP - Harris Nuclear Project
ICV - Individual Cell Voltage
IEEE - Institute of Electrical and Electronics Engineers
IR - Inspection Report
LCO - Limiting Condition for Operation
LER - Licensee Event Report
LOCA - Loss of Coolant Accident
LOSP - Loss of Offsite Power
MCR - Main Control Room
MMM - Maintenance Management Manual
MST - Maintenance Surveillance Test
NAD - Nuclear Assessment Department
NAS - Nuclear Assessment Section

NPF	-	Nuclear Production Facility [a type of facility license issued by the NRC]
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
NSSS	-	Nuclear Steam System Supplier
OMM	-	Operations Management Manual
OST	-	Operations Surveillance Test
PLP	-	Plant Program Procedure
PRA	-	Probabilistic Risk Assessment
RAB	-	Reactor Auxiliary Building
RHR	-	Residual Heat Removal
RO	-	Reactor Operator
SCO	-	Senior Control Operator
SRO	-	Senior Reactor Operator
SSN	-	Shift Supervisor - Nuclear
STA	-	Shift Technical Advisor
TI	-	[NRC] Temporary Instruction
TS	-	Technical Specification
URI	-	Unresolved Item
VAC	-	Volts Alternating Current
VDC	-	Volts Direct Current
WR/JO	-	Work Request/Job Order