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

Report No.: 50-400/89-06

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

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

Facility Name: Harris

Inspection Conducted: February 21, 1989 - March 28, 1989

Inspectors: _____ 4/13/89
W. H. Bradford Date Signed

_____ 4/13/89
M. C. Shannon Date Signed

Approved by: _____ 4/13/89
H. C. Dance, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine safety inspection was conducted in the areas of operational safety verification, surveillance observations, maintenance observations, licensee event reports, followup of events at operating power reactor, Part 21 Reports, and diesel fuel oil review.

Results: In the areas inspected, no violations or deviations were identified.

Two automatic reactor trips occurred during this report period that could have been prevented. The first trip on February 22, 1989, was caused by closure of the feedwater isolation valve to "A" steam generator during performance of an 18-month surveillance test without thoroughly investigating the consequence. The second trip on March 14, 1989, was caused by a trip of the "B" main feedwater pump due to an electrical fault in the feedwater pump electrical terminal box. Water leakage entered the electrical power terminal box via an unsecured seal (paragraph 6).

REPORT DETAILS

1. Persons Contacted

W. Batts, Supervisor, Mechanical Maintenance
D. Braund, Supervisor, Security
J. Collins, Manager, Operations
G. Forehand, Director, QA/QC
C. Gibson, Director, Programs and Procedures
*C. Hinnant, Plant General Manager
L. Tentz, Operations Support Supervisor
T. Morton, Manager, Maintenance
C. Alexik, Supervisor, Shift Operations
R. Richey, Manager, Harris Nuclear Project Department
J. Sapp, Manager, Environmental and Radiation Monitoring
H. Smith, Supervisor, Radwaste Operation
*D. Tibbits, Director, Regulatory Compliance
B. Van Metre, Manager, Technical Support
E. Willett, Manager, Outages and Modifications
W. Wilson, Performance Engineering
L. Woods, Engineering Supervisor

Other licensee employees contacted during this inspection included technicians, operators, mechanics, security force members, engineering personnel and office personnel.

*Attended exit interview.

Acronyms and initialisms used throughout this report are listed in paragraph 10.

2. Operational Safety Verification (71707)

The inspectors conducted routine plant tours during this inspection period to verify that the licensee's requirements and commitments were being implemented. These tours were performed to verify that: systems, valves, and breakers required for safe plant operations were in their correct position; fire protection equipment, spare equipment, and materials were being maintained and stored properly; plant operators were aware of the current plant status; plant operations personnel were documenting the status of out-of-service equipment; security and health physics controls were being implemented as required by procedures; there were no undocumented cased of unusual fluid leaks, piping vibration, abnormal hanger or seismic restraint movements; all reviewed equipment requiring calibration was current; and general housekeeping and control of fire hazards were satisfactory. Tours of the plant included review of site documentation and interviews with plant personnel. The inspectors

reviewed the control room operators' logs, tagout logs, chemistry and health physics logs, and control boards and panels. During these tours the inspectors noted that the operators appeared to be alert, aware of changing plant conditions and manipulated plant controls properly. The inspectors evaluated operations shift turnovers and attended shift briefings. They observed that the briefings and turnovers provided sufficient detail for the next shift crew and verified that the staffing met TS requirements.

Site security was evaluated by observing personnel in the protected and vital areas to ensure that these persons had the proper authorization to be in the respective areas. The inspectors also verified that vital area portals were kept locked and alarmed. The security personnel appeared to be alert and attentive to their duties and those officers performing personnel and vehicular searches were thorough and systematic. Responses to security alarm conditions appeared to be prompt and adequate.

Selected activities of the licensee's Radiological Protection Program were reviewed by the inspectors to verify conformance with plant procedures and NRC regulatory requirements. The areas reviewed included: operation and management of the plant's health physics staff, ALARA implementation, Radiation Work Permits for compliance to plant procedures, personnel exposure records, observation of work and personnel in radiation areas to verify compliance to radiation protection procedures, and control of radioactive materials. No discrepancies were noted.

Several inspector hours were spent on back shift inspections and observations. Various aspects of plant operation were observed and evaluated. The operators appeared to be alert, knowledgeable, and competent in their duties. The licensee has developed a high degree of professionalism in the control room staff.

The licensee convened a special meeting of the Plant Nuclear Safety Committee (PNSC) on March 22, 1989, to review and discuss an interim report from the task force on the problem of trips of the turbine driven auxiliary feedwater pump (TDAFW). The data from the four trips was analyzed. The conclusion was that mechanical overspeed trip, manual trip, operator error, or low suction pressure trip were not likely to be contributors to tripping the turbine. The unit is installed with electrical overspeed protection, as well as mechanical overspeed protection. The electrical overspeed is set at 4510 rpm and the mechanical overspeed is set at 5100 rpm. All the trips thus far have been from the electrical overspeed trip. The licensee selected the electrical by choice to provide a lower trip level which does not require a local reset for pump restart. The licensee is initiating a PCR to change the electrical overspeed setpoint from 110% to 115%. The licensee is determining other actions to collect data to determine the cause of the overspeed trips. Resolution of the TDAFW pump overspeed trips is identified as Inspector Follow Item 89-06-01.

No violations or deviations were identified.

3. Monthly Surveillance Observation (71709)

The inspectors reviewed surveillance test activities on safety-related systems and components to verify that the licensee performed the activities in accordance with applicable requirements. The review included witnessing selected portions of each surveillance, review of the surveillance procedure to ensure that administrative controls were in force, determining that approval was obtained prior to conducting the surveillance test, and verifying that the individuals conducting the test were qualified in accordance with plant approved procedures. Other observations included ascertaining that test instrumentation used was calibrated, date collected was within the specified requirements of TS, identified discrepancies were properly noted, and the systems were correctly returned to service. Portions of the following test activities were observed or reviewed by the inspectors:

OST-1216, Rev. 2, Component Cooling Water System Operability
MST-I-0133, Rev. 1, Main Steam Line Pressure Loop 3 Operational Test
OST 1008, Rev. 2, RHR Pump Operability Quarterly Interval
OST 1005, Rev. 2, Control Rod and Rod Position Indicator Exercise
OST-1226, RCS Leak Rate

No violations or deviations were identified.

4. Monthly Maintenance Observations (62703)

Station maintenance activities of safety-related systems and components were observed/reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards and were in conformance with TS. Items considered during the review included verification that LCOs were met while components or systems were removed from service; approvals were obtained prior to initiating the work; approved procedures were used; completed work was performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials were properly certified; and radiological and fire prevention controls were implemented. Work requests were also reviewed to determine the status of outstanding jobs to assure that priority was assigned to safety-related equipment maintenance which could affect system performance. Portions of the following activities were observed or reviewed:

Fuel Transfer Canal Decontamination and Liquid Penetrant Testing
4B Feedwater Heater Weld Repair
General Electric 6.9 kV Overcurrent Relay Calibration, PIC-E004, Rev. 4
"A" Boric Acid Transfer Pump Seal Repair
125 Vdc MMS Battery Replacement and Termination

No violations or deviations were identified.

5. Licensee Event Reports (92700)

LERs were reviewed for potential generic problems to determine trends, to determine whether information included in the report meets the NRC reporting requirements, and to consider whether corrective action discussed in the report appears appropriate. The licensee action was reviewed to verify that the event has been reviewed and evaluated by the licensee as required by the TS; that corrective action was taken by the licensee; and that safety limits, limiting safety setting and LCOs were not exceeded. The inspector examined the incident report, logs and records, and interviewed selected personnel. The following LERs are considered closed:

LER 88-17, Technical Specification Violation due to Failure of Emergency Service Water (ESW) Traveling Screens. On August 9, 1988, the licensee sealed and dewatered the suction bay for "A" ESW pump traveling screen. A loose bracket was repaired and screen guides were adjusted. The inspectors observed a portion of this work.

LER 88-18, Main Feedwater Pump Trip Due to Low Flow Caused by a Flow-Switch Malfunction Resulting in an Auxiliary Feedwater Actuation. Flow switches FY-OICE-2200A and B were recalibrated on WR/JO 88-JAM 376. These instruments are now scheduled to be calibrated on a semi-annual frequency.

LER 88-19, Both Source Range Neutron Flux Detectors Inoperable Requiring Manual Opening of Reactor Trip Breakers. The source range detectors were replaced under WR/20 88-ANSFI and 88-ASNKI. The licensee performed a root cause investigation of this event under CAP Item 88-H-0967.

LER 88-20, Wide Range Gas Monitor Inoperable Due to Loss of Sample Flow and Compensatory Actions Not Taken - Personnel Error. HPP 501, Routine Surveillance of Radiation Monitoring System was revised on October 31, 1988. Training was completed on November 22, 1988.

LER 88-22, Vent Stack Flow Rate Estimates were not Done as Required by Technical Specifications Due to Personnel Error. On-shift operations personnel were reminded of the importance of attention to detail in general and the estimated stack flow requirement in particular by a night order dated August 17, 1988.

LER 88-24, Entry Into Mode 6 Without Performing Technical Specification Surveillance Requirements on Source Range Detectors. Technical Specifications were reviewed to determine the test required for mode changes from 5 to 6. These tests were identified and loaded into the computer.

LER 88-25, Technical Specification Violation - Failure to Continuously Sample the Turbine Building Vent Stack While Radiation Monitor was Inoperable. A listing of electrical power supplies used for compensating

sampling, dated October 25, 1988, has been supplied to the clearance center. A listing of electrical power supplies has been supplied to Shift Chemists and procedure CRC-250, Plant Vent Sampling, has been revised. The Computerized Equipment Data Base System has been revised to incorporate a load list of power supplies. Appropriate control wiring drawings have been revised via PCR-3806. Operations and Chemistry personnel training was completed on December 7, 1988.

LER 88-26, Equipment Qualification Deficiency in Target Rock Solenoid Valves Resulting in Potential Valve Failure During Accident. Unqualified parts were replaced with qualified parts prior to returning to operable status. The inspectors observed portions of this work.

LER 88-27, Failure to Obtain Grab Sample From Turbine Building Vent Stack While Radiation Monitor was Inoperable. A prioritized sample scheduling and a status board are required by "Standing Shift Instructions," dated October 24, 1988. A formal human performance evaluation was completed on November 11, 1988.

LER 88-28, Plant Trip Due to a Loss of Feedwater Caused by a Low Condenser Hotwell Level. The failed relay was replaced under WR/JO 88-BBDM1. The auxiliary operator logs have been revised to include maximum and minimum levels. An investigation has been completed and corrective action has been designated. An evaluation has been performed to change from a pneumatic to an electronic level controller.

LER 88-29, 1B-SB Emergency Service Water Pump Start Due to a Defective Relay in the Emergency Sequences Test Circuit. The relay was replaced. Engineering Surveillance Test (EST) - 317 Emergency Sequencing System 1B-SB Response Time Test was Completed on September 16, 1988.

LER 88-30, Technical Specification Required Cooldown Due to Inoperable Containment Isolation Valves. The corrective action as stated in the LER was completed. The inspectors observed a portion of this work and reviewed the completed maintenance Work Requests.

LER 88-31, Wide Range Gas Monitor Inoperable and Compensatory Actions Not Taken, or Documented as Being Taken as Required Due to Personnel Error. The first corrective action as stated in the LER was completed. The second corrective action required that Health Physics Procedure HPP-496, Operability/Inoperability of Radiation Monitors, be revised. This was completed on January 20, 1989.

LER 88-32, Manual Reactor Trip Upon Loss of Main Feedwater Due to Trip of Heater Drain Pumps. The feedwater heater was inspected and the plywood was removed under WR/JO 88-BCST1. A design change to the Digital Electro Hydraulic control system is under consideration. Plant operators training on this issue was completed on December 8, 1988. A Operations Night Order

was issued on November 3, 1988. The licensee has reviewed the current controls on closure inspections and training is ongoing in proper work practices and system cleanliness.

LER 88-33, Technical Specification Violation Due to Inoperable Charging Safety Injection Pump Caused by Failure to Perform Surveillance Testing. The corrective action as stated has been completed. See PCR-4004, Rev. 0 and PCR-4005, Rev. 0.

LER 88-34, Technical Specification Violation Due to Inoperable RHB Emergency Exhaust System Caused by Failure to Reterminate Fan Motor. The corrective action as stated has been completed. This item was covered in a previous inspection report.

No violations or deviations were identified.

6. Followup on Plant Events (92702)

On February 22, 1989, at 1:14 p.m., the plant experienced a reactor trip on low steam generator level coincident with steam/feedwater flow mismatch. The event occurred during the performance of maintenance test procedure MST-I-0023, Steam Generator 1A Narrow Range Level Loop (L-474) - Protection Set I Calibration. This was an 18 month surveillance test. Prior to the last outage, the licensee had decided to postpone various 18 month surveillances that could be performed during operation in order to better utilize personnel during the outage. The procedure was reviewed and was considered acceptable for performance at power. Prior to performance, operations personnel questioned the I&C Technician about the consequences of performing the surveillance at power. Operations was ensured that the test had been reviewed and was acceptable. MST-I-0023 was written in technical terms such as (check voltage at this point) or (verify operation of this relay). The end result of performing this test was to cause a feedwater isolation valve closure which could only have been found by a detailed review of schematics and process cabinet's technical manuals. The section of the surveillance that initiated the feedwater isolation was not a TS surveillance requirement and was not required to be performed by other requirements. It was a routine test to verify operation of non-safety related equipment and should have been delayed until the next unit outage. This was the first reactor trip resulting from the performance of a maintenance surveillance test since the facility began commercial operation. The licensee has taken steps to prevent further similar events by requiring that each 18-month test or test modification/change be reviewed by operations, maintenance, technical support and regulatory compliance prior to use.

On March 14, 1989, at 8:45 a.m., the unit automatically tripped due to low-low steam generator level following a loss of the "B" main feedwater pump. The trip was initiated when the fire protection technicians had

experienced difficulty in resetting a deluge valve and inadvertently sprayed water on the "B" main feedwater pump. The motor was inspected, and while personnel were leaving the area, an electrical short caused the MFP breaker to trip. The energy from the short circuit caused the door for the motor junction box to blow off, resulting in further damage to nearby instrument lines. Investigation showed that the water from the fire system was able to seep into the junction box because of improper bolting of the box to the motor frame and seal deterioration at the joint. Additionally, the bolting of the "A" MFP junction box was also found to be inadequate. A failed deluge valve relay and subsequent inappropriate fire protection technician actions allowed deluge flow onto the feed pumps. The motors are designed as drip proof; therefore, proper bolting and good sealing could have alleviated this event. All safety related equipment functioned as required and expected. One steam dump valve to the condenser failed to open during the event. Another steam dump valve, 1-MS-109, did not close following the reactor trip and resulted in a cooldown to 545°F (normal 557°F). The operators were required to close the main steam isolation valves to stop the cooldown. Repairs were made to the steam dump valves prior to returning to power operation at 1:25 a.m. on March 15, 1989. The "B" MFP was returned to service following minor repairs at 9:50 a.m., on March 16, 1989. The licensee has analyzed the loss of MFP event and has determined that due to the large power defect, a reactor trip is unavoidable following the loss of a MFP at 100% power.

The plant operators handled their assignments very well during the two plant trips and recovery operation. Operator actions appeared to be appropriate in all cases.

No violations or deviations were identified.

7. 10 CFR Part 21 Reports

(Closed) 10 CFR Part 21 Item P2186-07, TDI Time Delay Relays. The licensee investigated the labeling on relays labeled 110 Vdc versus required design of 115 Vdc. The vendor stated that the relays were incorrectly labeled. The vendor does not make a 110 Vdc coil, only a 115 Vdc coil.

(Closed) 10 CFR Part 21 Item P2186-04, Anacon Chlorine Probes. The licensee returned the chlorine probes to the manufacturer for modification. The probes had blue tips rather than white and were insensitive to chlorine. At least one probe appeared to have been mishandled, and it was replaced.

(Closed) 10 CFR Part 21 Item P2186-01, Conduit Seals Defective and Do Not Pass Fire Rating Test. The licensee performed a engineering evaluation of the fire seals. It was determined that none of the seals in the fuel receipt and storage area required rework and are acceptable. Certain seals were identified which did require rework. This is addressed in FCR-FP-773R2 dated September 19, 1986.

(Closed) 10 CFR Part 21 Item P2187-01, Inadequate High Temperature Resistance of Rockbestos Cable Insulation. Corrective action dated February 29, 1988, performed under the guidance and input from Sorrento Electronics, indicate that the smallest calculated IR valve of 5.7186 X 10^8 is above the minimum value established for the coaxial rockbestos cable by Sorrento Electronics.

(Closed) 10 CFR Part 21 Item P2188-08, Defective Intercooler Inlet Adapter. The cracked inlet plenum air deflector was repaired under PCR 4045, dated December 13, 1988. This PCR incorporated IMO Service Information Memo No. 365.

No violations or deviations were identified.

8. Emergency Diesel Generator Fuel Oil Review (TI 2515/100)

The inspectors completed the EDG fuel oil inspection as required by TI 2515/100. The inspection indicated that the licensee was properly monitoring and maintaining the diesel fuel oil and had developed the necessary program and procedures for receipt, storage, and handling of diesel fuel oil.

No violations or deviations were identified.

9. Exit Interview

The inspection scope and findings were summarized during management interviews throughout the reporting period and on January 20, 1988, with those persons indicated in paragraph 1. The inspection findings listed below were discussed in detail, including the reactor trip events that were avoidable. The licensee acknowledged the inspection findings and did not identify as proprietary any material reviewed by the inspector during the inspection.

Item Number	Description
89-06-01	IFI - Resolution of TDAFW Overspeed Trips, paragraph 2.

10. List of Acronyms and Initialisms

AFW	-	Auxiliary Feedwater
AH	-	Air Handling
ALARA	-	As Low As Reasonably Achievable
ECCS	-	Emergency Core Cooling System
EDG	-	Emergency Diesel Generator
EIR	-	Equipment Inoperable Records
EPT	-	Engineering Periodic Test Procedure

FSAR	-	Final Safety Analysis Report
kV	-	Kilo Volt
LCO	-	Limiting Condition for Operation
LER	-	Licensee Event Report
LOCA	-	Loss of Coolant Accident
MS	-	Main Steam
MSIV	-	Main Steam Isolation Valve
MST	-	Maintenance Surveillance Test
NRC	-	Nuclear Regulatory Commission
OP	-	Operating Procedure
PCR	-	Plant Change Request
PMTR	-	Post Maintenance Test Requirements
PNSC	-	Plant Nuclear Safety Committee
RAB	-	Reactor Auxiliary Building
RCDT	-	Reactor Coolant Drain Tank
RCS/RC	-	Reactor Coolant System
RHR	-	Residual Heat Removal System
RWP	-	Radiation Work Permit
SF	-	Spent Fuel System
SIS	-	Safety Injection Signal
TS	-	Technical Specification
Vac	-	Volts Alternating Current
Vdc	-	Volts direct current
WR/JO	-	Work Request/Job Order