UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

December 12, 2002

ATTN: Mr. James Scarola
Vice President - Harris Plant
Shearon Harris Nuclear Power Plant
P. O. Box 165, Mail Code: Zone 1
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC SUPPLEMENTAL INSPECTION REPORT NO. 50-400/02-12

Dear Mr. Scarola:

By letter dated September 17, 2002, you were informed that the Nuclear Regulatory Commission (NRC) would conduct a supplemental inspection at your Shearon Harris Nuclear Power Plant for a White performance indicator in the initiating events cornerstone. On November 15, the NRC completed a supplemental inspection at your Shearon Harris Nuclear Power Plant. The enclosed report documents the inspection results that were discussed with you and other members of your staff on November 15, 2002.

The purpose of this supplemental inspection was to examine your problem identification, root cause and extent-of-condition evaluation, and corrective actions associated with a White performance indicator in the initiating events cornerstone. The White performance indicator involved crossing the threshold from Green to White for the Unplanned Scrams per 7,000 Critical Hours Performance Indicator for the third quarter of calender year 2002. The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC determined that the problem identification, root cause and corrective actions for the White performance indicator were adequate. The inspectors did not find common cause aspects linking the three reactor scrams from a risk perspective.

No findings of significance were identified during this inspection.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Paul E. Fredrickson, Chief,
Reactor Projects Branch 4
Division of Reactor Projects

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

Enclosure: NRC Inspection Report 50-400/02-12
w/Attachment

cc w/encl: (See page 3)

cc w/encl:
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-400
License No:	NPF-63
Report No:	50-400/02-12
Licensee:	Carolina Power & Light (CP&L)
Facility:	Shearon Harris Nuclear Power Plant, Unit 1
Location:	5413 Shearon Harris Road New Hill, NC 27562
Dates:	November 12- November 15, 2002
Inspector:	R. Musser, Senior Resident Inspector, Surry Power Station
Approved by:	Paul E. Fredrickson, Chief Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000400-02-12; Carolina Power and Light Company; on November 12-15, 2002; Shearon Harris Nuclear Power Plant, Unit 1; supplemental inspection IP 95001 for a White performance indicator in the initiating events cornerstone.

This inspection was conducted by a senior resident inspector. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, Reactor Oversight Process, Revision 3, dated July 2000.

Cornerstone: Initiating Events

This supplemental inspection was conducted to assess the licensee's evaluation associated with a White performance indicator in the initiating events cornerstone. The White performance indicator involved crossing the threshold from Green to White for the Unplanned Scrams per 7,000 Critical Hours Performance Indicator for the third quarter of calender year 2002. Specifically, the licensee experienced three reactor trips during the first three quarters of 2002. The first reactor trip, which occurred on January 2, 2002, was a manual trip from approximately 7 percent reactor power caused by an equipment failure associated with the main feedwater regulating valve bypass valve for the C steam generator. The second reactor trip, which occurred on July 13, 2002, was a manual trip from approximately 85 percent reactor power caused by an equipment failure associated with the digital electro-hydraulic control system. The third reactor trip, which occurred on August 15, 2002, was an automatic trip from approximately 100 percent reactor power caused by a momentary grid undervoltage condition.

The licensee's problem identification, root cause and extent-of-condition evaluations, and corrective actions for the three reactor trips were adequate. Common cause aspects linking the three reactor trips from a risk perspective were not evident.

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Report Details

01 INSPECTION SCOPE

The purpose of this supplemental inspection was to assess the licensee's evaluation associated with a White performance indicator in the initiating events cornerstone of the reactor safety strategic performance area. The White performance indicator involved crossing the threshold from Green to White for the Unplanned Scrams per 7,000 Critical Hours Performance Indicator for the third quarter of calender year 2002. Specifically, the licensee experienced three reactor trips during the first three quarters of 2002. The first reactor trip, which occurred on January 2, 2002, was a manual trip from approximately 7 percent reactor power caused by an equipment failure associated with the main feedwater regulating valve bypass valve (FWRBV) for the C steam generator (S/G). The second reactor trip, which occurred on July 13, 2002, was a manual trip from approximately 85 percent reactor power caused by an equipment failure associated with the digital electro-hydraulic (DEH) control system. The third reactor trip, which occurred on August 15, 2002, was an automatic trip from approximately 100 percent reactor power caused by a momentary grid undervoltage condition.

02 EVALUATION OF INSPECTION REQUIREMENTS

02.01 Problem Identification

a. Determination of who (i.e., licensee, self revealing, or NRC), identified the issue and under what conditions

The three reactor trips were self-revealing events which occurred during the course of normal operational conditions. The January 2 trip occurred during the process of unit startup. Plant operators manually tripped the unit when water level in the C S/G approached the automatic trip setpoint. With the FWRBV for the C S/G in the closed position, the valve failed to respond to an open signal, preventing normal feedwater from entering the steam generator.

The July 13 trip occurred during the performance of surveillance testing of the turbine governor valves. Plant operators manually tripped the unit when the turbine governor valves continued closing due to a malfunction in the DEH control system.

The August 15 trip occurred when two of three reactor coolant pumps experienced an undervoltage condition. The undervoltage condition resulted from a faulted transformer, located approximately 20 miles from the plant, being loaded onto a 230kV transmission line. This caused a momentary voltage perturbation on the grid supplying the plant and resulted in the automatic trip.

b. Determination of how long the issue existed, and prior opportunities for identification

The reactor trips which occurred on January 2 and August 15 were the result of equipment failures that occurred at or near the time of the trip. Prior opportunities for identification for these transients were therefore limited.

The reactor trip which occurred on July 13 was the result of a DEH control system VIDAR card failure. The licensee's investigation determined that this failure most likely occurred on June 15 when a DEH control system anomaly was identified by the Operations staff. The troubleshooting for this anomaly was ineffective and did not result in identification of the VIDAR card failure at that time.

c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issues

The licensee's evaluation assigned a change in core damage frequency of 2.2E-7 to the three reactor trips. The inspector reviewed the licensee's evaluation and assumptions and confirmed their validity. No compliance issues were identified.

02.02 Root Cause and Extent-of-Condition Evaluation

a. Evaluation of method(s) used to identify root cause(s) and contributing cause(s)

The licensee used combinations of five methods to identify root and contributing causes for the three reactor trips; interviews, barrier analysis, event and causal factor analysis, change analysis and fault tree analysis. The methods and combinations of methods used to identify root and contributing causes for the three reactor trips were appropriate.

b. Level of detail of the root cause evaluation

For the three reactor trips, the root cause evaluations were of sufficient detail to support the identified root and contributing causes.

For the January 2 reactor trip, the root cause evaluation was determined to be an intermittent failure attributed to an internal blockage within the current-to-pneumatic (I/P) converter for the FWRBV to the C S/G. Although the root cause evaluation was sufficiently detailed to support the root and contributing causes, the valve functioned normally following the event. An internal examination did not reveal any internal blockage. However, the inspector agreed with the root cause investigation team conclusion that internal blockage within the I/P converter was the most probable failure mechanism.

c. Consideration of prior occurrences of the problem and knowledge of prior operating experience

The root cause evaluations for the three reactor trips did consider prior occurrences of similar problems where applicable. With respect to the July 13 reactor trip, the licensee identified an insufficient use of operating experience in establishing preventive maintenance tasks and operation of the DEH control system. Additionally, the licensee identified weaknesses in completion and documentation of corrective actions from previous events related to failures within the DEH control system. The investigation for the manual reactor trip due to DEH malfunction was described in corrective action program action request (AR) 65753 Manual Reactor Trip due to DEH Malfunction. One

specific corrective action implementation issue related to the DEH control system involved not executing vendor recommended software configuration changes. The inspector requested the licensee's resolution of this issue as it was not addressed in AR 65753. The licensee was unable to determine the reason for not implementing the software changes, and therefore documented the matter in AR 78215.

d. Consideration of potential common cause(s) and extent of condition of the problem

The licensee performed an analysis to determine if the three reactor trips were connected by a common cause. The analysis determined that although each trip was the result of equipment failures, no specific causal link could be made. The analysis did point out that the January 2 and July 13 trips did share contributing cause attributes in the areas of preventive maintenance and the use of operating experience. The inspectors review of the reactor trips did not reveal a common cause.

02.03 Corrective Actions

a. Appropriateness of corrective action(s)

The licensee took prompt corrective actions to repair the equipment failures related to the reactor trips. Comprehensive corrective actions to address root and contributing causes, where appropriate, were performed or scheduled to be performed.

To address the January 2 trip, the licensee replaced the installed old style I/P converter for the FWRBV to the C S/G with a new upgraded model less susceptible to the accumulation of debris. The licensee also plans to upgrade the air filters in the supply lines to the I/P converters for category 1 air operated valves and balance of plant critical valves to an improved smaller mesh filtration. Additionally, all applications of the old style I/P converter had either been replaced or were scheduled to be replaced.

To address the July 13 trip, the licensee replaced the failed VIDAR card in the DEH control system. Numerous other corrective actions were implemented to appropriately address the root and contributing causes of the trip. These included providing plant operations staff with training and revised procedures on when and how to take manual control of the DEH control system, and establishing ownership of the computer portion of the DEH control system in system engineering in lieu of the information technology group.

To address the August 15 trip, the licensee's transmission department developed new procedures, training, and standards to prevent the improper loading of transformers onto the transmission system. These corrective actions are scheduled to be completed in January 2003.

b. Prioritization of corrective actions

Corrective actions for the three reactor trips were properly prioritized.

c. Establishment of a schedule for implementing and completing the corrective actions

The inspector verified that the licensee's corrective action program identified assigned individuals, completion dates, and reference numbers to ensure that individual corrective actions would be completed in accordance with their priority.

d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrence

For the January 2 trip, the licensee determined that an effectiveness review would not be required because the root cause of the event was determined to be an intermittent equipment failure.

For the July 13 trip, an effectiveness review is scheduled for June 2003.

For the August 15 trip, an effectiveness review is scheduled for July 2003.

The inspector found that the licensee's collective evaluation of the three trips was accurate. Although there were some common aspects such as not effectively using operating experience information, the inspector did not find common cause aspects linking the three reactor trips from a risk perspective.

03 OTHER ACTIVITIES

03.01 Event Followup

a. (Closed) Licensee Event Report (LER) 50-400/2002-002-00, Manual Reactor Trip Due to Turbine Digital Electro-Hydraulic Control System Malfunction.

The inspector reviewed the licensee's corrective actions delineated in the LER and determined that the actions were adequate. The corrective actions were either complete or scheduled to be completed in accordance with the licensee's corrective action program. This LER is closed.

b. (Closed) LER 50-400/2002-003-00, Reactor Trip Due to Momentary Grid Undervoltage.

The inspector reviewed the licensee's corrective actions delineated in the LER and determined that the actions were adequate. The corrective actions were either complete or scheduled to be completed in accordance with the licensee's corrective action program. This LER is closed.

04 MANAGEMENT MEETINGS

Exit Meeting Summary

The inspector presented the inspection results to Mr. J. Scarola, Vice President - Harris Plant, and other members of licensee management at the conclusion of the inspection on November 15. The inspector confirmed that proprietary information was not provided or examined during the inspection.

SUPPLEMENTARY INFORMATION

A. Key Points of Contact

Licensee Personnel

M. Bodnar, Lead Engineer, Electrical and I&C Systems Engineering
J. Bouchard, Lead Engineer, Electrical and I&C Systems Engineering
J. Caves, Licensing Supervisor
J. Dills, Supervisor, Electrical and I&C Systems Engineering
F. Diya, Superintendent, Systems Engineering
R. Duncan, Director of Site Operations
R. DuVal, Lead Engineer, Electrical and I&C Systems Engineering
R. Garner, Engineer, Licensing
J. Holt, Site Support Services Manager
E. McCartney, Engineering Technical Services Superintendent
M. Palmer, Manager of Shift Operations
J. Scarola, Harris Plant Vice President
B. Waldrep, Harris Plant General Manager
M. Wallace, Senior Specialist, Licensing
M. Weber, Superintendent, Operations Support
J. Yadusky, Engineer, Licensing

NRC Personnel

J. Brady, Senior Resident Inspector, Harris
H. Christensen, Deputy Director, Division of Reactor Safety, Region II
P. Fredrickson, Branch Chief, Division of Reactor Projects, Region II
R. Hagar, Resident Inspector, Harris
G. MacDonald, Acting Branch Chief, Division of Reactor Projects, Region II

B. Items Opened, Closed, and Discussed

Opened

None

Opened and Closed

None

Closed

50-400/2002-002-00	LER	Manual Reactor Trip Due to Turbine Digital Electro-Hydraulic Control System Malfunction (Section 03.01).
50-400/2002-003-00	LER	Reactor Trip Due to Momentary Grid Undervoltage (Section 03.01).

C. List of Documents Reviewed

January 2 Reactor Trip

NRC Inspection Report 50-400/01-06

LER 50-400/2002-001-00, Reactor Trip due to Main Feedwater Regulating Valve Bypass Valve Failure

AR 53386, C FRV Bypass Valve did not respond
AR 53348, Steam Generator Level Fluctuations
AR 69154, A and B FRV Bypass Valve did not control with precision
AR 55961, Air Quality Requirements for Model 7000 I/P Converter

Operations Logs dated January 2, 2002

July 13 Reactor Trip

VIDAR Card Failure Analysis Report dated September 9, 2002

Procedure OPT-1014, Turbine Valve Test Quarterly Interval Modes 1-5
Procedure OP-131.01, Main Turbine
Procedure AOP-038, Rapid Downpower
Procedure GP-005, Power Operation (Mode 2 to Mode 1)
Procedure GP-006, Normal Plant Shutdown From Power Operation to Hot Standby

LER 50-400/2002-002-00, Manual Reactor Trip Due to Digital Electro-Hydraulic Control System Malfunction

AR 65753, Manual Reactor Trip due to DEH Malfunction
AR 01516, DEH Failure/Rx Trip
AR 58550, DEH System Shifted to Manual
AR 53385, Abnormal DEH Operation

Harris Training Exercise Guide DEM-SIM-17.01

Operations Night Orders dated July 16, August 17, and August 27, 2002

Operations Logs dated July 13, 2002

August 15 Reactor Trip

LER 50-400/2002-003-00, Reactor Trip Due to Momentary Grid Undervoltage

AR 69088, Reactor Trip from 100% Power due to Reactor Coolant Pump Undervoltage on two of three pumps