



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
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July 27, 2001

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

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INSPECTION REPORT  
50-400/01-03

Dear Mr. Scarola:

On June 30, 2001, the Nuclear Regulatory Commission (NRC) completed an inspection at your Shearon Harris reactor facility. The enclosed report presents the results of that inspection which were discussed on July 5, with Mr. Chris Burton and other members of your staff.

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.

No findings of significance were identified by the NRC inspectors.

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) components of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Brian Bonser, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

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

Enclosure: (See page 2)

Enclosure: NRC Integrated Inspection Report  
w/Attachment

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DATE		7/27/2001	7/27/2001	7/27/2001	7/27/2001	7/27/2001	
E-MAIL COPY?		YES NO	YES NO				

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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

Report No: 50-400/01-03

Licensee: Carolina Power & Light (CP&L)

Facility: Shearon Harris Nuclear Power Plant, Unit 1

Location: 5413 Shearon Harris Road  
New Hill, NC 27562

Dates: April 1, 2001 - June 30, 2001

Inspectors: J. Brady, Senior Resident Inspector  
R. Hagar, Resident Inspector  
W. Sartor, Senior Emergency Preparedness Inspector (Sections 1EP1, 1EP4, 4OA1)  
J. Kreh, Emergency Preparedness Inspector (Sections 1EP1, 1EP4, 4OA1)  
B. Crowley, Senior Reactor Inspector (Section 1R02)

Approved by: B. Bonser, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000400-01-03, on 04/01/01 - 06/30/01, Carolina Power & Light, Shearon Harris Nuclear Power Plant, Unit 1. Baseline integrated resident inspection report.

The inspection was conducted by resident inspectors, regional emergency preparedness inspectors, and a regional reactor inspector. The inspection identified no findings. The significance of most findings is indicated by their color (green, white, yellow, red) using IMC 0609 "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>. Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation.

A. Inspector Identified Findings

None

B. Licensee Identified Violations

A violation of very low significance was identified by the licensee and has been reviewed by the inspectors. Corrective actions taken or planned by the licensee appear reasonable. This violation is listed in Section 40A7 of this report.

## Report Details

The unit operated at 100 percent of rated thermal power for the entire inspection period, except during the following periods:

- The licensee reduced power to approximately 20 percent on April 27 and subsequently returned the unit to 100 percent power on April 29, to enable repairs to steam generator blowdown system valves inside the reactor containment building.
- The licensee reduced power to 95 percent on June 26 and subsequently returned the unit to 100 percent power on June 27, to facilitate required testing of the moderator temperature coefficient of reactivity.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R02 Evaluation of Changes, Tests, or Experiments

##### a. Inspection Scope

The inspectors reviewed a sample of licensee 10 CFR 50.59 screening documents and safety evaluations to confirm that the licensee had appropriately reviewed and documented changes in accordance with 10 CFR 50.59 and licensee procedures and had considered the conditions under which changes to the facility or procedures may be made without prior NRC approval. The sample consisted of 25 evaluations, of which 14 were “screened out” as not requiring safety evaluations (Unreviewed Safety Question Determinations (USQDs)). The other 11 received full USQDs. As part of the review, the inspectors reviewed information associated with the evaluations such as applicable sections of the Updated Final Safety Analysis Report (UFSAR), supporting analyses, Technical Specifications (TS), Engineering Service Requests (ESR, design changes), and licensee procedures.

In addition, the inspectors reviewed a licensee self-assessment of the 10 CFR 50.59 program and a number of Action Requests (ARs) to confirm that the licensee was identifying issues, entering these into the corrective action program, and resolving the concerns.

The following documents and procedures were reviewed to evaluate the licensee’s 10 CFR 50.59 program for processing evaluations of changes, test and experiments:

Safety Evaluations (USQDs)

<u>Identification Number</u>	<u>Revision Number</u>	<u>Reference Document</u>	<u>Revision Number</u>	<u>Reference Document Title</u>
1914	0	ESR-00618	0	Replace Capped RCS Crossover Pipe Drain Valve 1RC-7
99-0001	0	ESR 97-00805	0	Evaluation of Changes to the Containment (Platform Extensions, Crane Supports, etc.) for Steam Generator Replacement
00-1893	0	ESR 99-00267	0	Provide Relief Line for Pressure Locking Concern For Safety Injection Valves 1SI-322 and 1SI-323
00-1752	0	ESR 00-00289	0	Replacement of Impellers and Other Modification to Feedwater Pumps - Power Uprate
00-0974 and 00-0067	1	Procedure AOP-017	16	Change AOP to Accommodate Temporary Air Compressors Installed to Supply Instrument Air Header While Replacing Permanent Air Compressors and Associated Equipment
99-1486	0	(UFSAR Change)	0	Change to Incorporate Replacement of Obsolete EQ Thermocouples Under ESR 99-00124, Revision 0
99-0859	2	(UFSAR Change)	8	Change Actuator Type on Feedwater Regulating Valves Under ESR 99-00017, Revision 8
00-1385	0	(UFSAR Change)		Incorporate Recent Changes in stroke Testing of Main Steam Isolation Valves - Full stroke Versus Part Stroke
01-0434	0	ESR 99-00407	0	Installation of ECCS Flow Balancing Orifices to prevent Pump Runout and Provide Proper Split Between Injection Points

99-1180	5	ESR-00419	8	Change-Out Obsolete Gould ITE Motor Control Center Breakers in 480V AC Distribution System
00-2129	0	ESR 99-00466	0	Replacement of Steam Generator Level Instrumentation Setpoints

Screening Documents (Screen-Outs)

<u>Identification Number</u>	<u>Revision Number</u>	<u>Reference Document</u>	<u>Revision Number</u>	<u>Reference Document Title</u>
00-0436	0	ESR 98-00244	0	Modify RAB Nitrogen Accumulator Valve 1NI-99 Control Switch to Change Tank from Normally Pressurized to Normally Depressurized
00-2176	0	Procedure OP-137	16	Identifies that De-Energizing 1MS-72 Causes the TDAFW Control Valves to Fail Open and Cautions Operator on the Affects of Flowing AFW to the Steam Generators on a Continuous Calorimetric
00-2071	0	Procedure EOP-EEP-014	8	Clarification and Simplification of Operator Actions by Moving Instructions to a More Optimal Location, Reducing Time to Transition to Other EOPs, and Deleting Instructions that are Contrary to Those Assumed in Plant Design
01-0669	0	ESR 01-00060	0	Evaluates Operability Effects of Degraded Piping at the Discharge of the ESW B Screen Wash Pump
01-0104	0	ESR 01-00011	0	Change Air System Check Valve Type for 230 KV Breakers
00-0911	0	ESR 00-00185	0	Evaluation of Corrosion on Whip Restraint R-RC-45-R-2

00-2116	0	ESR 00-00336	0	Replace Motors on AFW MOVs 1AF-55, 74, and 93 to Increase Torque From 15 ft.- lbs. to 25 ft.-lbs
01-0316	0	ESR 00-00297	0	Upgrade Isolation Phase Bus Cooling System to Support Steam Generator Replacement/Power Uprate
99-0217	0	ESR 94-00383	0	Evaluation of Procurement Specification for Upgrading Condenser Tubing From Copper-Based material
00-1754	0	ESR 00-00300	0	Specification for Procurement of Modified Impellers for Component Cooling Water Pump Uprate
00-1398	0	ESR 00-00271	0	Development of Specification for Feedwater Pump Uprate
01-1028	0	Procedure SPP-0323T	0	Purification of Spent Fuel Pool C Using Unit 1 Purification Systems
00-1374	0	Procedure EOP-EPP-001	21	Procedure Enhancements
00-1196	0	Procedure EOP-FRP-1.3	9	Deletes Check for Low Instrument Air Pressure to be Consistent with Replacement Air Compressors Under ESR 99-0145

#### Other Documents

- Standard Procedure REG-NGGC-0002, Revision 4, 10 CFR 50.59 and Other Regulatory Evaluations

- AR 29316 (Negative Trend in Performance of 10 CFR 50.59 screens/evaluations), including associated corrective action documentation and approximately 40 individual Condition Reports
- Self-Assessment REG-00-006 (AR9198), dated September 19-21, 2000

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

a. Inspection Scope

Partial Walkdown

For the three systems identified below, the inspectors reviewed the identified plant documents to determine correct system lineup, and observed equipment to verify that the system was correctly aligned:

- 1) "A" and "B" Auxiliary Feedwater pump with the turbine-driven pump out-of-service on April 25
  - Procedure OP-137, "Auxiliary Feedwater System", Revision 17
  - Drawing 2165-S-0544, "Simplified Flow Diagram Feedwater System", Revision 33
- 2) "A" Emergency Service Water with "B" Emergency Service Water Pump out of service on June 13
  - Procedure OP-139, "Service Water System," Revision 31
  - Drawing 2165-S-547, "Simplified Flow Diagram Circulating and Service Water Systems", Revision 34
- 3) "A" charging/safety injection pump with "B" charging/safety injection pump out of service on June 20
  - Procedure OP-107, "Chemical and Volume Control System," Revision 30
  - Procedure OP-110, Safety Injection System, Revision 15
  - Drawing 2165-S-1305, "Simplified Flow Diagram Chemical & Volume Control System", Revision 16
  - Drawing 2165-S-1308, "Simplified Flow Diagram Safety Injection System", Revision 10

Complete Walkdown

- 1) Auxiliary Feedwater System While the "A" Auxiliary Feedwater (AFW) pump was out of service for maintenance on April 4 to determine the correct system lineup of the AFW System, the inspectors reviewed those plant procedures, drawings, and the

Final Safety Analysis Report (FSAR) sections identified below:

- Procedure OP-137, "Auxiliary Feedwater System", Revision 17
- Drawing 2165-S-0544, "Simplified Flow Diagram Feedwater System", Revision 33
- System Description 137, "Auxiliary Feedwater System", Revision 9
- Design Basis Document -114, "Auxiliary Feedwater System", Revision 5
- FSAR Section 10.4.9, "Auxiliary Feedwater System"

The inspectors examined system components and their configuration to identify any discrepancies between the existing system equipment lineup and the correct lineup. In addition, the inspectors reviewed the following outstanding maintenance work requests on the system to determine whether any condition described in those work requests could adversely impact current system operability:

<u>Work Request #</u>	<u>Title/Description</u>
00090296	Replace turbine driven pump bearings
00104267	Replace the inboard and outboard turbine driven pump bearings
00020296	OST-1080 inservice test (pump hydraulics and vibration)
00090155	During RFO-10, implement Engineering Service Request 97-00807 to reroute AFW piping
00088453	During RFO-10, implement Engineering Service Request 97-00807 to reroute AFW piping
00088915	For AFW pump 1X-SAB, verify suction relief valve setpoint
00088687	Disassemble & inspect valve 1CE-36 as required for inservice inspection.
00088688	Disassemble & inspect valve 1CE-56 as required for inservice inspection.
00104272	Calibrate the turbine-driven AFW pump governor control valve
00104306	Calibrate the Terry turbine governor control system
00104335	Sample lubricating oil in the governor actuator reservoir sump
00089924	Repair the body-to-bonnet steam leak on the turbine-driven AFW pump trip throttle valve.

The inspectors reviewed the following ARs and Action Item Assignments (AIAs) to

verify that the licensee had properly identified and resolved AFW equipment alignment problems that could impact mitigating system availability:

<u>#</u>	<u>Title/Description</u>
AR 00015756	[Turbine-driven] AFW pump bearing low viscosity
AR 00017472	AFW valves failed PM-I0039 DC Limitorque shunt resistor test
AR 00017483	[Turbine-driven] AFW pump oil fill
AR 00018295	Caution tag hanging > 3 months on 1MS-72 power supply
AR 00020767	1AF-50 initial stroke open time failed OST-1076
AR 00023401	1AF-50 inoperability
AR 00026203	Channel test card failure
AIA 98-03213	Valve 1MS-73 did not seat in the lower 1/3 of its seating surface
AIA 98-01999	Two alarm procedures inappropriately direct operators to confirm that recirculation flow is zero.

Also, the inspectors examined the following Operating Experience (OE) reports, ARs, Significant Operating Experience Reports (SOERs), Significant Event Notices (SENs), and Information Notices (INs) that were related to the AFW system, to verify that the licensee had properly assessed those reports and, where applicable, had initiated appropriate actions to incorporate the lessons learned from those reports:

<u>Reference #</u>	<u>Title/Description</u>
AR 28227-2	Potential 10CFR21 [Report] on AFW pump cap screw failure
OE 10656	Turbine driven AFW pump inoperable due to recirculation blockage
Event 36745	Unanalyzed condition - using the AFW pump to feed the steam generators via the main feedwater system is unanalyzed
OE 11502	Cracks in turbine-driven AFW pump governor valve seats
OE 11795	Terry turbine testing device failure
OE 11862	Industry operating experience regarding failure of Rockwell valve packing gland followers may not have been adequately addressed
SEN 199	Feedwater Heater Shell Rupture at Point Beach Unit 1
OE 9869	Reactor Core Isolation Cooling Turbine Overspeed and Failure to Trip During post-Maintenance Test

IN 98-22	Deficiencies Identified During NRC Design Inspections
SEN 178	Overpressurization of Condensate Booster Pump Suction Bellows
IN 97-81	Deficiencies in Failure Modes and Effects Analysis for Instrumentation and Control Systems
IN 97-76	Degraded throttle valve in an Emergency Core Cooling System resulting from cavitation-induced erosion during a loss of coolant accident
SOER 89-1	Testing of Steam Turbine/Pump Overspeed Trip Devices
OE 11727	Auxiliary feedwater pump turbine governor valve inadvertently closed during insulation installation

Furthermore, the inspectors reviewed the March 20, 2001, report of AFW system health, compiled for the HNP periodic system review program, to determine whether any identified conditions could adversely impact system operability and, if so, whether the licensee was appropriately addressing those conditions.

2) Diesel Generator System While the "B" Emergency Diesel Generator (EDG) was out of service for maintenance on June 13, to determine the correct system lineup of the "A" EDG System, the inspectors reviewed the plant procedures, drawings, and FSAR sections identified below:

- Procedure OP-155, "Diesel Generator Emergency Power System", Revision 19
- System Description SD-155.01, "Emergency Diesel Generator System", Revision 6
- Design Basis Document -201, "Emergency Diesel Generator System", Revision 5
- The following FSAR sections:

<u>Section Number</u>	<u>Title</u>
8.3.1	[Alternating Current] Power Systems
9.5.4	Diesel Generator Fuel Oil Storage and Transfer System
9.5.5	Diesel Generator Cooling Water System
9.5.6	Diesel Generator Air Starting System
9.5.7	Diesel Generator Lubrication System
9.5.8	Diesel Generator Combustion Air Intake and Exhaust System

- The following drawings:

<u>Drawing Number</u>	<u>Title</u>	<u>Revision #</u>
2165-S-0633 S01	Simplified Flow Diagram Emergency Diesel Generator Lube Oil and Air Intake & Exhaust System - Unit 1	10
2165-S-0633 S02	Simplified Flow Diagram Emergency Diesel Generator 1A-SA & 1B-SB Jacket Water System - Unit 1	10
2165-S-0633 S03	Simplified Flow Diagram Emergency Diesel Generator 1A-SA & 1B-SB Fuel Oil and Drainage Systems - Unit 1	6
2165-S-0633 S04	Simplified Flow Diagram Emergency Diesel Generator 1A-SA & 1B-SB Starting Air System - Unit 1	19
2165-S-0563	Simplified Flow Diagram Diesel Fuel Oil System - Unit 1	8

The inspectors examined system components and their configuration to identify any discrepancies between the existing system equipment lineup and the correct lineup. In addition, the inspectors reviewed the following outstanding maintenance work requests on the system, to determine whether any condition described in those work requests could adversely impact current system operability:

<u>Work Request #</u>	<u>Title/Description</u>
87055	Perform "A" [emergency diesel generator] trip adjustment/replacement if opt-1511 fails
87983	Air compressor capacity is 74 ACFM per EPT-199 measurement
88220	Replace fuel injector pump timing window gaskets
89022	Replace start air bulk HD fitting for R-5 sub cover
90143	Remove diesel fuel oil DG-1B transfer pump pressure relief valve
127519	"A" [emergency diesel generator] start/stop switch did not spring return to normal
130932	Replace "B" [emergency diesel generator] lube oil [keep-warm] pump mechanical seal
140627	Replace "B" [emergency diesel generator] shutdown cylinder
149729	Replace fuel header staff clamp

The inspectors reviewed the following ARs and AIAs to verify that the licensee had properly identified and resolved EDG equipment alignment problems that could impact mitigating system availability:

<u>#</u>	<u>Title/Description</u>
AR 20510	Multiple tubes found blocked in "B" EDG jacket water cooler
AR 22113	Potential adverse trend - service water silt fouling
AR 25110	Missed regulatory guide 1.29 interaction near EDG 1A-SA & 1B-SB

Also, the inspectors examined the following ARs that were related to the EDG system, to verify that the licensee had properly assessed the subject reports and, where applicable, had initiated appropriate actions to incorporate the lessons learned from those reports:

<u>Reference #</u>	<u>Title/Description</u>
AR 26781	SEN 217: EDG Failure During Testing
AR 29046	Part 21 2001-07 "ES" Agastat Relays in Woodward 2301a EDG Governors
AR 30228	SER 2001-02 EDG Failure Inadequate Performance Monitoring

Furthermore, the inspectors reviewed the April 12, 2001, report of Diesel Generator and Support Systems system health, compiled for the HNP periodic system review program, to determine whether any identified conditions could adversely impact system operability and, if so, whether the licensee was appropriately addressing those conditions.

b. Findings

No findings of significance were identified.

## 1R05 Fire Protection

### .1 Fire Protection Area Walkdowns

#### a. Inspection Scope

Within the areas identified below, the inspectors observed the following to determine whether any conditions adversely affected fire protection defense-in-depth features:

- transient combustible materials;
- any welding or cutting being performed in the area;
- the physical condition of the fire detection devices;
- the physical condition of the automatic suppression system (where used);
- the availability and general condition of portable fire extinguishers;
- the physical condition of manual suppression systems, including fire hoses and hose stations;
- the material condition of electrical raceway fire barrier systems;
- the material condition of the fire door(s);
- the condition of ventilation fire dampers;
- the material condition of the structural steel fire-proofing (where used);
- the physical condition of seals in accessible electrical and piping penetrations; and
- the adequacy of compensatory measures where degraded features were identified.

The inspected areas included the following:

- “A” switchgear room
- “B” switchgear room
- cable spreading room
- “A” chiller area
- “B” chiller area
- control room

In addition, the inspectors observed performance of Fire Protection Periodic Test FPT-

3307, "Main Drain Test Diesel Generator Building", Revision 6, to observe the quality of the water in the fire water piping as an indication of the physical condition of the automatic suppression system in that building.

On May 10, during the unannounced fire drill in the "A" charging/safety injection pump room, the inspectors evaluated the timeliness, skill, and equipment utilization of the fire brigade.

b. Findings

No findings of significance were identified.

.2 Design Deficiency Involving Inadequate Fuse Coordination

a. Inspection Scope

The inspectors reviewed the 10 CFR 50.72 report of April 18, 2001, which reported that an unanalyzed condition existed due to a design deficiency involving inadequate fuse coordination that affected safe shutdown train separation, and reviewed the subsequent Licensee Event Report (LER), 50-400/2001-002-00, submitted June 15, for this event. The inspectors reviewed the following to assess the risk significance of this issue:

- AR 30818, initiated to document this deficiency and identify corrective actions;
- ESR 01-00072, developed to address the credible fire scenarios for this issue;
- Calculation HNP-F/PSA-0022, developed to analyze the risk associated with this issue;
- Abnormal Operating Procedure AOP-36, "Safe Shutdown Following a Fire," Revision 12, to determine the actions prescribed for a fire in the "A" switchgear room;
- AOP-36 Training Lesson Plan AOP-LP-3.36, to determine what knowledge based attributes were imparted to operators that were in addition to the procedural guidance.
- Procedure FPP-12, Fire Pre-plan A34-6-286-0639, Switchgear Room A, to determine what specific fire fighting strategy was specified for the A Switchgear Room.
- AR 43523, initiated to document the lack of guidance from the fire pre-plans and AOP-36 for switchgear room fires in relation to unnecessarily de-energizing electrical buses.

b. Findings

An unresolved item was opened pending determination of the risk significance of the reported condition which involved inadequate fuse coordination for two Pressurizer Power Operated Relief Valve (PORV) block valves (1RC-115 and 1RC-117). If certain

fires occurred in the “A” switchgear room, the potential existed for a PORV and its associated block valve, in the opposite safe shutdown division, to be open at the same time without the ability to shut either valve. With the existence of the identified deficiency, the occurrence of any of several fires could have resulted in an unisolable stuck-open PORV (small-break loss-of-coolant accident). This item was designated URI 50-400/01-01, PORV safe shutdown fuse coordination issue.

10 CFR 50.48 requires that all operating nuclear power plants have a fire protection program that satisfies Criterion 3 of Appendix A to 10 CFR 50. Operating license condition 2.F, Fire Protection Program, requires that the fire protection program described in the UFSAR be implemented and maintained in effect. The Fire Protection Program described in the UFSAR requires that redundant safe shutdown division features be protected by physical separation, isolation, or barriers. The reported condition represents the licensee’s failure to incorporate adequate separation, isolation, or barriers to protect redundant safe-shutdown division features.

To enable assessment of the risk significance of this condition using Inspection Manual Chapter 0609, Appendix F, the inspectors evaluated one additional factor which was how the fire brigade might impact the potential fire. One-half of all safety and non-safety AC power and one-half of all safety and non-safety DC power was distributed from each of the two switchgear rooms. Each switchgear room was considered a separate fire area. The inspectors looked for a specific strategy that would direct the fire brigade to fight the fire in such a way as to not only protect the safety-related/safe shutdown equipment of the affected train, but also ensure that the equipment had a high likelihood of remaining energized. This is important because loss of one train of safety-related/safe shutdown equipment could significantly increase plant risk. However, the inspectors found that neither the procedures nor associated training provided an applicable strategy. In addition, the inspectors found that to limit the effect of the fire on equipment required for safe shutdown, Section 3.2.6 of procedure AOP-36, provided general guidance to “shutdown equipment and de-energize electrical buses physically located within the fire area.” The inspectors concluded that, based on the above, the actions of the operators and fire brigade for the specific fires postulated might not keep the affected safe shutdown train equipment energized.

However, the inspectors also concluded that barriers and strategies were adequate to prevent the fire from spreading to the opposite train. With one train available, the plant meets its safe shutdown design basis.

## 1R06 Flood Protection Measures

### a. Inspection Scope

The inspectors reviewed the licensee’s analysis of the effects of external flooding, as described in UFSAR Section 2.4.10, “Flooding Protection Requirements”.

The inspectors reviewed the licensee's analysis of the effects of internal flooding resulting from postulated piping failures, as described in the following documents:

- FSAR Section 3.6A.6, "Flooding Analysis".
- Appendix I to the HNP Probabilistic Safety Assessment, "Internal Flooding Analysis", Revision 1
- Calculation #PRA-F/E-4, "RAB Unit 1 Elevation 190' & 216' Flood Analysis", Revision 0
- Calculation #PRA-F/E-5, "RAB Unit 1 Elevation 236 Compartment Flood Analysis", Revision 0
- Calculation #PRA-F/E-6, "RAB Unit 1 Elevation 261 Compartment Flood Analysis", Revision 0
- Calculation #PRA-F/E-7, "RAB Unit 1 Elevation 286 Compartment Flood Analysis", Revision 0
- Calculation #PRA-F/E-8, "RAB Unit 1 Elevation 305 Compartment Flood Analysis", Revision 0

To verify that the procedures for coping with flooding can reasonably be used to achieve the desired actions, the inspectors reviewed procedure AOP-022, "Loss of Service Water", Revision 12, and OP-139, "Service Water System", Revision 31.

The inspectors also verified that the current plant configuration is not different from the configuration described in these documents.

The inspectors identified the safety-related cables that are located in underground bunkers and manholes that are subject to local flooding. To verify that those cables are environmentally qualified for the environment in which they are located, the inspectors reviewed the following documents:

- FSAR Section 8.3.1.2.37, "Underground Raceway Design"
- Specification CAR-SH-E-14B, "Electric Cables", Revision 10
- Carolina Power & Light Company Quality Release No. 5984, "Power and Coaxial Cable"
- The "Vendor Quality Assurance Report Release for Shipment" for Purchase Order N4435045, Release 12
- Cable-qualification test reports obtained from the Kerite Company under Kerite Factory Order D-857
- Kerite Engineering Memorandum No. 223, "Determining Temperature 'Rating' of

High Temperature Kerite Insulated Cables for Operation in Wet and Alternate Wet/Dry Locations”, 5/4/77

The inspectors reviewed the following ARs associated with this area to determine whether the licensee identified and implemented appropriate corrective actions:

<u>AR Number</u>	<u>Title/Description</u>
24672	“Discrepancy in Testing of Class 1E Underground Cables”
25681	“[Final Safety Analysis Report] 8.3.2.37 Wording”
25688	“Manhole/Raceway/Cable Inspections for [Maintenance Rule] Impact”

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On May 7, the inspectors reviewed licensed operator requalification training for “B” shift operations personnel. The training was completed using Simulator Examination Scenario DSS-031af, Revision 0. The observation included the crew’s use of emergency and abnormal operating procedures. The scenario tested the operators’ ability to identify and isolate a ruptured steam generator, and cooldown the reactor coolant system at the maximum rate to limit the release of radioactive materials from the ruptured steam generator. The inspectors verified clarity and formality of communication, use of procedures, alarm response, control board manipulations, group dynamics and supervisory oversight.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

For the equipment issues described in the ARs listed below, the inspectors reviewed the licensee’s implementation of the Maintenance Rule (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated a(1) or a(2) classification, and the appropriateness of either the associated a(2) performance criteria or the associated a(1) goals and corrective actions:

AR Number    Subject/Description.

28558	Functional failure of “B” steam generator sampling valve 1SP-219
28474	Functional failure of “A” sequencer relay 2-20
22287	Valve 1RH-25 failed to stroke open on demand
29951	“B” Diesel Generator shutdown cylinder failure
30279	Failure of pressurizer liquid sample valve 1SP-40
31697	Failure of the “A” hydrogen analyzer

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee’s risk assessment and the risk management actions used by the licensee to manage risk for the plant configuration associated with removing the “A” Auxiliary Feedwater Pump from service on April 4.

Also, the inspectors reviewed the emergent work activities listed below, as described in the referenced Work Requests/Job Orders and/or ARs, to verify that any increase in risk was promptly assessed, and that any required risk management actions were implemented. The inspectors observed whether licensee actions were appropriate to minimize the probability of initiating events, maintain the functional capability of mitigating systems, and maintain barrier integrity.

<u>Reference</u>	<u>Description</u>
AR 30802	Through-wall leak on “B” Emergency Service Water screen wash pump discharge piping
AR 31178	Motor-driven Auxiliary Feedwater System check valve leakage and “A” pump alarm indication problem
AR 31295	Emergency Diesel Generator transfer relay DG-1 stuck in mid-position
AR 31449	High leakoff flow from the #1 seal on the “C” reactor coolant pump
AR 31934	Increased primary-to-secondary leakage, based on measured tritium concentrations in the steam generators, below both industry-accepted action levels and technical specification limits

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

During the non-routine evolutions identified below, the inspectors reviewed the operating crew's performance and plant indications to verify that operator response was in accordance with the associated procedures and training:

<u>Non-routine evolution</u>	<u>Date(s)</u>	<u>Associated procedure(s)</u>
Down-power evolution from 100% to approximately 20% power	April 27 and 28	GP-6, "Normal Plant Shutdown from Power Operation to Hot Standby", Revision 26
Up-power evolution to return to 100%	April 29	GP-5, "Power Operations Mode 2 and Mode 1", Revision 30
Return turbine control to auto after unexpected switch to manual	May 24	GP-5, "Power Operations Mode 2 and Mode 1", Revision 30

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

For the operability evaluations described in the ESRs listed below, the inspectors evaluated the technical adequacy of the evaluations to ensure that operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred:

<u>ESR No.</u>	<u>Rev. No.</u>	<u>Title</u>
00-00381	0	RHR Suction Relief Operability Determination
00-00047	0	Diesel Generator Stop Cylinder Past Operability Determination
00-00093	0 & 2	Diesel Fuel Oil Pipe Support Found Disconnected
00-00431	1	OST-1122 Operability Determination for [Undervoltage] Relays Train A

The inspectors reviewed the following ARs associated with this area to determine whether the licensee identified and implemented appropriate corrective actions:

<u>AR Number</u>	<u>Title/Description</u>
AR 30512	Quadrant Power Tilt Ratio not calculated every 12 hours

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modificationsa. Inspection Scope

Modification to the Component Cooling Water (CCW) system to add piping for the additional C and D spent fuel pools

The inspectors determined that the following parameters were affected by this design modification:

- system and component flow rates
- heat removal
- operations
- system and component flow paths

To determine the design adequacy of the modification with respect to the above parameters, the inspectors reviewed the following documents:

- ESR 98-00219, “[Component Cooling Water] Tie-ins to [Spent Fuel Pool] Heat Exchangers for North End Pools,” Revision 10, which contained the affected document change markups;
- Amendment 103 to the Facility Operating License including the safety evaluation report, issued December 21, 2000, for the expansion of spent fuel storage capacity;
- NRC Inspection Reports 50-400/99-12 and 2000-05;
- System Description SD-145, “Component Cooling Water System,” Revision 6;
- Design Basis Document DBD-131, “Component Cooling Water System,” Revision 7;
- FSAR Section 9.2.2, Component Cooling System;
- Operating Procedure OP-145, “Component Cooling Water System,” Revision 31; and
- Drawings 2165-S-1319 through 2165-S-1322, “Simplified Flow Diagram Component

Cooling Water System", sheets 1-4.

The inspectors verified that modification preparation, staging, and implementation did not impair the following:

- Emergency/abnormal operating procedure
- Key safety functions
- Operator response to loss of key safety functions

The inspectors observed and/or reviewed post-modification testing to verify that the testing will maintain the plant in a safe configuration, that no unintended system interaction will occur, that structures, systems or components (SSC) performance affected by the modification meets the design basis, that testing validates the basis of any modification design assumptions, and that the modification test acceptance criteria have been met. The inspectors observed all or portions of the following post-modification testing associated with ESR 98-00219 and reviewed the test records:

<u>Test Procedure</u>		
<u>Number</u>	<u>Title</u>	<u>Relation to modification</u>
MMP-012	"Hydrostatic and Pneumatic Testing of Piping Systems," Revision 12	Hydrostatic test of the piping added to the CCW system for cooling the 2&3A and 2&3B spent fuel pool heat exchangers.
OP-145	"Component Cooling Water System," Revision 31	Initial valve line-up of the portion added to the CCW system for cooling the 2&3A and 2&3B spent fuel pool heat exchangers and initial flow balance of the additional CCW piping.
OST-1103	Component Cooling Water ISI Valve Test, Revision 11	Flow test of check valves 1CC-578 and 1CC-580

### Addition of Spent Fuel Pools C and D Spent Fuel Pool Cooling and Cleanup Systems

The inspectors determined that the following parameters were affected by this design modification:

- Energy needs
- Materials
- Heat Removal
- Structural
- Process medium

To determine the design adequacy of the modification with respect to the above parameters, the inspectors reviewed the following documents:

- ESR 95-00425, "Study Effort to Support Fuel Pool C and D Inservice Date and BP," Revisions through 25, which contained the affected document change markups;
- Amendment 103 to the Facility Operating License including the safety evaluation report, issued December 21, 2000, for the expansion of spent fuel storage capacity;
- NRC Inspection Reports 50-400/99-12 and 2000-05;
- System Description SD-116, "Fuel Pool Cooling and Clean-Up System," Revision 8;
- Design Basis Document DBD-110, "Fuel Pool Cooling and Clean-Up System," Revision 8;
- FSAR Section 9.1.3, Fuel Pool Cooling and Clean-Up System;
- Drawings:
  - 2165-S-0807, "Simplified Flow Diagram Component Cooling Water System Unit 2"
  - 2165-S-0562, "Simplified Flow Diagram Fuel Pool Clean-Up Systems;"
  - 2165-S-1347, "Simplified Flow Diagram Fuel Handling Building Filter Backwash System"

The inspectors verified that modification preparation, staging, and implementation did not impair the following:

- Emergency/abnormal operating procedure
- Key safety functions

- Operator response to loss of key safety functions

The inspectors observed and/or reviewed post-modification testing to verify that the testing maintained the plant in a safe configuration, that no unintended system interaction occurred, that SSC performance affected by the modification met the design basis, that testing validated the basis of any modification design assumptions, and that the modification test acceptance criteria were met. The inspectors observed all or portions of the following post-modification testing associated with ESR 98-00219 and reviewed the test records:

<u>Test Procedure</u>		
<u>Number</u>	<u>Title</u>	<u>Relation to modification</u>
MMP-012	“Hydrostatic and Pneumatic Testing of Piping Systems,” Revision 12	Hydrostatic test of the piping for spent fuel pool cooling (5/26/2001), purification (6/1/2001), and skimmer (5/28/2001) systems for C and D spent fuel pools.
ESR 95-00425, Section 12	Testing Requirements	Flush of the spent fuel pool cooling, purification, and skimmer systems
Work Orders 90574 and 88028	Annunciator testing	Calibrates and tests control room annunciators for the C and D spent fuel pools

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

For the post-maintenance tests listed below, the inspectors reviewed the test procedure and either witnessed the testing and/or reviewed test records to determine whether the test was adequate for the scope of the maintenance work performed and demonstrated that the affected equipment was functional and operable:

Test Procedure		
<u>Number</u>	<u>Title</u>	<u>Related maintenance task</u>
OST-1215	“Emergency Service Water System Operability Train B Quarterly Interval Modes 1-2-3-4,” Revision 26	Repair piping leak downstream of the “B” Emergency Service Water Screen Wash Pump
EST-219	“Personnel Air Lock Door Seals Local Leak Rate Test,” Revision 8	Containment entry and door interlock testing
OST-1215	“Emergency Service Water System Operability Train B Quarterly Interval Modes 1-2-3-4,” Revision 26*	Preventive maintenance on 1SW-132 motor-operator, service water supply to “B” auxiliary feedwater pump
OST-1190	“Spent Fuel Pool Cooling System Train B [Inservice Inspection] Testing Quarterly Interval Spent Fuel in the Fuel Pools,” Revision 5	Lubrication of “B” spent fuel pool cooling pump bearings
OST-1214	“Emergency Service Water System Operability Train B Quarterly Interval Modes 1-2-3-4,” Revision 26*	Inspection and lubrication of the actuator on valve 1SW-124, the isolation valve which opens to provide backup service water flow to the turbine-driven auxiliary feedwater pump
OST-1093	“[Chemical & Volume Control System/Safety Injection] System Operability Train B Quarterly Interval Modes 1-4”, Revision 16	Inspection and lubrication of the actuator on valves 1CS-169, 1CS-752, and 1CS-753, all of which are isolation valves in the Chemical & Volume Control System/Safety Injection system

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the surveillance tests listed below, the inspectors examined the test procedure and either witnessed the testing and/or reviewed test records to determine whether the scope

of testing adequately demonstrated that the affected equipment was functional and operable:

<u>Number</u>	<u>Rev.</u>	<u>Title</u>
OST-1073	13	1B-SB Emergency Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6
OST-1122	7	Train "A" 6.9 KV Emergency Bus Undervoltage Trip Actuating Device Operational Test and Contact Check Modes 1-6
OST-1086*	14	1B-SB Diesel Generator Operability Test Semiannual Interval Modes 1-6
EST-209**	12	Type "B" Local Leak Rate Tests; Attachment 1, Emergency Air lock Local Leak Rate Test (Door Seals)
MST-I0320	27	Train "B" Solid State Protection System Actuation Logic & Master Relay Test
OST-1066	4	Reactor Coolant Pump "B" Undervoltage and Underfrequency Trip Actuating Device Operational Test

\*This procedure included inservice testing requirements.

\*\*This procedure included testing of a large containment isolation valve.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP1 Exercise Evaluation

a. Inspection Scope

The inspectors reviewed the objectives and scenario for the Harris Nuclear Plant biennial, full-participation 2001 emergency response exercise to determine whether they were designed to suitably test major elements of the licensee's emergency plan.

During the period April 23 - 26, 2001, the inspectors observed and evaluated the licensee's performance in the exercise, as well as selected activities related to the licensee's conduct and self-assessment of the exercise. The exercise was conducted on April 24, 2001 from 8:30 a.m. to 3:47 p.m. Licensee activities inspected during the exercise included those occurring in the Control Room Simulator, Technical Support Center, Operational Support Center, and the Emergency Operations Facility. The NRC's evaluation focused on the risk-significant activities of event classification, notification of governmental authorities, onsite protective actions, offsite protective action recommendations, and accident mitigation. The inspectors also evaluated command and control, the transfer of emergency responsibilities between facilities,

communications, adherence to procedures, and the overall implementation of the emergency plan. The inspectors attended the post-exercise critique to evaluate the licensee's self-assessment process, as well as the presentation of critique results to plant management.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspector reviewed changes to the Radiological Emergency Plan (REP), as promulgated in Revisions 38, 39, and 40 against the requirements of 10 CFR 50.54(q) to determine whether any of those changes decreased REP effectiveness.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed an emergency preparedness drill conducted on April 3 to verify licensee self-assessment of classification, notification, and protective action recommendation development.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator (PI) Verification

On April 25 - 26, 2001, licensee records were reviewed to determine whether the submitted PI statistics (through the first quarter of 2001) were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, Revision 0, "Regulatory Assessment Performance Indicator Guideline."

.1 Emergency Response Organization (ERO) Drill/Exercise Performance PIa. Inspection Scope

The inspector assessed the accuracy of the PI for ERO drill and exercise performance over the past eight quarters through review of a sample of drill and event records. Documentation was reviewed for ERO drills conducted on June 13 and October 17, 2000 and February 13, 2001, and control room simulator evaluations conducted in June 2000 to verify the licensee's reported data regarding successes in emergency classifications, notifications, and protective action recommendations.

b. Findings

No findings of significance were identified.

.2 ERO Drill Participation PIa. Inspection Scope

The inspector assessed the accuracy of the PI for ERO drill participation during the previous eight quarters through review of the training records for four of the 37 individuals assigned to key positions in the ERO as of the end of the first quarter of 2001.

b. Findings

No findings of significance were identified.

.3 Alert and Notification System Reliability PIa. Inspection Scope

The inspector assessed the accuracy of the PI for the alert and notification system reliability through review of a sample of the licensee's records of the biweekly silent tests, quarterly growl tests, and annual full-cycle tests conducted from April 1, 2000 to March 31, 2001.

b. Findings

No findings of significance were identified.

4OA3 Event Followup

(Closed) LERs 2000-006-00 & LER 2000-006-01, "Technical Specification Violation Due To Inoperable Emergency Core Cooling System Valve". These LERs reported that on August 2, 2000, valve 1RH-25, the isolation valve between the train "A" residual heat removal pump discharge and the train "A" charging/safety injection pump suction header, did not stroke when called upon during the performance of a quarterly surveillance test. Section 1R13 of NRC Inspection Report 50-400/00-03 discussed the

failure of this valve, and the discovery that the cause of the failure had been an incorrectly implemented modification rather than a misaligned rotor. In that report, two non-cited violations were associated with the circumstances related to the failure of this valve.

During this inspection period, the inspectors verified that the licensee completed the following related corrective actions:

- (1) The following plant procedures were revised to increase the level of detail concerning motor-operated valve (MOV) limit switch setup and to add requirements for independent verification and/or continuity checks of MOV limit switch contacts. These procedures were approved on January 29, 2001:
  - CM-I0002, “[Alternating Current] Limitorque Setup Check and Stroking”, Revision 12
  - CM-I0004, “Limitorque Calibration Check and Stroking of Special Westinghouse Supplied Valves”, Revision 11
  - CM-I0005, “[Direct Current] Limitorque Calibration Check and Stroking”, Revision 8
  - CM-I0012, “Terry Turbine [Direct Current] Limitorque Calibration Check and Stroking”, Revision 8
- (2) Plant procedure PLP-400, “Post Maintenance Testing”, Revision 21, was revised to incorporate the requirement that all MOV limit switch contacts performing safety-related functions affected by the scope of maintenance shall be tested to ensure safety-related functions are fully restored. Revision 21 became effective on December 1, 2000.
- (3) A real-time-training package titled “1RH-25” was prepared to describe the circumstances surrounding this valve’s failure to stroke, the associated violations, and the related causes. Between November 1, 2000, and November 6, 2000, that package was discussed with or read by each work group in the HNP Maintenance Unit.

The inspectors consider that the actions completed by the licensee were adequate to not only correct the condition which caused the subject valve to fail to stroke, but also to prevent recurrence of this type of failure. The inspectors determined that Revisions 0 and 1 of this LER provide no information beyond that already described in previous NRC Inspection Reports. Therefore, the inspectors consider these revisions of this LER to be closed.

#### 4OA6 Meetings, including Exit

##### .1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. Chris Burton, Director Site Operations, and other members of licensee management at the conclusion of the inspection on July 5. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

##### .2 Other Meetings

The NRC Division of Reactor Projects Division Director, the Branch Chief, and the Senior Resident Inspector assigned to Shearon Harris met on June 27 with Carolina Power and Light (CP&L) management to discuss the NRC's Reactor Oversight Process (ROP) annual assessment of safety performance for Shearon Harris for the period of April 2, 2000 - March 31, 2001. The major topics addressed were: the NRC's assessment program, the results of the assessment, and the NRC's Agency Action Matrix. Attendees included site management, members of plant staff, several local officials, and members of the public.

Following the annual assessment meeting, a brief meeting was held with local officials to discuss the ROP and NRC activities involving Shearon Harris. The Emergency Preparedness Manager also attended portions of the Meeting.

Both of the meetings were open to the public. Information used for the discussions of the ROP is available from the NRC's document system (ADAMS) as accession number ML 011980088. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room). Copies of the slides presented by CP&L at the annual assessment meeting are attached to this inspection report.

#### 4OA7 Licensee Identified Violations

The following finding of very low significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as a non-cited violation (NCV).

If you deny this non-cited violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to Regional Administrator, Region II; the Director, Office of Enforcement, United States Regulatory Commission, Washington, DC 20555-0001, and the NRC Resident Inspector at the Shearon Harris Facility.

NCV Tracking Number

Requirement Licensee Failed to Meet

50-400/01-03-02

The licensee failed to perform adequate receipt and dedication inspections, as required by 10 CFR 50, Appendix B, Criterion VII, for Siemens RLN/RLNF breaker cubicle Mechanism Operated Cell Switches as reported on April 24, 2001 under 10 CFR 21 (Green).

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee

D. Alexander, Nuclear Assessment Manager  
G. Attarian, Harris Engineering Support Services Manager  
C. Burton, Director Site Operations  
R. Duncan, Harris Plant General Manager  
J. Eads, Emergency Preparedness Supervisor  
R. Field, Regulatory Affairs Manager  
T. Hobbs, Operations Manager  
J. Holt, Major Projects Manager  
T. Natale, Training Manager  
K. Neushaeffer, Outage and Scheduling Manager  
J. Scarola, Harris Plant Vice President  
P. Summers, Environmental & Radiation Control Manager  
B. Waldrep, Maintenance Manager

NRC

B. Bonser, Chief, Reactor Projects Branch 4  
R. Laufer, Harris Project Manager, NRR

**ITEMS OPENED, CLOSED, AND DISCUSSED**Opened

50-400/01-03-01	URI	Pressurizer Power Operated Relief Valve safe-shutdown fuse coordination issue (Section 1RO5)
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Opened and Closed

50-400/01-03-02	NCV	Inadequate receipt inspection for mechanism operated cell switches (Section 40A7)
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Previous Items Closed

50-400/2000-006-00	LER	Technical Specification Violation Due To Inoperable Emergency Core Cooling System Valve (Section 40A3)
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50-400/2000-006-01	LER	Technical Specification Violation Due To Inoperable Emergency Core Cooling System Valve (Section 40A3)
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Previous Items Discussed

None