UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

October 30, 2000

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, NC 27562-0165

SUBJECT: NRC INTEGRATED INSPECTION REPORT 50-400/00-03

Dear Mr. Scarola:

On September 30, 2000, 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 October 5, 2000, with Mr. C. Burton and other members of your staff.

The inspection was an examination of 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. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel.

This inspection report identified two apparent violations related to the C Charging/Safety Injection Pump failed thrust bearing which remain under NRC review. These issues have not yet been characterized by the Significance Determination Process. Accordingly, no Notice of Violation is presently being issued for the apparent violation. In addition, please be advised that the number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review. No response regarding the apparent violations is required at this time.

The NRC also identified two other issues of very low safety significance (Green). One of the two issues was determined to involve two violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as Non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these Non-cited violations, 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 the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Shearon Harris facility.

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 Public Available Records (PARS) component 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/

Loren Plisco, Director
Division of Reactor Projects

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

Enclosure: Inspection Report

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-400
License No:	NPF-63
Report No:	50-400/00-03
Licensee:	Carolina Power & Light (CP&L)
Facility:	Shearon Harris Nuclear Power Plant, Unit 1
Location:	5413 Shearon Harris Road New Hill, NC 27562
Dates:	July 2 - September 30, 2000
Inspectors:	J. Brady, Senior Resident Inspector R. Hagar, Resident Inspector K. Poertner, Resident Inspector, Surry (1R16)
Approved by:	B. Bonser, Chief Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

Shearon Harris Nuclear Power Plant, Unit 1
NRC Inspection Report 50-400/00-03

IR 05000400-00-03, on 07/02 - 09/30/2000, Carolina Power & Light, Shearon Harris Nuclear Power Plant, Unit 1. The following are areas where findings were identified: emergent work, permanent plant modifications, and other activities.

The report covers a 13-week period of resident inspection. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609 (see Attachment).

Cornerstone: Initiating Events

- Green. An inadvertent safety injection (SI) resulted from two conflicting activities being performed at the same time. A concurrent breakdown in two aspects of the work control process, scheduling and implementation, allowed this event to occur.

  The SI was not safety significant because the plant was shutdown and none of the critical shutdown safety parameters were affected. (Section 1R13).

Cornerstone: Mitigating Systems

- To Be Determined (TBD). Two apparent violations were identified associated with the C charging/safety injection pump (CSIP) outboard thrust bearing failure. An apparent corrective action violation was identified for failing to classify the bearing failure as significant and consequentially failing to determine its cause. An apparent violation of Technical Specification (TS) 3.5.2, Emergency Core Cooling System (ECCS), was identified for having only one operable CSIP for longer than the allowed out-of-service time.

  The safety significance had not been assessed and remained under review at the completion of this inspection period. (Section 1R13).

- Green. Two non-cited violations were identified associated with the failure of valve 1RH-25 to open during a surveillance test. 1RH-25 is one of two isolation valves which open to allow flow between the low-head and high-head SI pumps to enable high-pressure recirculation. A non-cited violation was identified for having only one operable ECCS flowpath for longer than the TS allowed out-of-service time, and for entering operational modes 3, 2, and 1 while the TS was not satisfied. A non-cited violation was issued for failure to take corrective action to complete adequate post-modification testing of several motor-operated valves, after identifying the failure to complete adequate post-modification testing as one cause of the failure of valve 1RH-25.

The safety significance was low primarily because operators could have opened 1RH-25 manually at the valve location, and they could have opened it soon enough to enable the ECCS to accomplish the corresponding safety function. In addition, one low head SI pump can provide adequate flow to both high head SI pumps with the suction cross-connect valve in its normally open position. (Section 1R13).

Report Details

The unit operated at 100 percent of rated thermal power for the entire inspection period.

1. REACTOR SAFETY
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

a. Inspection Scope

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

- A and B emergency diesel generators, and A startup transformer while the B startup transformer was out of service,
- B emergency service water, and B emergency diesel generator during a combined system outage on the opposite train, and
- power supplies and motor control centers for containment air handlers AH-1 and AH-4, during an outage of the opposite train electrical busses which supply power to containment air handlers AH-2 and AH-3.

b. Issues and Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors reviewed current Action Requests (ARs), work orders, and impairments associated with the fire suppression system. The inspectors reviewed the status of ongoing surveillance activities to determine whether they were current to support the operability of the fire protection system. The inspectors observed surveillance test FPT 3430, "Fire Damper Inspection 18 Month Interval [Fuel Handling Building]," Revision 4. The inspectors observed the fire protection detection and suppression equipment in the following areas:

A switchgear room

B switchgear room

cable spreading room

A chiller area

B chiller area

control room

The inspectors also observed a fire drill in the A switchgear room.

b. Issues and Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors reviewed licensed operator requalification simulator training for crew A on August 31. This observation included emergency operating procedure (EOP) and abnormal operating procedure (AOP) scenarios. The scenarios tested the operators' ability to respond to a small break loss of coolant accident scenario and the loss of the emergency response facility information system (ERFIS). The inspectors verified clarity and formality of communication, use of procedures, alarm response, control board manipulations, group dynamics and supervisory oversight. The training was done utilizing Exercise Guide EOP-SIM-17.106.

b. Issues and Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

For the equipment issues described in the Condition Reports (CRs) and 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 maintenance rule category classification, and the criteria used to monitor equipment safety function performance and corrective actions:

Reference Number	Description.
AR 9642	A Emergency Services Chilled Water low oil pressure trip
AR 19373	Functional failure of A Charging Safety Injection Pump on May 3, 2000
AR 20796	A steam generator level decreased and did not respond to operator action due to A main feedwater isolation valve 1FW-159 going shut requiring a manual reactor trip

AR 21644	1CH-616, B Charging Safety Injection Pump room cooler chilled water control valve, functional failure
AR 19922	Functional failure of process card 1PIC-17-0543 (which provides accident-monitoring instrumentation to the alternate control panel) on May 5, 2000
WR/JO 00-AEKH1	Radiation monitor RM*1FR-3566B-SB failed high causing E-13 to start and normal ventilation to isolate

b. Issues and Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

Throughout the inspection period, the inspectors reviewed the risk assessments prepared by the licensee for each week's planned work.

The inspectors reviewed WR/JO 00-AFCL1 (1RH-25 piggyback valve failure to stroke during surveillance testing), to verify that the licensee had taken the necessary steps to demonstrate that emergent work activities were adequately planned and controlled to avoid initiating events, and to verify that the licensee ensured the functional capability of accident mitigation systems.

The inspectors reviewed the following ARs associated with this area:

AR Number	Description
20822	C Charging Safety Injection Pump rotating element thrust bearing failure
19338	LER 00-003 for inadvertent safety injection actuation

In addition, the inspectors reviewed the licensee's assessment of the impact on plant risk of removing the B startup transformer from service for preventive maintenance.

b. Issues and Findings

.1 C Charging/ High Head Safety Injection Pump (CSIP) Thrust Bearing Failure

On June 19, while performing maintenance on the C CSIP, the licensee found the outboard thrust bearing severely degraded. The licensee repaired the pump by replacing the thrust bearing and the rotating element. The licensee also initiated AR 20822 to document this problem. An Adverse Condition Investigation (ACI) was initiated to determine the apparent cause. The results were presented to the licensee management team on July 12. The ACI concluded that:

- Possible causes were improper fill and vent, and a bent shaft.
- Loss of lubricating oil was not a potential cause.
- When in service, the pump experiences axial thrust only in the inboard direction.
- The pump had passed surveillance and vibration testing and was fully capable of performing its safety function at all times.

After attending the presentation and reviewing the ACI, the inspectors had the following concerns:

- The licensee had not consulted the vendor about the operability of the pump.
- The adverse condition might have had common-cause implications that could have affected or will affect the other CSIPs, resulting in a complete loss of the high pressure safety injection (SI) function, which would be risk significant.

The inspectors found the following requirements and procedures related to assessing significance of conditions in the corrective action program:

- 10 CFR 50 Appendix B Criterion XVI, “Corrective Action”, requires that conditions adverse to quality be promptly identified and corrected. For significant conditions adverse to quality it requires that the cause of the condition be determined and corrective action taken to preclude repetition.
- Program Manual NGGM-PM-0007, “Quality Assurance Program Manual,” Revision 4, Section 12, Conditions Adverse to Quality and Corrective Action, implements Criterion XVI. Section 12.7, Significant Evaluation Guidance, describes minimum conditions that shall be classified as significant including a significant degradation in the ability of a safety system to perform its function.
- Procedure CAP-NGGC-0200, “Corrective Action Program,” Revision 1, implements the corrective action program described in the Quality Assurance Program Manual. In attachment 1, the procedure includes criteria for significant adverse condition determination. Those criteria include item 2c; damage to major plant equipment including 4 KV and above motor-driven and diesel engine-driven equipment. The procedure also indicates that an adverse condition investigation is required to

identify corrective actions to correct the problem, and that a significant adverse condition investigation (SACI) is required to find a root cause(s) and identify corrective actions to prevent recurrence.

On July 14, the inspectors reviewed the classification of AR 20822 against the significance criteria in CAP-NGGC-0200, attachment 1. The C CSIP is a 6.9 KV motor-driven pump and therefore met the criteria in item 2c; damage to major plant equipment. The inspectors concluded that AR 20822 should have been classified as significant, and a SACI should have been performed to determine the cause and prevent recurrence. Contrary to 10 CFR 50, Appendix B, Criterion XVI, as implemented by the Quality Assurance Program Manual and CAP-NGGC-0200, the licensee failed to classify AR 20822 as significant and consequently did not take adequate actions to determine the cause of the condition. This is identified as an apparent violation, EEI 50-400/00-03-01, failure to classify the C CSIP thrust bearing failure as a significance adverse condition.

The licensee initiated AR 21647 to document the failure to properly classify AR 20822, and subsequently initiated and completed an SACI of the C CSIP thrust bearing failure. That investigation determined that for some accidents the pump would not have performed its safety function, and concluded that loss of lubrication had been a cause of the failure, and that an improper fill-and-vent evolution could not be eliminated as a possible cause.

The results of the SACI were significantly different from the results of the ACI, in three ways:

- First, the ACI determined that the pump had been fully capable of fulfilling its safety functions at all times, while the SACI determined that, for some accidents, the pump would not have fulfilled its safety function.

- Second, the ACI determined that despite the failed thrust bearing, the pump had remained operable, while the SACI determined that, because the pump would not have fulfilled its safety function for some accidents, the pump had in fact been inoperable.

- Finally, the ACI determined that loss of lubricating oil had not been a cause of the bearing failure, while the SACI determined that loss of lubricating oil was definitely a cause of the failure.

The SACI concluded that the pump would not have fulfilled its safety function for some accidents because information obtained from the pump vendor indicated that at flow rates greater than approximately 200 gallons per minute (gpm) and less than approximately 500 gpm the pump would have experienced axial thrust in the outboard direction. Because the outboard thrust bearing had failed, this meant that operation of the pump in those flow ranges would have caused the pump to fail. The investigation thus concluded that for accidents which required the pump to deliver flow in those flow ranges, the pump would not have performed its safety function. Consequently, the investigation determined that only one train of the Emergency Core Cooling System (ECCS) had been operable from November 13, 1999, to December 18, 1999, and from January 3, 2000, to January 7, 2000. Technical Specification (TS) 3.5.2. requires two independent subsystems of ECCS to be operable including one CSIP in each subsystem. Action statement (a) applied if only one train is operable and required that the inoperable subsystem be restored within 72 hours or be in hot standby in the next 6 hours. Since the TS limiting condition for operation (LCO) was not satisfied and the action statement was not completed, the periods that the licensee identified involved operation contrary to TS 3.5.2.

The inspectors' review of the SACI resulted in one concern. The licensee used September 29, the date the oil sample was taken for which the analysis results showed a factor of 40 increase in particle count, as the date on which pump damage was discovered, and identified periods of pump inoperability only after that date. However, the inspectors considered that for the high particle count to be detected in an idle pump on September 29, the damage must necessarily have already existed before that date. The inspectors' review of the pump's operating history showed that the C CSIP had operated from May 15, 1999, to June 4, 1999, prior to the September 29 oil sample and after the previous oil sample that provided normal results (May 11, 1999). The most likely time for the damage was, therefore, on the pump start that occurred on May 15. The periods that the licensee identified in the investigation and those identified by the inspector constitute operation contrary to TS 3.5.2 which is identified as an apparent violation of TS 3.5.2. for failing to comply with LCO Action Statement (a). This is identified as an apparent violation EEI 50-400/00-03-02, Failure to have two operable CSIPs.

The licensee issued Licensee Event Report (LER) 50-400/2000-007-00 on October 4, after the end of the inspection period, for this violation. The inspectors concluded that the initial adverse condition investigation had not identified the cause(s) and that the conclusions related to the pump being operable and able to perform its intended safety function at all times had been shown to be invalid.

Significance

The CSIPs are used to mitigate the following scenarios: plant transients (including reactor trips), loss of the power conversion system, small and medium break loss-of-coolant accidents (LOCA), stuck open pressurizer power operated relief valve, loss of offsite power, steam generator tube rupture, anticipated transient without scram (ATWS), loss of component cooling water (CCW), loss of B DC bus (DP-1B-SB), loss of instrument air, and loss of offsite power with loss of Division AC. The flow rate for a CSIP must be between approximately 200 and 500 gpm for outboard thrust to occur. ATWS and loss of CCW were determined to be not applicable since they would not produce outboard thrust that would cause the pump to be inoperable. This item was still under NRC review at the conclusion of this inspection period and therefore the risk characterization is To Be Determined.

.2 (Open) Licensee Event Report (LER) 50-400/2000-006-00: TS violation due to inoperable ECCS valve. This LER reports that on August 2, valve 1RH-25, the isolation valve between the train A residual heat removal (RHR) pump discharge and the train A CSIP suction header, did not stroke when called upon during the performance of a quarterly surveillance test, and that a misaligned rotor in the valve's actuator was the cause of the failure. The inspectors determined that this LER involves two violations of NRC requirements, as described below.

(1) Technical Specification Violation

Upon initial investigation of the failure, the licensee determined that one of the limit switch rotors in the motor-operated valve actuator had not been properly adjusted such that the actuator's torque switch was not bypassed during most of the valve's stroke. Consequently, with the torque switch not bypassed, the high starting torque associated with moving the valve off its seat had caused the torque switch to open, and the valve had stopped moving. The licensee determined that valve 1RH-25 had been inoperable from May 10, when the rotor had been set-up following implementation of a design modification, until August 2, when the rotor was adjusted to provide the proper torque switch bypass function.

Technical Specification 3.5.2.d requires, in part, that while the plant is operating in Modes 1, 2, or 3, two independent ECCS flowpaths must be capable of taking suction from the refueling water storage tank on an SI signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation. Valve 1RH-25 is one of two valves that are opened to establish the flowpath from the containment sump to the reactor coolant system (RCS) during high-pressure recirculation. Because valve 1RH-25 had been inoperable, one train of the ECCS flowpath had been inoperable when the plant entered Mode 3 on May 15, and had remained inoperable until the valve was repaired on August 2. The licensee therefore operated the plant in violation of TS 3.5.2 from May 15 through August 2, and as a result, the plant entered Modes 3, 2, and 1 while TS 3.5.2 was not satisfied, in violation of TS 3.0.4.

Significance

The inspectors considered that the TS violation was not minor because it had a realistic potential for impact on safety, in that it was associated with an inoperable ECCS function. Using Appendix A of NRC Inspection Manual Chapter 0609, "Significance Determination Process," the inspectors determined that this violation had very low risk significance, based on the following key considerations:

- In accident mitigation, valve 1RH-25 must be opened to enable discharge flow from the A train RHR pump to enter the suction piping of the two CSIPs, thus partially enabling the high-pressure recirculation (HPR) function. (Valve 1RH-63 must be opened to enable discharge flow from the B train RHR pump to enter the CSIP suction piping.)

- The flow through either RHR pump is more than enough to enable the HPR function.

- Cross-connection valves between the CSIP suction headers are normally open, which means that the flow from either RHR pump can adequately supply both CSIP pumps.

- Although 1RH-25 would not have opened in response to a signal from its handswitch in the main control room, it could have been opened manually, using a handwheel located on the valve itself. Sufficient time would have been available and environmental conditions would have allowed access to manually open the valve. Therefore, operator action could have recovered the HPR function.

This issue represented an actual loss of safety function of a single train in excess of the TS allowed outage time. An analysis performed by an SRA evaluated the risk increase associated with the piggyback valve's inability to open upon demand from the control room assuming an exposure time of 85 days (May 10 - August 2). Input from the licensee's full scope model used for Maintenance Rule implementation and from the NRC's Rev. 3 Simplified Plant Analysis Risk (SPAR) Model were used in quantifying the risk increase.

Scoping calculations were performed. From the licensee's full scope model the baseline core damage frequency (CDF) was 5E-5 and the risk achievement worth (RAW) for 1RH-25 failing to open was 2.32. The RAW is the increase in baseline CDF if 1RH-25 always failed to open for an entire year. Therefore,

5E-5 [baseline CDF] * 2.32 [RAW]
= 1.15E-4 [new CDF] - 5E-5 [baseline CDF]
= 6.5E-5 [change in CDF for 1 year] * 85/365 [exposure time]
= 1.5E-5 [change in CDF over the exposure time].

However, recovery credit is appropriate since the valve could be easily recognized as needing to be opened. An initial screening using an Accident Sequence Precursor human error worksheet was completed with all performance shaping factors set at nominal except ergonomics and stress. Ergonomics was set between nominal and poor since it was an action needing to be done outside the control room, although accessible and properly labeled. Stress was set at high. Therefore, the recovery term was 1E-3 [Action baseline] * 2 [stress] * 5 [ergonomics] = 1E-2. Applying the recovery term to the CDF change = 1.5E-5 * 1E-2 = 1.5E-7. A similar calculation was used using the SPAR model's baseline CDF and RAW for the 1RH-25 valve and the ASP recovery term. Comparable results were obtained. Therefore, the performance deficiency was characterized as Green.

This violation is therefore being treated as a Non-cited Violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy dated May 1, 2000. This violation is in the licensee's corrective action program as AR 22287, and has been designated NCV 50-400/00-03-03, TS violation due to inoperable ECCS flow path.

(2) <u>Violation of 10CFR50, Appendix B, Criterion XVI</u>

On August 2, the licensee initiated AR 22287 to document the failure of 1RH-25, and initiated a corresponding SACI in accordance with procedure CAP-NGGC-0200, "Corrective Action Program," Revision 1. On August 31, the licensee completed the SACI. The report stated, in part, that during the recent outage, the post-modification test completed on the valve had not identified the incorrectly adjusted rotor because the Engineering Service Request (ESR) under which the torque switch bypass rotor had been adjusted (ESR 99-0008, "[Motor Operated Valve] Mod - 1RH-25, 1RH-63, 1SI-

359"), had not specified post-modification tests that were adequate to test the torque switch bypass function. The specified tests were not adequate, in part, because the tests did not include continuity checking of every branch of the circuit.

The inspectors noted that although the licensee had determined that ESR 99-0008 had not specified continuity checks for the torque switch bypass circuit, the SACI report did not include corrective actions to complete such checks on the subject valve. The inspectors considered that the failure to complete adequate post-modification tests of the subject valve not only was one cause of the valve failure, but also was in itself a condition adverse to quality which required correction. After the inspectors questioned the licensee about the need to complete continuity checks, the licensee initiated AR 22395 to document their failure to complete those checks, and subsequently initiated and completed continuity checks on the four valves that had been modified by the ESR. The inspectors learned that a technician who completed that work noticed that the wiring configuration on 1RH-25 appeared to be different from similar wiring on valve 1RH-63 (the valve on the opposite train that performs the same function as 1RH-25). The licensee initiated AR 23437 to document this discovery. The licensee's subsequent investigation revealed that on 1RH-25, the wires that provided the torque switch bypass function had been landed on the wrong termination points: although the design in the ESR specified termination on the points designated as #12, the wires had been terminated on the contacts designated as #9. (The #9 contacts and the #12 contacts are 90° out of position; when the #9 contacts are open, the #12 contacts are closed, and vice versa.) This discovery invalidated the results of the August 31 SACI. It also invalidated the information in the LER which stated that the misaligned rotor had been the cause of the failure. In response to this discovery, the licensee re-opened AR 22287, and initiated a second SACI on the failure of valve 1RH-25 to stroke.

10 CFR 50, Appendix B, Criterion XVI, "Corrective Action", requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected, and that, in the case of significant conditions adverse to quality, the cause of the condition is determined and corrective action taken to preclude repetition. Contrary to this requirement, the licensee identified a condition adverse to quality but did not correct it, in that in the August 31 SACI of the failure of 1RH-25, the licensee determined that adequate post-modification tests had not been completed, but did not initiate corrective action to complete those tests until prompted by the inspectors. The inspectors considered the failure to take corrective action to complete adequate post-modification testing to be a violation of 10 CFR 50, Appendix B, Criterion XVI.

<u>Significance</u>

The inspectors considered that this violation was not minor because it had a realistic potential impact on safety, in that this violation caused the licensee to not identify the correct cause of the 1RH-25 failure, and to consequently not implement effective corrective action. Because it is associated with the TS violation described above, and because the TS violation has very low risk significance, the Criterion XVI violation is being treated as a NCV consistent with Section VI.A.1 of the NRC Enforcement Policy dated May 1, 2000. This violation is in the licensee's corrective action program as AR 22395, and has been designated NCV 50-400/00-03-04, failure to take corrective action to complete adequate post-modification testing.

As noted above, the LER is incorrect, in that it states that the cause of the 1RH-25 failure was a misaligned rotor, while the actual cause was a wiring error. Pending licensee correction of this error, this LER remains open.

.3 <u>(Closed) Licensee Event Report (LER) 50-400/2000-003-00</u>: Inadvertent SI actuation. The SI occurred with the plant in Mode 5 at 0 percent reactor power when two work activities were performed concurrently that caused the SI blocking function to be removed. The activities involved de-energizing instrument bus S-III to restore its power source to the normal uninterruptible supply, and performing time response testing for channel 1 pressurizer pressure. The concurrent activities resulted in de-energizing 2 of 3 P-11 input relays which caused the unblocking of the low pressure SI signal.

The inspectors reviewed the licensee's root cause analysis, documented in AR 19338, which noted that specific procedural precautions and guidance gave adequate warning of potential interaction with other work for each of the two procedures being performed. The licensee found that their work schedule specifically allowed the performance of these two activities at the same time. The cause of the event was that operators failed to validate or verify information upon which key decisions were made, and that the site had less than adequate sensitivity to activities that may cause a SI actuation during shutdown conditions. The licensee also found that the problem of unblocking the SI signal due to concurrently performing surveillance testing and swapping inverter power supplies had been recognized as a potential problem with the schedule the previous day in relation to a different surveillance test (although it did not result in an SI), but the immediate actions taken did not prevent the SI. Corrective actions involved counseling the involved operators and training operators when faced with complex knowledge problems. In addition, corrective action included incorporating the sensitive activity work control, scheduling, and associated expectations for pre-job briefs and oversight into a plant procedure. The inspectors reviewed the corrective actions and verified that they were complete or were being tracked with implementation dates in the licensee's corrective action program under AR 19338.

The inspectors considered that two aspects of the work control process, scheduling and implementation, broke down and was the cause of the SI. The SI was not safety significant because the plant was in Mode 5, and because the SI containment isolation valves were shut and de-energized in preparation for another surveillance test. However, inadequate work control through both scheduling and implementation problems could have a realistic potential impact on safety during power operation. This issue was characterized by the SDP as having very low risk significance because none of the critical safety parameters were affected (Green).

1R15 <u>Operability Evaluations</u>

a. <u>Inspection Scope</u>

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:

ESR No.	Rev. No.	Title
00-00191	0	“[Emergency Diesel Generator] 1A-SA Left Turbocharger Casing - Jacket Water Weepage”
00-00217	0	“Possible [Safety Injection] Void”
00-00343	0	“Operability Determination for ‘A’ WC-2A Chiller,” prepared after the subject chiller tripped on low oil pressure differential during a routine start.
00-00343	2	“Operability Determination for ‘A’ WC-2A Chiller,” prepared after the compressor oil level on the subject chiller was found to be at or below the level of the lower oil-level sightglass.

b. Issues and Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the workarounds listed below, to determine whether the functional capability of the related system or human reliability in responding to an initiating event was affected. The inspectors specifically considered whether the workarounds affected the operators’ ability to implement abnormal or emergency operating procedures.

Workaround Number	Description
261	Operators must vent the pressurizer relief tank more frequently than normal due to leakage into the tank.
264	Performing DC ground tests on the 1A-SA 125V battery chargers/ DC bus causes several alarms to actuate associated with the ‘A’ diesel generator.

In addition, the inspectors toured the plant with on-shift operators, to determine if any operator workarounds existed that had not been identified.

b. Issues and Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed ESR 98-00552, “Addition of Vents to [Component Cooling Water] Piping,” Revision 0, to verify that the design bases, licensing bases, and performance capability of risk significant structures, systems, and components were not degraded through this modification, and to verify that performing this modification while the unit is operating would not place the plant in an unsafe condition. (At the end of the inspection period, this modification had not been completely installed in the plant.)

The inspectors also reviewed portions of ESR 99-0008, “[Motor Operated Valve] Mod - 1RH-25, 1RH-63, 1SI-359", during their review of the circumstances described in section 1R13.2 of this report, because the licensee determined that this ESR had not specified post-modification tests that were adequate to test the torque switch bypass function on valve 1RH-25.

b. Issues and Findings

Findings associated with ESR 99-0008 are discussed in section 1R13.2 of this report. No other 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 scope of testing adequately verified that the work performed was correctly completed and demonstrated that the affected equipment was functional and operable:

Test Procedure Number	Title	Related maintenance task
OST-1834	“Essential Services Chilled Water Isolation Valve Remote Position Indication Test Two Year Interval Modes 1-6,” Revision 9	Replace actuator on 1SW-1055 (1A-SA WC-2 chiller condenser outlet valve)
OST-1040	“Essential Services Chilled Water System Operability Quarterly Interval Modes 1-6,” Revision 17	Replace actuator on 1SW-1055 (1A-SA WC-2 chiller condenser outlet valve)
OST-1093	“[Chemical & Volume Control System/Safety Injection] System Operability Train B Quarterly Interval Modes 1 - 4,” Revision 16	Replace the C charging/safety injection pump outboard thrust bearing and rotating element
OST-1214	“Emergency Service Water System Operability Train A Quarterly Interval Modes 1-2-3-4," Revision 21	Replace valve 1SW-9 (a check valve in the discharge line of the A Emergency Service Water System pump)
OST-1215	“Emergency Service Water System Operability Train B Quarterly Interval Modes 1-2-3-4," Revision 22	Inspect and lubricate the actuator on 1SW-271 (the valve that isolates the B Emergency Service Water header from the auxiliary reservoir)
OST-1077	“Auxiliary Feedwater Operability Test Quarterly Interval,” Revision 9	Resolve a problem associated with the remote position indication for valve 1AF-50 (the auxiliary feedwater flow control valve for the C steam generator)
OST-1214	“Emergency Service Water System Operability Train A Quarterly Interval Modes 1-2-3-4,” Revision 22	Adjust torque switch on 1SW-97 (an isolation valve on service water piping to a containment air cooler)

The inspectors reviewed the following AR associated with post-maintenance testing:

AR Number	Description
AR 22287	Valve 1RH-25 A train residual heat removal to charging safety injection pump header piggy-back valve, exceeded stroke time code criteria following maintenance on August 2

b. Issues and Findings

No findings of significance were identified.

1R22 Surveillance Testing

.1 Testing Inspections

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:

Number	Rev.	Title
MST-E0010	9	“1E Battery Weekly Test”
OST-1092	8	“1B-SB [Residual Heat Removal] Operability Quarterly Interval Modes 1-2-3"
EST-220*	7	“Type C [Local Leak Rate Test] of Containment Purge Exhaust Penetration (M-58)”
OST-1011	9	“Auxiliary Feedwater System Operability Test, Monthly Interval”
MST-I0160	9	“Reactor Coolant Flow Instrument (F-0436) Operational Test”

* EST-220 was a surveillance test of a containment isolation valve.

In addition, the inspectors reviewed the licensee’s problem identification and resolution activities associated with the failure on September 16 of valve 1SW-97 to stroke during the execution of procedure OST-1214, “Emergency Service Water System Operability Train A Quarterly Interval Modes 1-2-3-4,” Revision 22, to verify that the licensee had identified and implemented appropriate corrective actions.

b. Issues and Findings

No findings of significance were identified.

.2 (Closed) LER 50-400/1999-005-00. Engineered safety features actuation systems TS exceeded. This LER reported that on March 13, 1999, the licensee had been out of compliance with TS 3.3.2 for 2 hours and 28 minutes. The LER was discussed in NRC

Inspection Report 50-400/99-02. In that report, the TS violation was dispositioned as NCV 99-02-01, and the LER remained open pending inspector verification of licensee corrective actions.

The inspectors noted that the corrective actions described in the LER included, in part, revising procedure MST-I0072, “Train A 18 Month Manual Reactor Trip, Solid State Protection System Actuation Logic & Master Relay Test,” and completing licensed operator training on the requirements of TS 3.3.2. The inspectors reviewed Revision 20 of MST-I0072, and verified that it incorporates instructions that address the effects of testing on compliance with TS 3.3.2. The inspectors also reviewed lesson/course number N07520H, “Technical Specifications and Reactor Trip Breaker Review,” Revision 1, and verified that those materials included treatment of the requirements of TS 3.3.2 and the circumstances surrounding the noncompliance reported in the LER. In addition, the inspectors verified that, according to licensee action tracking records, those materials had been presented to the licensed operators during licensed-operator requalification session #3. The inspectors therefore considered that the licensee had completed the corrective actions described in the LER.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors verified the Performance Indicators listed in the tables below to verify their accuracy and completeness:

Cornerstone: Initiating Events		
Performance Indicator	*Verification Period*	*Records Reviewed*
Unplanned Scrams	3rd Quarter 1999 through 2nd Quarter 2000	• Licensee Event Reports • NRC Inspection Reports • Monthly Operating Reports • operator logs • licensee power history curves
Scrams with Loss of Heat Removal		
Unplanned Power Changes		

Cornerstone: Barrier Integrity		
Performance Indicator	*Verification Period*	*Records Reviewed*
Reactor Coolant System Specific Activity	3rd Quarter 1999 through 2nd Quarter 2000	plant chemistry data

The inspectors observed the licensee obtaining RCS samples in accordance with procedure CRC-100, “Reactor Coolant System Chemistry Control,” Revision 18, and determining the radioactivity of those samples in accordance with procedure RCP-660, “Sample Preparation for Determination of Radioactivity,” Revision 11, to verify that the data upon which the RCS specific activity performance indicator values are determined, are themselves valid indications of RCS conditions. The inspectors also reviewed the action-request database, to verify that no condition reports had been initiated during the verification period that involved obtaining RCS samples and/or determining the radioactivity of those samples.

b. Issues and Findings

No findings of significance were identified.

4OA3 Event Follow-up

.1 (Closed) LER 50-400/2000-004-00, TS violation due to inoperable power range nuclear instrumentation. The licensee submitted this LER on June 12, to document their discovery on May 12 that one of the four power-range nuclear instruments was inoperable longer than the six hours allowed by TS 3.3.1 without placing the associated channel in a trip condition, as required by Technical Specifications. That circumstance constituted a violation of TS 3.3.1.

The licensee determined that the subject nuclear instrument (channel N-44), one of four power-range nuclear instruments, had become inoperable as a result of maintenance that had been performed on the channel during the refueling outage: the licensee determined that the high-voltage cable to the instrument had been damaged during the maintenance activity, and that the cause of the damage had been inadequate self-checking and attention to detail. The licensee discovered the instrument’s inoperability during the May 12 reactor startup, when the subject instrument failed to indicate increasing reactor power. Upon discovery of the inoperable instrument, the licensee diagnosed and repaired the failed cable. The licensee subsequently reviewed with crews who work on nuclear instruments the circumstances which caused the subject instrument to become inoperable, and revised the procedures under which maintenance is performed on the instruments, to require additional verification that cables are positioned properly and not damaged.

The inspectors reviewed the circumstances associated with this LER, and found that the licensee’s response to their discovery of the failed instrument had been timely and appropriate. The inspectors noted that those circumstances include a violation of TS 3.3.1. However, in accordance with Section IV of the NRC’s Enforcement Policy, the inspectors determined that this violation was of minor significance and is not subject to formal enforcement action.

.2 (Closed) LER 50-400/2000-005-00, Manual reactor trip due to a reduction in feedwater flow. This event resulted from a random equipment failure of a main feedwater isolation valve (MFIV) solenoid due to a manufacturing defect. During the last refueling outage, the MFIV actuators (including solenoids) had been replaced with actuators of a different design.

.3 (Closed) Licensee Event Report (LER) 50-400/2000-003-00: Inadvertent SI actuation. This LER is addressed in section 1R13, Maintenance Risk Assessments and Emergent Work Evaluation.

.4 (Closed) LER 50-400/1999-005-00. Engineered safety features actuation systems TS exceeded. This LER is addressed in section 1R22, Surveillance Testing.

4OA6 Management Meetings

.1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. C. Burton, Director of Site Operations, and other members of licensee management at the conclusion of the inspection on October 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 Public Meeting Summary

On July, 18, 2000 a public meeting was held in Region II with NRC and CP&L Shearon Harris personnel. The meeting covered: plant status, licensee management changes, past refueling outage summary, steam generator replacement/power uprate project status, and current plant focus areas.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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

NRC

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-400/00-03-01	EEI	Failure to classify the C CSIP thrust bearing failure as a significant adverse condition (Section 1R13)
50-400/00-03-02	EEI	Failure To Have Two Operable CSIPs (Section 1R13)

Opened and Closed

50-400/00-03-03	NCV	TS violation due to inoperable ECCS flow path (Section 1R13)
50-400/00-03-04	NCV	Failure to take corrective action to complete adequate post-modification testing (Section 1R13)

Previous Items Closed

50-400/2000-003-00	LER	Inadvertent SI actuation (Section 1R13)
50-400/1999-005-00	LER	Engineered safety features actuation systems TS exceeded (Section 1R22)
50-400/2000-004-00	LER	TS violation due to inoperable power range nuclear instrumentation (Section 4OA3)
50-400/2000-005-00	LER	Manual reactor trip due to a reduction in feedwater flow (Section 4OA3)

Previous Items Discussed

50-400/2000-006-00	LER	TS violation due to inoperable ECCS valve (Section 1R13)

NRCs REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety

- Initiating Events
- Mitigating Systems
- Barrier Integrity
- Emergency Preparedness

Radiation Safety

- Occupational
- Public

Safeguards

- Physical Protection

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee’s performance. The NRC’s actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.