

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

Report No.: 50-400/94-24

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

Docket No.: 50-400

Facility Name: Harris 1

Licensee No.: NPF-63

Inspection Conducted: December 4, 1994 - January 7, 1995 Inspectors: for S! Inspector Sianec Roberts. Resident Inspector Síaned Approved by: Christensen, Section Chief Date Signed **Reactor Projects Section 1A Division of Reactor Projects** 

# SUMMARY

Scope:

This routine resident inspection was conducted in the areas of plant operations; onsite followup of events; effectiveness of licensee control in identifying, resolving, and preventing problems; maintenance observation; surveillance observation; plant support activities; and Licensee Event Reports. Numerous facility tours were conducted and facility operations observed. Backshift tours and observations were conducted on December 4, 6, 23, 24, 26, 1994, and January 4, 1995.

Results:

## **Operational Safety**

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Operator coordination and communications were effective during several major surveillance tests (paragraph 4.b).

The Nuclear Assessment Section was thorough in assessing areas such as maintenance and Foreign Material Exclusion (paragraph 3.b).



# Maintenance

Shop work practices were effective while replacing the heat exchanger for the 1B emergency diesel generator. The rigging equipment used during the above heat exchanger replacement was found to be adequately tested (paragraph 4.a).

Foreign Material Exclusion procedures and practices were found to be moderately effective (paragraph 4.c).

# Plant Support

A non-cited violation was identified concerning failure to lock a locked-highradiation-area door. The licensee's initial onsite response upon discovering the condition was effective (paragraph 5.b).

# **REPORT DETAILS**

# 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
- \*K. Neuschaefer, Manager, Radiation Control
- \*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

\*Attended exit interview

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

#### 2. PLANT STATUS AND ACTIVITIES

- The plant continued in power operation (Mode 1) for the duration a. of this inspection period. Reactor power was reduced to 47 percent on December 10 to repair tube leaks on the "A" condensate booster pump lubricating oil cooler and was returned to 100 percent on December 12. The unit operated at essentially full power for the rest of the period, ending the period in day 60 of power operation since startup on November 8.
- b. There were no other NRC inspections or meetings at the site during this inspection period.



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### 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 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. 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.

During a review of the chemistry daily report book on January 6, the inspector noted that sample results for RWST silica (SiO<sub>2</sub>) and "A" EDG jacket cooling water system nitrite  $(NO_2)$  were outside of their acceptable ranges. The RWST silica value was 1300 parts per billion (ppb) vice the acceptance criteria of 1000 ppb or less. The "A" EDG jacket water system nitrite level was 739 parts per million (ppm) vice.750 ppm or more. Although the chemistry report book is updated daily, the above two values were the results of monthly samples taken in December 1994. Each of the above two entries were annotated with corrective steps by the chemistry technician completing the data sheet. For the RWST silica entry, the technician wrote "specialist notified". For the EDG jacket cooling water entry for nitrite, the technician noted "chemical addition made 12/19; resampled and  $NO_2 = 952$  ppm". The latter note appeared to contradict the information provided in the data block just above which referenced the jacket water nitrite concentration as being 739 ppm.

The inspector reviewed the controlling procedure for performing chemistry samples, and interviewed chemistry personnel to determine the importance of the above requirements and what actions were required to correct the noted discrepancies. Chemistry procedure CRC-001, SHNPP [Shearon Harris Nuclear Power Plant] Environmental and Chemistry Sampling and Analysis Program, specified the sampling schedule and provided limits for the various sample points. According to the procedure, the RWST and EDG jacket water requirements for silica and nitrite were administrative limits, not control limits. That meant that

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regulatory requirements which would have required immediate action. According to the procedure and discussions with chemistry personnel, the RWST silica value was based on information contained in a standard information package provided by the plant's Nuclear Steam Supply System vendor. Nitrite was used in the diesel generator jacket cooling water system as a corrosion inhibitor. Chemistry personnel indicated that a chemical addition and resample had indeed been conducted on December 19 and also later in the month. during which jacket water nitrite levels were recorded to be at least 900 ppm. Chemistry personnel indicated that the January 6 chemistry log book entry of 739 ppm was in error. For the RWST entry, according to licensee personnel, an investigation was ongoing to determine if the RWST silica acceptance limit of 1000 ppb or less was too conservative and whether or not it should be relaxed. The inspector concluded that although the January 6 log entry for jacket water nitrite concentration was inaccurate, the technician acted in accordance with procedure CRC-001 by annotating it with correct information.

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; 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 pertiment-plant information during these turnovers. The licensee's performance in these areas was satisfactory.

No violations or deviations were identified.

- Effectiveness of Licensee Control in Identifying, Resolving, and Preventing Problems (40500)
  - (1) Adverse Condition and Feedback Reports (ACFRs) were reviewed to verify TS compliance, that corrective actions and generic items were identified, and items were reported as required by 10 CFR 50.73.

An ACFR was generated during this period for an issue involving a potentially inadequate emergency battery surveillance procedure. There have been other recent ACFRs addressing battery surveillance. On December 5, it was determined that the 18-month battery load test required by TS 4.8.2.1.d and TS 4.8.2.2, as delineated in maintenance procedure MST-E0027, 1E Battery Service Test, was potentially inadequate in that it did not reflect the actual battery load profile resulting from various plant modifications which occurred over the life of the plant. By the end of the inspection period, the licensee had completed an evaluation which concluded that the battery was never inoperable over the life of the plant because of significant conservatism built into the load profile assumed in the surveillance test procedure. The licensee also concluded that, because of this conservatism, no TS violation occurred for inadequate surveillance testing. The inspectors are following the corrective actions to address this issue.

- (2) The NAS observed the planning and execution of the January 4 Safety System Outage in great detail. The main task involved was the replacement of the 1B EDG cooling system heat exchanger tube bundle (paragraph 4.a), however a circuit breaker modification affecting an EDG auxiliary was also included. The inspector observed the NAS auditors at work during the tube bundle replacement and reviewed their conclusions. The assessment was very thorough, well focused, and well documented. NAS identified for improvement several instances of inefficient planning or coordination.
- (3) On December 14, a licensee NAS person found a door posted as a "locked high radiation area" to be unlocked. This door led to the Filter Backwash Storage Tank/Pump room. This event is discussed in paragraph 5.b.

(4) During this period, the NAS issued the following assessments:

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- H-SP-94-02 Special Processes Including Welding, Non-Destructive Examination, Heat Treating, and Freeze Sealing.
- H-SP-94-05 Harris Nuclear Plant Response to Generic Letter 88-14, "Instrument Air Supply Problems Affecting Safety-Related Equipment"

The inspectors reviewed these and found them to be in depth, and effective assessments.

(5) On December 7, the licensee management initiated a site wide "Quality Standdown" to focus on a number of continuing quality problems that have been appearing in the last six months. In addition to publishing management expectations, this standdown asked for improvement ideas from all plant staff levels and provided free time for persons to respond. While it is too soon to tell if the standdown was effective, the inspector considered it to be an important step attesting to management interest in quality.

#### 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.

The inspectors observed the licensee replacing the 1B EDG service water to jacket water heat exchanger (HX) tube bundle on January 4. This tube bundle, about a foot in diameter and 12 ft long, had developed a tube leak. Since the leak was unexpected, the licensee opted to not plug the existing tube but to replace the bundle with a spare intended for the abandoned Unit 2, then pursue the cause of the leak separately. The licensee eddy current tested the replacement prior to installation. The work area was moderately confined such that protecting adjacent equipment was a consideration. Activities observed included removal and installation of the tube bundle, rigging the channel heads back onto the HX, rigging of various components, foreign material exclusion practices, mechanical work practices, procedure adherence, and post-maintenance testing.

The inspectors observed that the main gasket sealing surfaces on the outlet channel head and shell were in excellent condition. The outlet ESW pipe connection surface had minor pits. On the



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inlet channel head and shell, the gasket surface had pits and areas of partial deterioration over about a quarter of the circumference. Gasket installation showed that the deteriorated areas were not under the gasket and not involved in sealing the joint, therefore not a problem.

When the old tube bundle was removed, the inlet tube sheet was quite clean but the outlet tube sheet had a thick layer of tightly adhering corrosion products. This unusual condition prompted a review of the Emergency Service Water (ESW) piping to confirm connection per the flow diagram. During subsequent retesting, the inspector observed ESW inlet and outlet pipe surface temperature as measured with a surface pyrometer. System temperature responded normally as the EDG was operated, showing that ESW flow entered the inlet pipe and exited the exit pipe as designed. The licensee produced test data for several years showing consistent behavior. The inspector agreed with the licensee's conclusion that the buildup was a function of flow conditions in the exit channel head and that the buildup had not significantly reduced heat exchanger performance.

Following the repair, operators retested the EDG per OST-1073, Rev. 3, Advance Change Notice (ACN) 8, "1B-SB Emergency Diesel Generator Operability Test". The inspector focused on procedure adherence, communications and coordination, and response to indications in the field. Operators performed a partial valve lineup in the work area to ensure that EDG systems had not been inadvertently disturbed. Responses to engine water and oil temperature alarms and water level alarms were appropriate. The EDG performed well during the run and mechanics completed tightening the HX expansion joint after the EDG warmed up.

The inspector reviewed inspection records for the crane and rigging equipment used to move the HX tube sheets into and out of the diesel generator building. Maintenance procedure MMM-020, "Operation, Testing, Maintenance and Inspection of Cranes and Special Lifting Equipment," required annual inspections on overhead cranes. The procedure requires the inspection results to be documented on the applicable data sheets for each crane and recorded in the plant equipment files. The inspector verified that the diesel building overhead crane had been inspected within the last 12 months (February 25, 1994). Data sheets indicated that the crane was inspected satisfactorily for deformed or cracked hooks, leakage in lines, tanks, valves, and other parts, and excessive wear on brake system parts. The inspector also verified that rigging equipment (straps, hooks, chain falls, etc.) were color coded in accordance with procedure MMM-021, Inspection, Identification, and Application of Material Handling Attachments. This procedure required that rigging devices be inspected prior to use and color coded (according to a scheme based on the last digit of the inspection year) to indicate acceptability. The rigging

equipment was tagged with red straps indicating that they had been inspected in 1994. The inspector concluded that the licensee's handling of the crane and rigging inspections was adequate.

In general, the performance of work was satisfactory with proper documentation of removed components and independent verification of the reinstallation. The NAS also followed this repair and concurrent or related jobs continuously in great detail from the planning stage on. Their observations addressed a number of factors involving efficiency and coordination and are discussed in report section 3.b.

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.

- (1) OST-1073, Rev 3, ACN 8, "1B-SB Emergency Diesel Generator Operability Test" was observed as described in report section 4.a. Procedure performance was satisfactory with proper use of calibrated test equipment, necessary communications established, notification/authorization of control room personnel, and knowledgeable personnel performing the tasks.
- (2) OST-1014, Rev 4, ACN 8, "Turbine Valve Test, Monthly Interval, Mode 1" was observed on December 4. This test, required by TS 4.3.4, tested the turbine throttle valves, governor valves, low pressure reheat stop valves, and low pressure turbine reheat intercept valves. The test was prebriefed and effectively performed. Radio communication was effective between the control room operators and test personnel on the turbine deck. The inspector witnessed smooth valve operation.
- (3) OPT-1509, Rev 4, ACN 3, "Turbine Trip Tests, Monthly Interval, Modes 1 and 2" was observed on December 4. This procedure tested the turbine trip circuitry vice the various trip valves tested by OST-1014. During this test, procedure adherence and communications are vital to prevent a turbine trip. The test was performed by a trainee under direct supervision. Procedure adherence and communications were excellent. The STA also witnessed the test and noted that, though the procedure was adequate, a number of human factors

improvements were applicable to the procedure. Following the test, the STA generated ACFR 94-03599 requesting a procedure revision.

No violations or deviations were observed during these surveillances.

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c. Foreign Material Exclusion Controls (TI 2515/125)

(Closed - Unit 1) TI 2515/125, "Foreign Material Exclusion Controls". The inspector reviewed this program as requested by the TI. Procedures reviewed included:

-	AP-619,	Rev 5	Foreign Material Exclusion (FME)
-	WC-009,	Rev 3	Work Management Center Desktop Guide
-	ALP-616,	Rev 5	Fuel Handling Operations
-	MMM-011,	Rev 5, ACN 3	Cleanliness and Housekeeping
-	AP-003,	Rev 5	General Plant Personnel Safety and Housekeeping

NAS Assessments H-OUT-94-01, and C-NF-94-01

NAS Outage Daily Debriefs (Spring 1994)

- NAS weekly observation rollup of October 31, 1994

ACFR listing of 1994 ACFRs involving Foreign Material Exclusion

Licensee procedures and practices address provisions for material, parts, and tool accountability, and are intended to ensure loose items are not inadvertently left inside structures, systems, or components after the work activity is complete. The procedures are applicable to the refueling area, fuel pool, reactor cavity, containment, and safety systems. The base program document is AP-619, which is primarily focused on keeping foreign material out of the reactor core. This document is obviously a compilation of earlier programs without much integration. In fact, the log sheet for signing in and out of the main turbine area is different from and more detailed than the one for an open reactor vessel. Conceptually, what should be a level of control is listed an area, e.g., reactor cavity, fuel handling building, main generator, other primary and secondary systems. The control for "Other primary and secondary systems" is at the discretion of the planner and mechanic using guidelines of procedure MMM-011. These guidelines are minimal. The planning desktop guide, which is what planners use to fill out work tickets, merely says to enter

supporting instructions for . . . cleanliness requirements, confined entry, or hot work permits, etc. . . . among a lot of other items.

The NAS found some examples of good FME practice and numerous examples of inadequate FME practice during the Spring, 1994, refueling outage. An assessment of the corporate nuclear fuel group showed that the nuclear fuels group had stopped a periodic surveillance of controlled areas in the fuel building. During the Fall of 1994, and example of excellent FME control in the turbine system was observed.

The inspector concluded that the FME program has been somewhat effective though actually fragmented into separate programs under temporary managers at the time of fuel pool activities, refueling, or turbine system activities, and planners for "other activities".

# 5. 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.

On December 14, a licensee NAS person found a door posted as a "locked high radiation area" to be unlocked. This door led to the Filter Backwash Storage Tank/Pump room. The licensee promptly restored the proper door condition and conducted an extensive investigation which found that no one had received radiation exposure because of the unlocked door. This door being unlocked followed a period of authorized maintenance activity in the room. This activity included initial HP surveys, moving of radiation boundary to a door closer to the actual source, continual HP coverage to support maintenance, and reestablishment of the expanded boundary at job completion. The technician failed to "challenge" the door as required by plant procedures to ensure that it was locked shut upon leaving for the last time. The licensee's investigation also found several physical and organizational factors which contributed to the event.

• The lock on this door did not auto-lock when the door was shut as did many other similar doors. Locked high radiation area door locks that do not presently auto lock are being changed to do so.

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- The general radiation work permit for Health Physics Technicians did not require a Health Physics Supervisor authorize, therefore consider, HP entry in to such areas. This is now being required.
- Independent verification of reestablishing Locked High Radiation Area boundaries was only required if a padlock was used, not a door lock. Policy and procedures are being changed to require independent verification in all cases.

Failure to maintain locked areas posted as "locked high radiation areas" is a violation of Technical Specification 6.12, "High Radiation Area", subsection 6.12.2. which requires locked doors to prevent unauthorized entry. This violation will not be subject to enforcement action because the licensee's actions in identifying and correcting the violation meet the criteria specified in Section VII.B of the enforcement policy.

Non-cited Violation 400/94-24-01: Failure to maintain locked a door posted as a "Locked High Radiation Boundary".

- 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.

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 generally satisfactory. One non-cited violation was identified in the radiological controls area.

# REVIEW OF LERs (92700)

7.

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 94-06: This LER was issued for a violation discussed in NRC Inspection Report 400/94-23 concerning inter-cell float voltage below TS limits for a cell on the 1B-SB emergency battery. The LER is closed and corrective actions for this event will be tracked under violation 400/94-23-02.
- b. (Closed) LER 94-07: This LER was issued for a control room shift staffing event which was discussed in NRC Inspection Report 400/94-23. An enforcement conference for the corresponding apparent violation was held on December 28, 1994. The LER is closed and followup inspection effort, if any, will be based on resolution of the potential enforcement action.

# 8. EXIT INTERVIEW (30703)

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on January 13, 1995. 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 non-cited Violation 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.

<u>Item Number</u>

# **Description and Reference**

400/94-24-01

Non-cited Violation: Failure to maintain locked a door posted as a "Locked High Radiation Boundary", paragraph 5.b.



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# ACRONYMS AND INITIALISMS

ACFR	-	Adverse Condition and Feedback Report
ACN	-	Advance Change Notice
CFR	-	Code of Federal Regulations
EDG	-	Emergency Diesel Generator
ESW	-	Emergency Service Water
FME	-	Foreign Material Exclusion
Hx	-	Heat Exchanger
LER	-	Licensee Event Report
NAS	-	Nuclear Assessment Section
NRC	-	Nuclear Regulatory Commission
RWST	-	Refueling Water Storage Tank
STA	-	Shift Technical Advisor
TI	-	Temporary Instruction
TS	-	Technical Specification