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

Report No.: 50-400/88-11

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

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

Facility Name: Harris 1

Inspection Conducted: April 20 - May 20, 1988

Inspector: G. F. Maxwell 6/15/88
Date Signed

Approved by: P. E. Fredrickson, Section Chief 6/16/88
Division of Reactor Projects Date Signed

SUMMARY

Scope: This routine, announced inspection involved inspection in the areas of Operational Safety Verification, Monthly Maintenance Observation, and Emergency Response Facilities Appraisal.

Results: In the areas inspected, one violation was identified - Failure to Control System Configuration During a Test of the Solid State Protection System - Paragraph 2.b.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

J. M. Collins, Manager, Operations
G. L. Forehand, Director, QA/QC
J. L. Harness, Plant General Manager
C. S. Hinnant, Manager of Maintenance
J. R. Sipp, Manager, Environmental and Radiological Control
D. L. Tibbitts, Director, Regulatory Compliance
R. B. Van Metre, Manager, Harris Plant Technical Support
R. A. Watson, Vice President, Harris Nuclear Project

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

Acronyms and initialisms used throughout this report are listed in paragraph 6.

2. Operational Safety Verification (71707, 71710, 93702)

a. Plant Tours

The inspector 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 the following: 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 cases of unusual fluid leaks, piping vibration, abnormal hanger or seismic restraint movements; and all reviewed equipment requiring calibration was current.

Tours of the plant included review of site documentation and interviews with plant personnel. The inspector reviewed the shift foreman's log, control room operator's log, clearance center tag out logs, system status logs, chemistry and health physics logs, and control status board. During these tours the inspector noted that the operators appeared to be alert and aware of changing plant conditions.

The inspector evaluated operations shift turnovers and attended shift briefings. He observed that the briefings and turnovers provided sufficient detail for the next shift crew.

The inspector verified that various plant spaces were not in a condition which would degrade the performance capabilities of any required system or component.

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 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.

b. Solid State Protection System Testing

On April 22, during a routine daily review of EIRs, licensee Regulatory Compliance personnel identified an instance where TS 3.0.3 was violated. The event occurred on April 19, with the plant at 100% power. The "A" train automatic trip logic, which is part of the SSPS, was being tested. The SSPS test began at 1:10 p.m., and ended at 2:26 p.m., lasting a total of one hour, 16 minutes.

When the "A" train SSPS test was being conducted, the following mechanical components associated with the "B" train were not fully operable:

- The "B" emergency service water pump had its power supply circuit breaker "racked out". The breaker was racked out to allow maintenance personnel to conduct a loop calibration on a discharge pressure transmitter. This work started at 10:00 a.m., on April 19 and was completed at 2:35 p.m.

- The control room "B" train emergency filtration system was shutdown for preventive maintenance on the power breaker cubicle and a surveillance test to measure heater capacity. Due to the work on the breaker cubicle, the "B" control room emergency filtration system could not have functioned until its power breaker was reclosed. This work started at 8:00 a.m., on April 19 and was completed at 3:45 p.m.

- The "B" train reactor auxiliary building emergency exhaust system had two outstanding clearances against it. The work associated with these clearances had been completed. The clearance tags were in the process of being removed; at 2:56 p.m., on April 19 they were removed.

TS Table 3.3-3, Action Statement 14, Page 3/4 3-26, allows one of the two SSPS trains to be in the test mode for up to two hours, provided the other train is operable. If the other train is inoperable, as on April 19, then TS 3.0.3 would apply. TS 3.0.3, when entered, requires that the associated Action requirements be completed within one hour or steps should be taken to place the plant in a reduced mode. As noted above, the plant was operating under the condition of TS 3.0.3 for greater than one hour, and operators failed to recognize during that time that the plant was required to begin reducing power to change its mode of operation.

The inspector evaluated the shift foreman's log and EIRs for each time that MST I001 (Train "A" SSPS Actuation Logic and Master Relay Test) and MST I0320 (Train "B" SSPS Actuation Logic and Master Relay Test) were implemented during the past twelve months on the "A" and "B" SSPS trains. Records show that the "B" train SSPS tests were conducted during 1987 on May 15, July 26, September 22, November 16, and during 1988 on January 18 and March 21. When these tests were conducted, all of the associated "A" train SSPS equipment was available for operation.

Records indicate that the corresponding "A" train SSPS tests were conducted during 1987 on June 18, August 18, October 23 and December 17, and during 1988 on February 19. The "A" train test on August 18, 1987, was conducted between 8:55 a.m. and 10:20 a.m. The EIR and shift foreman's logs for the "B" train equipment show that the "B" train ESW pump was in an inoperable status from 8:57 a.m., on August 17, 1987, until 4:55 p.m., on August 19, 1987; thus, the unit had entered TS 3.0.3 during this test also. The pump was declared inoperable due to a packing replacement for its associated screen wash pump. The screen wash pump provides seal injection flow for the associated ESW pump.

Consequently, there have been at least two separate instances where the plant was operating unknowingly under the requirements of TS 3.0.3 while the SSPS system was being tested.

Normally, operations personnel have relied on the following two methods of assuring that a system is not placed in a configuration where redundant components are simultaneously and/or inadvertently out of service:

- The first method involves the application of the Operations Management Manual procedures: OMM-001, Rev. 4, Operations - Conduct of Operations, and OMM-003, Rev. 2, Equipment Inoperable Record. These procedures require the shift foreman to review Work Requests of other activities in general to assure compliance with TS requirements. When carrying out this task he normally reviews the open EIRs and, when in doubt, asks his subordinates and peers if they know of any reasons that a job, test, etc., should not be conducted.

- The second method involves the use of Operations Work Procedures when conducting complex plant system and logic testing. In this application, an OWP is used to establish initial plant/system configuration for a surveillance test; then once testing is complete, the OWP returns the plant/system to normal. Usually, these OWPs contain specific cautions either by directly cautioning the procedure user and/or through specific procedure application. The procedure may contain specific checklists or steps which by application would prevent an inadvertent defeat of a system or component's safety function.

Procedure OMM-003, noted under the first method described above, provides guidance to operations clearance personnel. Its purpose is to ensure compliance with LCOs. As found in the TS, this includes identification, tracking, evaluating, and initiating the reports which may be required by the LCOs. However, it should be noted that OMM-003 does not contain the specific cautions and/or checklists, etc., which may be contained in an OWP. Operations clearance personnel have relied on the OWPs to contain sufficient safety nets to prevent inadvertent loss of two redundant components during testing. Therefore, they apparently did not question allowing the SSPS train "A" tests to be conducted on August 18, 1987, or on April 19, 1988, even though some of the "B" train SSPS activated equipment was out of service.

These events occurred because operations personnel did not realize that when actuation logic equipment in an SSPS train is placed out of service, all emergency equipment for the opposite SSPS train must be available. The associated Operations Work Procedure, OWP-RP-17, Reactor Protection Automatic Trip Logic, Rev. 1, should have helped prevent this condition from occurring, but did not specifically address the requirement for redundant train equipment being operable.

The inspector evaluated eight of the remaining OWPs to assure that, as applicable, they contained statements cautioning operators that redundant equipment must be operable when the OWPs are being conducted. Those procedures evaluated are as follows:

- OWP-RP-16, Rev. 1, Reactor Trip Breaker;
- OWP-AF-01, Rev. 1, Auxiliary Feedwater Pump 1A-SA;
- OWP-AF-02, Rev. 1, Auxiliary Feedwater Pump 1B-SB;
- OWP-AC-01, Rev. 1, AC Electrical Uninterrupted Power Supply UPS Channel I;
- OWP-CS-01, Rev. 1, Chemical and Volume Control System Charging Pump 1A-SA;

- OWP-CT-01, Rev. 1, Containment Spray Pump 1A-SA;
- OWP-DG-01, Rev. 1, Diesel Generator Number 1A-SA; and
- OWP-ESF-01, Rev. 1, ESFAS - Containment Pressure - Circuit Components.

The procedures implemented by the licensee failed to assure that the plant was maintained in a safe configuration when the SSPS system was being tested. The inspector informed the licensee that the preceding examples demonstrate that procedures for controlling tests conducted on the SSPS system, and therefore system configuration control procedures, are inadequate. This is a violation, Failure to Control System Configuration During a Test of the Solid State Protection System, 50-400/88-11-01.

c. Low Temperature Over Pressure Protection

On May 11, while the plant was operating at 100% power, the licensee made a 10 CFR 50.72 report to the NRC Duty Officer. The notification was to make the NRC aware of a potential unanalyzed condition regarding the plant low temperature over pressure protection system (LTOP). The unanalyzed condition was brought to the attention of the licensee earlier during the day by Westinghouse Electric Corporation personnel, the supplier for the plant NSSS.

LTOP utilizes the pressurizer PORVs to protect the reactor vessel from overpressurization when the plant is operating at low temperatures of 335 degrees F or less. The LTOP system is not needed when the temperature is greater than 335 degrees F. When the plant is operating at temperatures greater than 335 degrees F, the PORVs are controlled to open at pressures to relieve the RCS pressure during design transients. Operation of the PORVs minimizes the undesirable opening of the spring-loaded pressurizer Code Safety Valves.

LTOP, at the Harris Plant, was designed to be automatically in effect when the control switches for the two affected PORVs are placed in the automatic position and one of the two affected wide range temperature detectors indicates a reactor coolant temperature of 335 degrees F or less. The remaining PORV is unaffected by the LTOP controls. Likewise, the three Code Safety Valves are unaffected by the LTOP circuit. The Westinghouse unanalyzed scenario postulated a condition where a main steam line break accident or major S/G tube rupture accident coincident with a single failure of either of the two LTOP RCS wide range temperature channels may allow the plant temperature in the affected S/G to drop to 335 degrees F or less, thus arming the LTOP circuit in the faulted loop and with the other temperature detector failed, LTOP would actuate. Thus, this would even further drop RCS pressure, perhaps into an unsafe DNB condition.

To reduce the likelihood of this condition from occurring, on May 11 the licensee placed the control switches for the two affected PORVs in the "shut" position and placed caution tags on the switches to advise the operators that the two switches must be manipulated from the main control board by the operators if they wished to open the two PORVs thus eliminating the ability of the LTOP system to activate these two PORVs if a scenario occurred similar to that proposed by Westinghouse above. Also, placing these two switches in the "shut" position turned off all automatic controls for these two PORVs.

The licensee determined that the plant would be in a more suitable condition if the LTOP system was electrically disconnected from the normal PORV control circuit and the switches for the two affected PORVs were returned to the "automatic" position. On May 13 the control circuits for the LTOP system were disconnected (the cards were unplugged) and the switches for the affected valves were returned to the "automatic" position.

Currently the licensee plans to make some permanent design change to the LTOP control system to allow it to be manually turned off at temperatures greater than 335 degrees F. The inspector discussed the preceding event with the licensee, Region II management, and NRR management. As a result the inspector concluded that the licensee took satisfactory corrective steps upon notification by Westinghouse of this unanalyzed condition.

d. Emergency Service Water Pump

While the plant was operating at 100% power on May 13, a condition occurred in which both ESW pumps were considered inoperable. This placed the plant in a condition under TS 3.0.3, which required the plant to begin changing modes within one hour. The event lasted only ten minutes and therefore the licensee was within full compliance of this TS requirement. The NRC Duty Officer was made aware of this condition by the licensee. The event resulted from the "A" ESW seal water booster pump being declared inoperable due to its suction and discharge valves failing to properly shut, thus making the "A" ESW pump inoperable. The "B" ESW system had previously been declared inoperable for repairs on its ESW booster pump valves. The technicians took immediate steps to make adjustments to both of the affected "A" ESW seal water booster pump valves by cycling the valves and flushing the valve seats. Within ten minutes the "A" ESW seal water booster pump, and therefore the "A" ESW pump, were returned to operable status. The plant was then no longer operating under the condition of TS 3.0.3.

Except as noted in paragraph 2.b, no other violations or deviations were identified in the areas inspected.

3. Monthly Maintenance Observation (62703, 37700)

The inspector reviewed the licensee's maintenance activities during this inspection period to verify the following: maintenance personnel were obtaining the appropriate tag out and clearance approvals prior to commencing work activities, correct documentation was available for all requested parts and material prior to use, procedures were available and adequate for the work being conducted, maintenance personnel performing work activities were qualified to accomplish these tasks, no maintenance activities reviewed were violating any limiting conditions for operation during the specific evolutions; the required QA/QC reviews and QC hold points were implemented; post-maintenance testing activities were completed; and equipment was properly returned to service after the completion of work activities. The following specific activities were evaluated:

- The inspector evaluated work associated with WR 88-AKUG1 and WR 88-AKUT1 which required unplugging the electrical control circuit cards on the LTOP system. The circuit was located in process instrumentation cabinets PIC-8 and PIC-5. Once unplugged, the cards were tagged in accordance with the controlling Administrative Procedure to assure that they were properly controlled.

- The work associated with WR 88-ABSF5 was evaluated. The WR was generated to require that repairs be conducted to stop a body-to-bonnet leak which developed on an auxiliary feedwater system valve. The valve was identified as 1AF-155, an isolation valve associated with the "A" steam generator preheater bypass. The valve provides isolation between the auxiliary feedwater piping leading to the "A" steam generator and the chemical addition system piping which has been installed for the addition of hydrazine. The work activity required drilling a hole in the valve bonnet and injecting a liquid sealer in accordance with the WR and PCR-3068. Upon completion of the work the valve was tested and returned to service.

No violations or deviations were identified in the areas inspected.

4. Emergency Response Facilities Appraisal (82412, 71707)

On May 17 the licensee conducted its annual emergency preparedness exercise, which this year was a limited scale drill. A team of regional based emergency preparedness inspectors were on site to perform an emergency response facility appraisal.

The exercise began about 8:05 a.m., and was completed at about 1:45 p.m. While the drill scenario was in progress the inspector observed licensee personnel at their exercise stations, both in the TSC and in the Control Room.

The drill started with a RCS leak over 50 gpm in the containment building. At about 8:24 a.m., an "alert" was declared, and by 8:44 a.m., the TSC was activated. A fire was reported at elevation 291' in the Waste Process Building at 9:09 a.m. The Holly Springs Fire Department notification was given and a simulated fire truck responded. By 9:54 a.m., the plant condition had worsened and the plant simulated being in a "site emergency", and at 10:02 a.m., simulated evacuation of the site commenced. Containment phase "B" isolation was simulated at 11:52 a.m., and at about 11:59 the plant simulated the declaration of a "general emergency". The simulated conditions then allowed the gradual return of plant conditions to normal.

The inspector arrived in the TSC shortly before the TSC was activated. While in the TSC the inspector observed the following:

- Both primary personnel and their alternates appeared in the TSC very promptly. This allowed the TSC to be ready for operation in less than 25 minutes.

- The plant general manager gave detailed briefings throughout the drill and played a significant role in keeping the "players" organized and making sound decisions when taking corrective steps.

- The EOPs and the associated diagnostic chart were available and were used extensively by TSC personnel.

- The status of the plant and supporting drill data were promptly and clearly posted on the data charts located in the TSC.

- During the drill there was a change in players; the new shift personnel were thoroughly briefed by those being relieved.

The inspector also toured the Control Room during the exercise, and the following were observed:

- The players were well organized and kept continuous and accurate logs on the simulated changing plant conditions.

- The TS and applicable procedures and charts were available where the players were assembled and they were reviewed and referenced continuously by the players.

- The shift foreman maintained clear and accurate communications when using the public address system and when speaking to his fellow players.

During the exercise the inspector reviewed the licensee's documented exercise scenario and noted that it appeared to have an inclusive scheme with an unpredictable path.

No violations or deviations were noted in the areas inspected.

5. Exit Interview

The inspection scope and findings were summarized on May 24, 1988, with the Plant General Manager, Operations. The inspector described the areas inspected and discussed in detail the inspection findings listed above. Dissenting comments were not received from the licensee. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection. One violation was identified:

VIO 50-400/88-11-01; Failure to Control System Configuration During Testing of the SSPS - paragraph 2.b.

6. Acronyms and Abbreviations

CP&L	Carolina Power and Light Company
DNB	Departure from Nucleate Boiling
EIR	Equipment Inoperable Record
EOP	Emergency Operating Procedure
ESW	Emergency Service Water
F	Fahrenheit
GPM	Gallons Per Minute
LCO	Limiting Condition for Operation
LTOP	Low Temperature Over Pressure Protection
MST	Maintenance Surveillance Test
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NSSS	Nuclear Steam Supply System
OST	Operational Surveillance Test
OWP	Operations Work Procedure
PCR	Plant Change Request
PORV	Pressure Operated Relief Valve
QA	Quality Assurance
QC	Quality Control
RCS	Reactor Coolant System
S/G	Steam Generator
SSPS	Solid State Protection System
TS	Technical Specifications
TSC	Technical Support Center
WR	Work Request