



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

Report No.: 50-400/92-28

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

Docket No.: 50-400

Licensee No.: NPF-63

Facility Name: Harris 1

Inspection Conducted: November 21 - December 18, 1992

Inspectors:

H. Tedrow  
J. Tedrow, Senior Resident Inspector

12/22/92  
Date Signed

M. Shannon  
M. Shannon, Resident Inspector

12/22/92  
Date Signed

Approved by:

H. Christensen  
for H. Christensen, Chief  
Reactor Projects Section 1A  
Division of Reactor Projects

12/22/92  
Date Signed

SUMMARY

Scope:

This routine inspection was conducted by the resident inspectors in the areas of plant operations, radiological controls, security, fire protection, surveillance observation, maintenance observation, safety system walkdown, licensee event reports and licensee action on previous inspection items. Numerous facility tours were conducted and facility operations observed. Some of these tours and observations were conducted on backshifts.

Results:

No violations or deviations were identified.

An information meeting with local officials was held following the SALP presentation, paragraph 5.

Improvements in licensee's self-assessment were noted, paragraph 6.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. Collins, Manager, Operations
- J. Cribb, Manager, Quality Control
- C. Gibson, Manager, Programs and Procedures
- \*C. Hinnant, General Manager, Harris Plant
- D. Knepper, Project Engineer, Nuclear Engineering Dept.
- B. Meyer, Manager, Environmental and Radiation Monitoring
- T. Morton, Manager, Maintenance
- J. Moyer, Manager, Project Assessment
- J. Nevill, Manager, Technical Support
- \*C. Olexik, Manager, Regulatory Compliance
- A. Powell, Manager, Harris Training Unit
- W. Seyler, Manager, Outages and Modifications
- H. Smith, Manager, Radwaste Operation
- G. Vaughn, Vice President, Harris Nuclear Project
- W. Wilson, Manager, Spent Nuclear Fuel

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

#### \*Attended exit interview

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

### 2. Review of Plant Operations (71707)

The plant began this inspection period in cold shutdown (Mode 5) condition. On November 25, 1992, a plant heatup was commenced and the plant entered hot standby (Mode 3) condition at 10:50 a.m. on November 26. On November 29 a reactor startup was commenced and the reactor was taken critical at 5:16 p.m. The plant entered Mode 1 at 5:23 p.m. on December 1, 1992 and was placed on the grid at 11:13 a.m. on December 3, 1992. The plant remained at full power for the rest of the inspection period.

#### a. 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; Outage Shift Manager'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.

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

b. Facility Tours and Observations

Throughout the inspection period, facility tours were conducted to observe operations, surveillance, and maintenance 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; control room; emergency diesel generator building; reactor auxiliary building; waste processing building; turbine building; fuel handling building; reactor containment building; emergency service water building; battery rooms; electrical switchgear rooms; and the technical support center.

During these tours, the following observations were made:

- (1) Monitoring Instrumentation - Equipment operating status, area atmospheric and liquid radiation monitors, electrical system lineup, reactor operating parameters, and auxiliary equipment operating parameters were observed to verify that indicated parameters were in accordance with the TS for the current operational mode.
- (2) Shift Staffing - The inspectors 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.
- (3) Plant Housekeeping Conditions - 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.
- (4) Radiological Protection Program - Radiation protection control activities were observed routinely to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements. The inspectors also reviewed selected radiation work permits to verify that controls were adequate.
- (5) Security Control - 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.

- (6) Fire Protection - 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.

The inspectors found plant housekeeping and material condition of safety related components to be good. The licensee's adherence to radiological controls, security controls, fire protection requirements, and TS requirements in these areas was satisfactory.

c. Review of Nonconformance Reports

Adverse Condition Reports (ACRs) were reviewed to verify the following: TS were complied with, corrective actions and generic items were identified and items were reported as required by 10 CFR 50.73.

3. 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:

- OST-1039 Calculation of Quadrant Power Tilt Ratio
- OST-1075 Turbine Mechanical Overspeed Trip Test
- OST-1080 Auxiliary Feedwater Pump 1X-SAB Full Flow Test
- OST-1118 Containment Spray Operability Train A
- OST-1211 Auxiliary Feedwater Pump 1A-SA Operability Test
- OST-1411 Auxiliary Feedwater Pump 1X-SAB Operability Test
- MST-I0070 Calibration of NIS Power Range Overpower Trip High Range Bistables

- MST-I0121 Pressurizer Pressure P-0457
- MST-I0165 Nuclear Instrumentation System Power Range N43 Operational Test
- MST-I0170 Nuclear Instrumentation System Source Range N32 Operational Test
- MST-I0650 Incore Thermocouple and Reactor Coolant System RTD Cross Calibration Test
- EST-704 Shutdown and Control Rod Drop Test
- EPT-069 Initial Criticality
- EPT-070 Reactivity Computer Initial Setup and Calibration
- EPT-115T Dynamic Test of Auxiliary Feedwater Pump 1X-SAB

The performance of these procedures was found to be satisfactory with proper use of calibrated test equipment, necessary communications established, notification/authorization of control room personnel, and knowledgeable personnel having performed the tasks. No violations or deviations were observed.

#### 4. 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, as required, were issued and being followed; quality control personnel were available for inspection activities as required; and TS requirements were being followed.

Maintenance was observed and work packages were reviewed for the following maintenance activities:

- Troubleshooting/replacement of a blown fuse in the control rod drive system for control rod L-11 in shutdown bank "B".

During the reactor startup on November 29, control rod L-11 did not withdraw with the rest of shutdown bank "B". Operators suspended rod withdrawal and inspected the control rod drive system cabinet associated with control rod L-11. A blown fuse was found which corresponded to the stationary gripper coils for control rod L-11. The fuse was subsequently replaced. During the inspection the inspector discussed control rod drive system circuitry with the operator. The operator's knowledge of the circuitry was extremely good which facilitated quick identification of the blown fuse.

- Troubleshooting repair of a Brown Boveri 480 VAC LK-16 breaker failure.

The group A pressurizer heater 480 VAC supply breaker failed to open on demand and was found stuck in the closed position. The breaker is supplied from a 480V vital bus. Maintenance of the Brown Boveri LK-16 breakers continued to be a problem because of the original marginal design of the breaker. The plant staff is continuing its search for a breaker replacement, which is scheduled for refueling outage 5.

- Repair of the turbine driven AFW pump.

A routine PM was performed under CM-M-0071, for the inspection of the turbine driven auxiliary feedwater pump. During the refueling outage the AFW pump was inspected and reassembled. During subsequent testing the pump did not perform as required and had to be disassembled. It was found that the manufacturer's instructions/procedures lacked sufficient detail for proper reassembly. The pump was subsequently reassembled and tested satisfactory.

The performance of the above work was satisfactory with proper documentation of removed components and independent verification of the reinstallation.

No violations or deviations were identified.

#### 5. Information Meetings with Local Officials (94600)

On December 11, 1992 following the Harris SALP presentation at the Harris Environment & Energy Center, at approximately 2:30 p.m., members of NRC regional, headquarters and resident staffs met with local officials. Representatives from the Townships of Apex, Fuquay-Varina, and Holly Springs, as well as representatives from the North Carolina State Emergency Preparedness and Radiation Protection organizations attended the meeting. The objectives of this meeting were to:

- Acquaint local officials to the mission of the NRC.
- Introduce NRC officials and resident inspectors.
- Discuss the lines of communication between local officials and the NRC.
- Discuss the SALP.
- Discuss any related community concerns with the plant or its operation.

It was felt that all participants benefitted from this meeting and that the meeting objectives were accomplished.

The meeting was conducted in accordance with ROI 2217 and ROI 2218. The following is a listing of all participants in the meeting:

E. Edwards, Mayor, Town of Apex, N. C.  
 M. Wilson, Interim Town Manager, Apex, N. C.  
 S. Smith, Apex Chamber of Commerce  
 G. Hollemon, Mayor, Town of Holly Springs, N. C.  
 L. Bennett, Manager, Town of Fuquay-Varina, N. C.  
 W. Moore, North Carolina Emergency Management  
 M. Chriscoe, Wake County Emergency Management  
 E. Wathen, N. C. Division of Emergency Management  
 J. James, Radiation Emergency Coordinator, Division of Radiation Protection, State of North Carolina  
 G. Vaughn, Vice President, Shearon Harris Nuclear Plant  
 C. Hinnant, General Manager, Shearon Harris Nuclear Plant  
 G. Sinders, Manager, Harris Visitors Center  
 M. Staton, Site Representative, N. C. Eastern Municipal Power Agency  
 J. Holland, Assistant County Manager, Wake County, N. C.  
 B. Snyder, District Manager, CP&L  
 K. Nelson, Area Manager, CP&L  
 R. Indelicate, Manager Emergency Preparedness, CP&L  
 F. Keller, District Manager, CP&L  
 E. Bean, CP&L Nuclear Spokesperson  
 L. Reyes, Deputy Regional Administrator, Region II, RII  
 E. Merschhoff, Director, Division of Reactor Projects, RII  
 E. Adensam, Director, Project Directorate PDII-1, NRR  
 K. Clark, NRC Public Affairs Officer, Region II  
 H. Christensen, Section Chief, DRP, NRC, Region II

6. Evaluation of Licensee Self Assessment (40500)

The inspectors reviewed the involvement of the Quality Verification Section as it related to assessment of plant activities. Self assessments/field surveillances of other plant organizations had commenced. On November 25, 1992, the inspectors reviewed the self assessment records and found that 29 field surveillances had been performed during the outage. A review of the last ten field surveillances revealed good findings which should help to improve the licensee's performance. The inspectors discussed the performance and high quality of these assessments with the QV manager and was informed that this effort would be continued.

The inspectors reviewed recently completed NAD assessments in the areas of Technical Specifications/Operating License, In-Service Inspection and the Harris site-wide. The assessments were found to have sufficient detail for the inspectors to determine the depth and adequacy of the assessments. The assessments had well documented results with both strengths and issues. The issues were sufficiently detailed for the plant to understand and implement corrective actions. An Adverse Condition Report was assigned to each issue so the issue could be tracked in the Corrective Action Program. It was also noted that the



reports were properly forwarded to the appropriate site and corporate managers. The quality of the NAD assessments has improved. No violations or deviations were identified.

7. Plant Startup From Refueling (71711)

The inspector observed plant activities during unit startup following refueling to verify that plant systems were properly returned to service and that the startup was conducted in accordance with approved procedures and in compliance with the TS.

The plant began deboration to criticality on November 29 and entered the startup mode (Mode 2) at 10:44 a.m. Criticality was achieved at 3:16 p.m. on November 29. The inspectors observed the approach to criticality and verified that criticality occurred within the limits calculated by the licensee. Implementation of the following procedures was verified:

- GP-004 Reactor Startup
- EPT-069 Initial Criticality

Due to the new core, initial plant power operation was accomplished with a positive moderator temperature coefficient. The inspectors attended operator simulator training on plant startup with this unusual condition to ascertain the new plant response characteristics. Operator control of reactivity was observed for simulated startup, subsequent power escalation, and different steam demand conditions such as rolling/loading the main turbine. The inspectors noted that the operators were thoroughly trained and capable of handling the new core characteristic. The inspectors also reviewed licensed operator classroom training lesson plans and noted references to other nuclear facilities reactor operation with a positive moderator temperature coefficient. The actions those utilities decided to implement to control this characteristic was provided to the licensed operators.

The moderator temperature coefficient is expected to be positive for the first half of core life at low power conditions (up to approximately 35 percent power). For higher power levels the negative fuel doppler coefficient is expected to dominate. No violations or deviations were identified.

8. Review of the Licensee's Erosion/Corrosion Program (72707)

The inspectors reviewed the licensee's activities regarding non-destructive examination of piping systems to detect corrosion/erosion. Requirements for this program were contained in procedure ISI-107, SHNPP Erosion/Corrosion Program. The EPRI CHEC/CHECKMATE computer codes were utilized to model plant systems to predict erosion rates and identify specific points for inspection by ultrasonic thickness measurement devices. This program was used primarily for large diameter piping (four inches or greater) and included the following systems: main



steam, main feedwater, auxiliary steam, auxiliary feedwater, condensate, blowdown, heater drains, heater vents, low pressure extraction steam, high pressure extraction steam, cold reheat, and hot reheat.

During this refueling outage, licensee personnel inspected approximately 288 components of which 55 components were found to be in need of repair/replacement. As discussed in NRC Inspection Report 50-400/92-27, significant portions of the auxiliary feedwater and pre-heater bypass systems were replaced. In addition, several secondary valves were found to have severe erosion damage, including the main feedwater regulating valves. All identified components were subsequently replaced. The inspectors found the licensee's implementation of the program to be thorough and appropriate action was taken to correct identified deficiencies. No violations or deviations were identified.

9. Review of Licensee Event Reports (92700)

The following LERs were reviewed for potential generic impact, to detect trends, and to determine whether corrective actions appeared appropriate. Events that were reported immediately were reviewed as they occurred to determine if the TS were satisfied. LERs were reviewed in accordance with the current NRC Enforcement Policy.

- a. (Closed) LER 91-19: This LER reported the unplanned ESF actuation (containment ventilation isolation) due to a spike on a radiation monitor. Subsequent testing, during RFO 4, found loose connections and a defective low voltage power supply circuit in the monitor's 110 volt supply. The conditions were corrected and the monitor was returned to service. The other radiation monitors were inspected and found to be satisfactory.
- b. (Closed) LER 92-05: This LER reported a Technical Specification violation due to a missed compensatory grab sample. The licensee has completed corrective actions by providing additional training, clarification of responsibilities between Operations and Radwaste, and by providing written operability criteria for the radiation monitor's isokinetic sample-skids. A generic isokinetic skid drawing was supplied with the written operability criteria.
- c. (Closed) LER 92-06: This LER reported mispositioned excess flow check valves. Excess flow check valves in both the hydrogen and auxiliary steam systems were found with the internal bypasses in the open position. The licensee has completed corrective actions by repositioning all of the affected valves, providing training, and revising operating procedures.
- d. (Closed) LER 92-10: This LER reported a reactor trip due to a low pressure turbine exhaust boot seal failure. The licensee has completed corrective actions by having the low pressure turbine boot seals replaced by the manufacturer and by completing the testing of IMS-47 which had lifted during the transient. The



licensee is continuing to investigate the rubber boot seal failure.

- e. (Closed) LER 92-12: This LER reported a Technical Specification 3.0.3 entry due to a failure of 1B-SB emergency bus undervoltage relay. The licensee has completed corrective actions by replacing the faulted relay, revising OST-1124 to ensure all relays trip, as required, providing guidance on how to place the relays in the tripped position, and modification of the target flag circuitry.

10. Licensee Action on Previously Identified Inspection Findings (92702 & 92701)

- a. (Closed) P2190-04: This 10 CFR Part 21 Report notified the licensee of the long term degradation of Rosemont resistance bridges due to power and humidity. After a detailed review the licensee determined that the affected instruments were not used at Harris.
- b. (Closed) P2191-02: This 10 CFR Part 21 Report notified the licensee of sticking air start pistons in the piston cap because of material problems and installation distortion. The licensee verified the air start valve caps and piston dimensions on both emergency diesels and installed the components in accordance with the manufacturers' instructions.
- c. (Closed) P2191-05: This 10 CFR Part 21 Report notified the licensee of the potential failure of SMB00 torque switch roll pins. The licensee reviewed the application of these torque switches at Harris and determined that no safety concern existed because of the plant design which bypasses the torque switches on safety system actuations. The torque switches are being changed out with the new modified torque switches as necessary.
- d. (Closed) P2191-06: This 10 CFR Part 21 Report notified the licensee of tappet head swelling and loss of guide and head clearance on Terry turbines. The licensee completed engineering evaluation PCR 6300 which determined that the temperatures in the Harris Terry turbine would not cause excessive swelling and subsequent inadequate guide clearance problems.
- e. (Closed) URI 400/89-16-01: Testing of molded case circuit breakers in safety-related 125V DC power systems. This item was reviewed in Inspection Report 400/92-26 which stated that no safety concern existed, therefore this item is considered closed.
- f. (Closed) Violation 400/92-13-02: Failure to identify excessive AFW motor starts. The inspector reviewed and verified completion of the corrective actions listed in the licensee's response letter dated August 28, 1992. A simulator scenario resulting in exceeding motor starting duties was developed for licensed



operator retraining and this item completed the corrective actions.

- g. (Closed) Violation 400/92-15-01: Failure to properly implement plant procedures. The inspector reviewed and verified completion of the corrective actions listed in the licensee's response letter dated October 19, 1992. An operations night order was issued to inform operators of the backflushing incident and RAD waste procedures were revised to complete corrective actions on example two. Compliance action item 92H0876 was initiated to track procedure revisions and operator training on new fuel handling procedures.
- h. (Closed) Apparent Violation 400/92-17-03: Failure to promptly identify and correct an adverse condition. It was concluded during the Enforcement Conference on October 14, 1992 that the licensee actions to correct the observed deficiencies in the alternate miniflow portion of the high head safety injection system were appropriate. This information was sent to the licensee in a letter dated November 5, 1992 and therefore the apparent violation is considered to be closed.

#### 11. Exit Interview (30703)

The inspection scope and findings were summarized on December 18, 1992 with those persons indicated in paragraph 1. Dissenting comments were not received from the licensee.

#### 12. Acronyms and Initialisms

ACR	-	Adverse Condition Report
AFW	-	Auxiliary Feedwater
CFR	-	Code of Federal Regulations
CP&L	-	Carolina Power & Light Co.
DC	-	Direct Current
EPRI	-	Electric Power Research Institute
EPT	-	Engineering Performance Test
ESF	-	Engineered Safety Feature
EST	-	Engineering Surveillance Test
ISI	-	In-Service Inspection
LER	-	Licensee Event Report
MST	-	Maintenance Surveillance Test
NAD	-	Nuclear Assessment Department
NIS	-	Nuclear Instrumentation System
NRC	-	Nuclear Regulatory Commission
OST	-	Operations Surveillance Test
PCR	-	Plant Change Report
PM	-	Preventive Maintenance
QV	-	Quality Verification
ROI	-	Regional Office Instruction
RTD	-	Resistance Temperature Detector
SALP	-	Systematic Assessment of Licensee Performance

SHNPP - Shearon Harris Nuclear Power Plant  
TS - Technical Specification  
URI - Unresolved Item  
VAC - Volt Alternating Current  
VIO - Violation