U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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Licensee:	Carolina Power & Light (CP&L)
Facility:	Shearon Harris Nuclear Power Plant, Unit 1
Location:	5413 Shearon Harris Road New Hill, NC 27562
Dates:	November 24, 1996 - January 4, 1997
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Enclosure 2

EXECUTIVE SUMMARY

Shearon Harris Nuclear Power Plant, Unit 1
NRC Inspection Report 50-400/96-11

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six-week period of resident inspection; in addition, it includes the results of announced inspections by a regional reactor engineer and a regional reactor inspector.

Operations

- In general, the conduct of operations was professional and safety-conscious (Section 01.1). The licensee made a conservative decision to remove the unit from service and repair an unisolable steam leak on a small gland seal line. Operator performance for the down power and return to service was adequate. Problems with the circulating water system (straw in the suction screens) and a turbine rotor bow were preventable (Section 01.2). Nuclear Assessment Section personnel in the control room during the power reduction and return to service were effective in providing assessment of operator performance (Section 07.1).

- The licensee effectively prepared for cold weather operations. The material condition of insulation and heating equipment was good (Section 02.3).

- A violation was identified with two examples of failure to follow procedure. The first concerned the failure of the licensee to assure that chart recorders in the control room were functioning properly (Section 02.1). The second concerned failure to properly implement annunciator panel procedure APP-111 for alarms associated with temperature maintenance panels affecting safety-related boric acid systems (Section 02.3). This violation, and one identified in the maintenance section, continued a negative trend in operator performance that has been documented in several previous inspection reports and LERs (Section 04.1).

Maintenance

- Overall workmanship for the repair of a leaking air solenoid on the "B" Diesel Generator was good. The thorough involvement by a Quality Control inspector was particularly noteworthy (Section M1.1).

- The remote shutdown system has been maintained in a satisfactory manner. A violation was identified for failing to perform 18-month Technical Specification surveillance testing for the remote shutdown system control circuit associated with reactor coolant system power operated relief valve (PORV) block valve 1RC-115. An unresolved item was opened regarding manual operation and testing of the motor driven auxiliary feedwater pump from the auxiliary shutdown control panel (Section M2.2).

- The surveillance performances observed were adequately conducted (Section M2.1). The licensee found and corrected a non-cited violation regarding the failure to properly perform an emergency service water system surveillance procedure (Section M7.1). A self-disclosing condition in which a wiring lead was terminated incorrectly in the "A" train Reactor Auxiliary Building Ventilation system resulted in a non-cited Technical Specification violation and was appropriately reported by the licensee (Section M8.1).

Engineering

- The review of the licensee's handling of emergency service water structure air handler AH-86 resulted in a corrective action violation due to weaknesses in the implementation of temporary modifications, adherence to clearance program requirements, documentation of restoration requirements for inoperable equipment, and the identification and correction of adverse conditions (Section E1.1).

- Engineering support was good during the steam leak, repair, and recovery (Section E2.1). Two design deficiencies were found by the licensee and appropriately reported per 10 CFR 50.72 and 10 CFR 50.73 during the period. The first related to emergency diesel generator protection circuitry when the diesel is paralleled with off-site power (Section E8.1). The second identified a common mode failure in the reactor auxiliary building electrical equipment protection room ventilation system (Section E8.2).

Plant Support

- The general approach to the control of contamination and dose for the site was good (Section R1.1). The licensee was able to achieve its 1996 goals in personnel dose, personnel and floor contamination, and radwaste generation and processing. The licensee's achievements in 1996, a non-outage year, represented their best numbers ever in all major categories (Section R4.1).

- The security and safeguards activities were performed well. Access to the entry turnstiles was changed in response to an event at the Robinson facility (Section S1.1). Fire protection activities were acceptable (Section F1.1).

Report Details

Summary of Plant Status

Unit 1 began this inspection period at 100 percent power. On December 19, 1996 at about 10:55 a.m., a steam leak was discovered on a gland seal drain line that was not isolable for repair. A power reduction was commenced at 3:15 p.m. and the unit was taken off-line at about 9:15 p.m. that same day. The piping was repaired and the unit was brought back on line December 21, 1996. The unit reached 100 percent power on December 22, 1996. The unit remained at 100 percent power for the remainder of the period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious; the decision to shut down the unit to repair the steam leak was conservative; specific events and noteworthy observations are detailed in the sections below.

O1.2 Steam Leak

a. Inspection Scope (71707)

The inspectors observed the plant activities that resulted from the unisolable steam leak upstream of valve 1GS-102, discovered December 19 at approximately 10:55 a.m. The unit was taken off-line to repair the leak at 9:15 p.m. The inspectors observed the power reduction and securing of steam to the turbine. The inspectors also observed the generator synchronization to the grid following the repair.

b. Observations and Findings

The licensee discovered a steam leak on a 1 1/2 inch drain line that attaches to the moisture separator reheater (MSR) and the high pressure turbine steam chest. A block orifice was located in this line to limit flow from the steam chest to the MSR. The leak occurred about 3/4 inch from the block orifice on the MSR side. This was a high pressure steam leak, but did not result in enough steam escaping to affect steam flow readings on the main control board. The inspectors' observation of the leak was that it was a small leak of high energy steam that was potentially dangerous from a personnel safety standpoint, but presented no immediate reactor safety issues. The licensee decided to take the unit off-line and perform a permanent repair rather than attempt a temporary repair on-line. The inspector found that this decision was conservative with respect to reactor safety and personnel safety.

The reactor remained critical during the off-line period. Reactor Coolant System temperature was controlled using the steam generator power operated relief valves. Steam generator levels were maintained using the auxiliary feedwater system. The inspector observed that procedures were followed during the power reduction and off-line period.

The licensee had problems recovering the secondary system after the repair was complete. The licensee secured the condenser circulating water pumps ("B" & "C") when they were heard cavitating. Due to the cold temperatures, ice had formed in the cooling tower. The circulating water pump screens were cleaned. The inspector observed that the "A" pump screen had ice on about 1/8th the screen area and the "B" pump screen was completely covered with straw. Straw had been placed adjacent to the cooling tower in grass areas in the fall when new grass seed was sown. This was the only straw in the area. Apparently, some of this straw had gotten sucked into the cooling tower and plugged the "B" pump screen. The inspector found that the straw on the screens was not recorded in the shift supervisor's log.

When warming the main turbine, the shaft was found slightly bowed which caused an additional delay in the turbine startup. The licensee found that the turbine had been off the jack for approximately 30 minutes which was sufficient time with the condenser steam dump open to cause the turbine rotor to bow. The turbine was warmed at low speed for approximately 4 hours and the bow was removed. The inspector observed synchronizing the generator with the grid which occurred at 1:04 p.m. on December 22, 1996. The inspector found that procedures were being appropriately followed.

A small water hammer was heard when steam generator blowdown was put in service. Licensee inspection of the blowdown system identified several snubbers that were damaged on the "C" steam generator blowdown line. These were being replaced. No other damage was identified. The licensee was investigating the cause of the water hammer. CR 97-00055 was generated for this condition.

c. Conclusions

The licensee made a conservative decision to remove the unit from service and repair the steam leak. Operator performance was adequate. Problems with the circulating water system and turbine bow were preventable.

02 Operational Status of Facilities and Equipment

02.1 Review of Shift Logs

a. Inspection Scope (71707)

The inspectors checked the main control room (MCR) chart recorders to assure that pens were marking properly and the recorders were timing

correctly. The inspectors also verified that each chart had been checked by each shift and annotated as required by procedures.

b. Observations and Findings

On December 4, 1996 the inspector identified where the licensee failed to properly check the MCR chart recorders as required by OMM-016, Revision 8, Operator logs. Chart recorder UR 478, Steam Generator (SG) "A" Feedwater Flow red pen, was not properly inking and had not been for several days. Furthermore, the operators on each shift had been initialing and dating the recorder without verifying that the recorder was functioning properly as required. The failure to properly implement procedure OMM-016 is considered a violation of Technical Specification 6.8.1.a and procedure OMM-016 and is identified as violation 50-400/96-11-01.

When the inspector identified that the UR 478 recorder was not inking properly, the MCR licensed operator immediately re-primed the red pen to allow a trace to be read. Management wrote an Operations Night Order on December 5, 1996. This night order re-emphasized the requirements of OMM-016.

c. Conclusions

The inspector identified one violation concerning the failure of the licensee to assure that the MCR chart recorders were functioning properly.

02.2 Engineered Safety Feature System Walkdowns (71707)

a. Inspection Scope (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of the emergency diesel generator system (FSAR Sections 7.3, 8.3.1, 9.5.4, 9.5.5, 9.5.6, 9.5.7, and 9.5.8). The inspection of both emergency diesel generators, 1A-SA and 1B-SB, covered the fuel oil storage system, the diesel fuel oil system, the lube oil system, the jacket water system and the starting air system. The inspectors used the current valve lineup checklist from operating procedure, OP-155, Diesel Generator Emergency Power Systems, Revision 12, and simplified flow diagrams, CPL-2165-S-563 and CPL-2165-S-633, to verify the correct valve and instrument lineup at the site.

b. Observations and Findings

The following minor inconsistencies were found during the inspection:

- Valve 1DFO-208, the three-way selector valve for the fuel oil strainers, was not positioned against the full-open stop on the 1B-SB emergency diesel generator. The licensee subsequently determined that this was not an operability issue. An operator later repositioned the valve against the full-open stop.

- There were a total of eight valves that were locked open in the field and marked locked open on the lineup checklist, but were only shown as open (not locked) on the simplified flow diagram. There were 33 valves marked capped or blind-flanged on the flow diagrams, but were not marked as such on the lineup checklist. Valve 1DFO-165 is shown to precede a vent on the flow diagram, but is capped on the diesel generator. This was inconsistent with the licensee's general practice of designating locked or capped valves as such on both the flow diagrams and the lineup checklists.

- There were six valves shown open on the flow diagram, but were marked closed on the lineup checklist and found to be closed.

- There were nine valves that had either no or illegible identification tags. A room light was also found burned out in the 1A-SA fuel oil day tank room.

The above discrepancies were identified to the licensee. The licensee was evaluating the items and determining the appropriate corrective action.

c. Conclusions

Equipment operability, material condition, and housekeeping were generally acceptable.

02.3 Cold Weather Preparations (71714)

a. Inspection Scope

The inspector used Inspection Procedure 71714 to determine whether the licensee had effectively implemented a program to protect safety-related systems against extreme cold weather.

b. Observations and Findings

The inspector reviewed procedure AP-301, Adverse Weather Operations, Revision 16, to ensure that lessons learned from the previous winter were incorporated into guidelines for this winter season. Attachment 1 to this procedure contained various requirements including the verification of proper insulation on refueling water storage tank (RWST) level transmitter sensing lines and associated valves. Other actions included ensuring that freeze protection and temperature maintenance systems were operable per procedures OP-161 and OP-161.01. The status of electric unit heaters located throughout the plant were also checked in accordance with AP-301.

The inspector verified that procedure AP-301 had been completed prior to this inspection as required when ambient temperatures had fallen to below 35 degrees Fahrenheit. During this inspection, the inspector walked down applicable portions of the turbine building, emergency service water and emergency diesel generator structures, reactor

auxiliary building, and outside areas to verify that instrument sensing lines were well insulated, and heating equipment was functioning. The inspector especially noted that the RWST level sensing lines had been adequately insulated and that no heat trace cables were exposed. The four safety-related RWST level transmitters were now located in box-shaped enclosures with a one-inch thick rubber-based insulation replacing the vulnerable fiberglass insulation which had allowed moisture intrusion in the past.

The inspector reviewed maintenance records for heat trace and unit heater circuits affecting safety-related systems and verified that they had been calibrated since Summer 1996 using preventive maintenance procedure PIC-E048, Heat Tracing Control Temperature and Readout Unit Calibration, Revision 10; and procedure MST-E0069, Boric Acid Piping Heat Tracing Control Temperature and Readout Unit Calibration and Unit Heater Checkout, Revision 4. Clamp-on ammeters were used where required to measure the actual current of circuits being tested.

During a plant walkdown, the inspector had an operator accompany him to heat-trace/temperature maintenance panels which required opening to verify that breaker positions were as specified in procedure OP-161.01 lineup sheets. For panel HT-18751A and its redundant HT-18751AA, both of which powered circuits associated with RWST level transmitters and sensing lines, the inspector noticed that the required breakers were turned on but "off-normal position" tags were unnecessarily attached to them. The operator immediately reviewed the current electrical lineup file located in the main control room and later removed the tags.

On another walkdown, the inspector noticed that switches associated with redundant temperature maintenance panels HT-18753C and HT-18753CC, which heat Chemical and Volume Control System (CVCS) boric acid lines, were opposite from the positions specified in the current operating lineup file. That is, circuits annotated in OP-161.01 for HT-18753C as being on were turned off while the redundant circuits in HT-18753CC were on, and vice-versa. This alone did not affect equipment operability, because at least one redundant circuit switch was on for each circuit powered by the two panels. However, this discrepancy demonstrated inattention to detail in the equipment lineup and/or restoration processes. Condition Report 96-03823 was generated for this discrepancy.

Heat Trace Alarms Not Properly Responded To By Operators

Concerning panel HT-18753C and its backup HT-18753CC, the inspector noticed overtemperature, undertemperature, and circuit failure annunciators periodically illuminating locally at the panels. Similar alarms were also noted during later walkdowns on two other panels (HT-18753B and HT-18753BB) which also contained circuits associated with Technical Specification boric acid systems. Specifically noted were an undertemperature annunciator associated with HT-18753CC circuit 28, which affected the safety-related CVCS boric acid system, as well as various combinations of all three alarming conditions on circuits

affecting both non-safety and safety-related systems. All of these alarming conditions, as well as those for other panels, were tied to a central alarm/annunciator panel located in the radwaste control room (RWCR). The inspector went there to verify proper operator response. The operator in the radwaste control room indicated that the associated annunciator windows had been continuously illuminated for these four panels for weeks and that no new alarms had sounded in the RWCR because the annunciators had been "locked in" during that time. In other words, any new alarming conditions occurring at the heat trace panels would not annunciate in the RWCR because the alarms had not been reset locally by operators.

Problem tags on the panels indicated that some older deficiencies had been identified by auxiliary operators during routine daily plant tours. However, no tags had been generated for the conditions observed by the inspector. The inspector concluded that the newer temperature maintenance panel alarms deserved immediate attention as they could have resulted from problems ranging from open or shorted resistance temperature detectors, current failure in the heating cables, continuity failure of bus wires, or process temperatures not being controlled properly. The inspector was concerned that these conditions were not being properly identified and corrected since the alarms and annunciators in the RWCR were essentially disabled.

Following the inspector's field observations, licensee personnel initiated problem tags for the inspector-identified deficiencies as well as for the numerous other new deficiencies found during followup walkdowns by operators. A condition report was generated for the poor habit of not resetting the alarms locally and its affect on the RWCR alarms. By the end of this inspection period, the deficiencies were being tracked on the daily status and schedule review document by plant management. Subsequent to this inspection period, maintenance personnel were observed troubleshooting and fixing deficiencies related to the panel alarms.

Annunciator panel procedure APP-111, Freeze Protection and Temperature Maintenance, Revision 6, contained instructions for responding to the RWCR alarms. The procedure listed probable causes for the alarms, possible effects on safety-related systems, and instructions to notify the main control room (MCR) of the alarms. Licensee personnel were unable to properly implement annunciator panel procedure APP-111 because panel alarms were not being investigated and reset locally. Operators in the RWCR were unaware of and therefore could not notify the MCR of deficiencies which could potentially affected the operability of safety-related boric acid systems. The failure to properly implement procedure APP-111 is considered a violation of Technical Specification 6.8.1.a and is identified as the second example of violation 50-400/96-11-01.

Although operators were not appropriately responding to temperature monitoring alarms, the inspector verified that the operability of safety-related and TS-related equipment was not affected by the observed deficiencies.

c. Conclusions

The licensee effectively prepared for cold weather operations. The material condition of insulation and heating equipment was good. However, this inspection exposed weaknesses in how the licensee responded to alarms associated with temperature maintenance panels affecting safety-related boric acid systems. One violation was identified for failure to properly implement annunciator panel procedure APP-111.

04 Operator Knowledge and Performance

04.1 General Comments (71707)

The licensee continued to be challenged with human error issues as evidenced by the two violation examples discussed in report sections 02.1 and 02.3, and the non-cited violation discussed in section M7.1. Several violations were issued in 1995 and 1996 for performance problems associated with routine plant tasks (i.e., periodic tests, procedure adherence, procedure revisions). Although the errors noted this month had no major safety consequences, they were of concern because two of them were NRC-identified and were related to identifying and correcting deficiencies in the field. The licensee immediately corrected the short-term deficiencies and was continuing to address the poor practices which resulted in the violations.

07.1 Licensee Self-Assessment Activities (40500)

During the inspection period, the inspectors reviewed multiple licensee self-assessment activities, including:

- the Plant Nuclear Safety Committee (PNSC) meeting on December 10, 1996;
- Nuclear Assessment Section Audits on Technical Specifications (HNAS 96-239) and Special Processes (HNAS 96-255);
- Condition Reports
- NAS surveillance of operations activities for the down power and return to service

Nuclear Assessment Section personnel in the control room during the down power and return to service were effective in providing assessment of operator performance.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707)

The inspector observed all or portions of the following work activity:

- WR/JO 96-AAAQ1, Repair/Replace Leaking Solenoid in "B" Emergency Diesel Generator (EDG) Control Panel

b. Observations and Findings

The solenoid-operated valve in the control air system in the engine control panel, which was leaking could have eventually caused the diesel to switch from the operational mode to maintenance, or remain in the maintenance mode. Hence, the diesel was declared inoperable and Technical Specification (TS) Limiting Condition for Operation (LCO) action statements were applied.

During repair activities, workers were especially sensitive to the material condition of the new replacement solenoid and appropriately questioned and resolved what appeared to be imperfections in the solenoid o-rings. The lifting and landing of wire leads were properly documented on an independent verification log sheet. The inspector noted that terminal strips located in the panel were not labeled and the technicians had to improvise when describing the location of lifted leads. The technicians later initiated a Condition Report documenting this deficiency.

A quality control (QC) inspector was present and QC hold points were adhered to. The QC inspector identified some material condition improvement items (missing or oversized lockwashers, improperly labeled components) for which deficiency tags were generated. Another finding by the QC inspector involved a near-miss in the work ticket repair instructions. Specifically, the "A" EDG control panel was specified in the repair instructions while the "B" EDG control panel was the item for repair. Workers had gone to the correct panel anyway and the work ticket discrepancy was corrected upon identification.

c. Conclusions

Overall workmanship during the above activity was good. The thorough involvement by the QC inspector was particularly noteworthy. The backup system engineer was also present and assisted during troubleshooting activities.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Surveillance Observation (61726)

The inspectors observed all or portions of the following surveillance tests:

- OST-1093, CVCS/SI System Operability Train B Quarterly Interval Modes 1-4, Revision 4.
- MST I0124, Pressurizer Pressure P-0457, Revision 4
- MST I0360, MCR Normal OAI Radiation Monitor RM-01CZ-3504ASA, Revision 6
- MST I0145, Steam Generator A Narrow Range Level Loop Operational Test, Revision 4

b. Observations and Findings

The inspector found that the testing was adequately performed.

c. Conclusions

The surveillance performances were adequately conducted.

M2.2 Auxiliary Safe Shutdown System

a. Inspection Scope (62700)

The scope of the inspection was to inspect the auxiliary safe shutdown system including its components and panels to determine if they were adequately maintained and tested to assure operability. The inspector reviewed documentation and conducted walkdown inspections of the auxiliary shutdown panels. The inspector reviewed Final Safety Analysis Report (FSAR) Chapter 7, Section 7.4, Systems Required For Safe Shutdown, Table 7.4.1-1, Monitoring Instruments For Safe Shutdown, Table 7.4.1-2, Instrumentation And Control, Auxiliary Control Panel, Section 7.4.1.3, Auxiliary Feedwater System for safe shutdown requirements.

The Technical Specification (TS) Sections 3.3.3.5.a, 3.3.3.5.b, 4.3.3.5.1, and 4.3.3.5.2, were reviewed for surveillance requirements. Other TS requirements that were reviewed were in Table 3.3-9, Remote Shutdown System and Table 4.3-6, Remote Shutdown Monitoring Instrumentation Surveillance Requirements.

The remote shutdown system engineering document, Analysis E-5523.000, Instrumentation, Control And Transfer Switches For Components Credited In The Event Of A Fire Requiring Control Room Evacuation, was reviewed to obtain a list of components and instruments that require surveillance and testing under TS Sections 3.3.3.5.a and 3.3.3.5.b. The latest completed surveillance procedures OST-1020, Remote Shutdown Monitoring and Accident Monitoring Instrumentation Channel Check Monthly Interval

Modes 1-2-3 and OST-1813, Remote Shut Down were reviewed to verify that the TS requirements for surveillance were met.

The system description was reviewed for the identification of safe shutdown equipment and operation. Electrical drawings were reviewed to identify remote shutdown transfer control switches in the remote panels. Maintenance activities and procedures for testing, calibration, surveillance, and preventive maintenance (PM) tasks were examined to determine if auxiliary safe shutdown equipment was being maintained in a satisfactory manner.

b. Observations and Findings

The licensee provided equipment lists for the remote Auxiliary Shutdown System components from the computerized Equipment Data Base System (EDBS). These lists identified components, panels, instruments, systems, and the procedures for PM inspection, testing, surveillance, and the required frequency for performance. One instrument list identified the instrument loops, their calibration procedures, and the various systems that make up the safe shutdown system. The safe shutdown system consists of 92 instrument loops and components in 11 different systems. The inspector verified that these equipment lists contained all the instruments, components, and equipment listed in the FSAR and TS.

The inspector verified that all the calibrations, testing, and surveillances for the instruments were completed within the required time frame. The licensee provided the last completed PM tasks for all the auxiliary safe shutdown equipment. The inspector reviewed the task list to determine if all of the auxiliary safe shutdown equipment and panels were in the PM program. The completed PM tasks identified when the last PM inspection, calibration, test, or surveillance was accomplished. The inspector identified that the cleaning of the auxiliary control panels was not in the PM program. During the walkdown inspections, the inspectors observed that two of the panels were not up to the same cleanliness quality observed in the other electrical panels. To correct this minor concern, the licensee added the cleaning of the auxiliary control panels to the PM program. In the past, the cleaning of the panels was left to the discretion of the system engineer. The inspector reviewed completed work orders DLE 96D01324 and DLE 96D01325, dated September 30, 1996 to verify that in the past the system engineer had initiated cleaning of the auxiliary control panel (ACP).

The inspector reviewed the last completed surveillance test that was scheduled and performed by Operations to verify operability of the auxiliary shutdown system. Operations surveillance test procedure OST-1813, Remote Shut Down System Operability 18 Month Interval Modes 5 or 6, implements the TS requirements in Section 4.3.3.5.2 for testing the auxiliary shutdown system transfer switches, control switches, and control circuits at least once per 18 months as required in TS 3.3.3.5.b. During preparation for this inspection, the licensee identified that the control switch for valve 1RC-115 was not tested and

initiated Condition Report 96-03826 on December 13, 1996. The requirement to test the control switch for PRZ PORV ISOLATION 1RC-115 block valve was deleted from OST-1813. Consequently, the switch and valve RC-115 were not tested during the required 18 month period which ended during the refueling outage September 2 - October 12, 1995, when the plant was in MODE 5 or 6 as required by TS 4.3.3.5.2. The failure of the licensee to test 1RC-115 as required by TS 4.3.3.5.2 was identified as violation 50-400/96-11-02, Failure To Test 1RC-115 Per TS. Temporary test procedure OST-9024T was developed as a corrective action to test the switch for valve 1RC-115. The inspectors observed and verified that Operations Surveillance Test OST-9024T, Temporary Test for Testing 1RC-115 ACP Control was performed satisfactorily December 19, 1996. The licensee initiated a revision to OST-1813, to include switch testing for valve 1RC-115. The inspector concluded that the corrective action of testing 1RC-115 using OST-9024T was satisfactory.

During the above review a discrepancy was found between the FSAR and plant procedures. In FSAR Section 7.4.1.3, Auxiliary Feedwater System, the following is stated:

> When in a shutdown condition, manual initiation of the selected auxiliary feedwater pumps is required. This is accomplished by using the manual control switches on the main control board (MCB) or the auxiliary control panel (ACP).

The ACP has the controls and instrumentation (hardware) to operate the motor driven auxiliary feedwater pumps (MDAFWP). However, the MDAFWPs are not tested from the ACP and no test or operating procedures (software) exist to operate the MDAFWPs from the ACP. This discrepancy will be tracked as Unresolved Item (URI) 50-400/96-11-03, MDAFWP Manual Initiation From ACP.

c. Conclusion

The inspector concluded that the licensee has tested and maintained the remote auxiliary shutdown system in a satisfactory manner, except for minor cleaning of two panels. In addition, a valve was removed from a surveillance procedure and was not tested as required by TS. The licensee has corrected this violation. An unresolved item was opened regarding manual operation of the motor driven auxiliary feedwater pump from the auxiliary control panel.

M7 Quality Assurance in Maintenance Activities

M7.1 Condition Report 96-03792

a. Inspection Scope (40500)

The inspector reviewed Condition Report 96-03792 and associated documentation to determine the cause of a test pressure gauge being found installed in the emergency service water (ESW) system on December 10, 1996 that should not have been installed.

b. Observations and Findings

The inspector found through discussion with licensee personnel and review of documentation that the gauge had been left installed during the performance of OST 1215, ESW System Operability Test Train B, Revision 13, on December 9, 1996. Review of the written statements from the personnel involved indicated that a transposition error had occurred when the workers' initials were transferred from one of the field working copies of the test procedure to the control room master copy. This resulted in the gauge removal being signed off when it had not been completed. The licensee found that the gauge had not been removed because communication between the operations personnel in the control room and the field was not adequate. The communication problem resulted in one step of the procedure not being performed. The transposition error resulted in the installed gauge not being identified by the control room personnel reviewing the completed test documentation. As a result, the OST was signed off as complete when it had not been. The inspector determined that the gauge being installed had no impact on the system being able to perform its intended function. The licensee removed the gauge and took disciplinary action with the personnel involved. This failure to follow procedure is considered a violation of TS 6.8.1.a. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with section VII.B.1 of the Enforcement Policy (NCV 50-400/96-11-04).

c. Conclusion

The licensee found and corrected a failure of the operating staff to properly perform a surveillance procedure.

M8 Miscellaneous Maintenance Issues (92700)

M8.1 (Open) LER 50-400/96-022-00: Wiring Discrepancy Found in Reactor Auxiliary Building Ventilation System Circuitry.

This LER described a self-disclosing condition in which a wiring lead was terminated incorrectly in the "A" train reactor auxiliary building ventilation system. The mislanded lead provided an alternate power source to two relays associated with dampers in the system. With the lead landed incorrectly, the two relays would become energized upon receipt of a certain main control room alarm. The relays were normally required to deenergize on a safety injection signal which would allow the normally open dampers to shut, isolating the non-emergency ventilation system from the emergency post-accident system.

On November 12, the control room alarm occurred for a preplanned clearance on one of the 27 "A" train ventilation dampers, and remained in place until November 22, when operations personnel secured the normal ventilation fans and the other 26 dampers did not close as expected. A subsequent investigation discovered the mislanded lead which was immediately corrected. The inspector verified that the licensee's

troubleshooting effort was consistent with maintenance management manual procedure MMM-027, Troubleshooting Guide, Revision 8.

The above condition was caused by personnel error when a maintenance technician incorrectly terminated the lead and subsequently a quality control (QC) technician failed to identify the error. The mislanded lead, coincident with the alarming condition, prevented the "A" train dampers from closing, and would have prevented them from performing their safety-related isolation function following a safety injection signal. This condition existed for 10 days and exceeded the seven day single train outage time allowed by Technical Specification Limiting Condition for Operation 3.7.7.

The safety consequences associated with this event were minimal. The "B" train dampers are located in series with the "A" train dampers and would have isolated the ventilation boundaries. The licensee immediately corrected the discrepancy upon identification and counseled the maintenance and QC technicians. Having the "A" train reactor auxiliary building ventilation system inoperable for 10 days without satisfying the LCO action statements was considered a violation of TS 3.7.7 and is identified as NCV 50-400/96-11-05. This licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

The LER will remain open pending the licensee's completion of further corrective actions to train maintenance and QC personnel on this event.

III. Engineering

E1 Conduct of Engineering

E1.1 Isolation of AH-86A and AH-86B Cooling Coils

a. Inspection Scope (37551)

The inspector reviewed activities associated with the isolation of cooling water to safety-related Heating Ventilation and Air Conditioning (HVAC) fans AH-86A and AH-86B located at the service water pump intake structure. Each fan's cooling coils were normally filled with coolant from either the emergency service water (ESW) system or the cooling tower makeup (CTMU) system. The fans originally provided electrical equipment room cooling and helped to maintain certain ESW components within equipment qualification specifications. Previous testing and operational problems associated with the fans' coolant supply valves and piping resulted in extremely conservative entries into Technical Specification Limiting Condition for Operation action statements in 1994 and 1995. These problems, along with flow balance deficiencies related to other ESW-cooled components, prompted the licensee to readdress the need for ESW flow to the AH-86 fans' cooling coils. A 1995 engineering analysis had determined that coolant through the fans' coils would not

be required for equipment operability as long as ambient temperatures remained below 105°F. Because this temperature was also the maximum ambient temperature assumed in the plant's design basis as described in the FSAR, the licensee initiated steps to permanently eliminate the tie between ESW and the AH-86 fans.

b. Observations and Findings

Background

Previous problems with the cooling water supply for fans AH-86A and AH-86B had occurred in January 1994 (frozen cooling coils), and May 1995 (missed TS surveillance on automatic isolation valves). In the Summer of 1995, the licensee had also discovered that very little margin existed for ESW flow to other system-cooled components including two of the four containment fan coolers, the "A" emergency diesel generator jacket water heat exchanger, and the "A" essential services chilled water system chiller. Following the licensee's 1995 engineering analysis mentioned in the above paragraph, the two fans' coils were drained (with associated drain valves left open), coolant supply and return valves were shut, automatic supply valves were deenergized shut (fuses pulled), and clearance 95-01286 was issued documenting the new valve and fuse positions. Equipment Inoperable Records (EIR 95E0479T, 95E0480T, 95E0481T, and 95E0482T) were generated for each automatic coolant supply valve (two each in the ESW and CTMU systems) detailing what Technical Specification surveillance tests were required before their power could be restored. After flow balance testing confirmed that additional margin would be available to other system components with the AH-86 coils isolated from the ESW system, an engineering memorandum was generated on September 15, 1995 and attached to each EIR indicating licensee plans to permanently remove the tie between ESW and the cooling coils. The clearance and EIRs were dated September 21, 1995.

In the months following the isolation of the cooling coils, the licensee modified ESW flow balance test procedures to eliminate the AH-86 cooling coils from the ESW flow equation. In early 1996, the plant FSAR was amended (and supported by a 10 CFR 50.59 safety evaluation) deleting the original flow requirements specified for the AH-86 fans. Modified flow requirements were also specified for other ESW-cooled components based on results from a Fall 1995 flow balance and numbers contained in service water flow calculation SW-0080, ESW Flow Requirements Based on Reservoir Level, Revision 3. During and immediately following this period, no modification was issued to change operating procedures, valve lineups, or system drawings to incorporate the new valve lineup (maintained by clearance) which would facilitate the ESW flow rates specified in the FSAR and design calculations.

During a quarterly clearance audit in September 1996, licensee personnel discovered that clearance 95-01286 had been in place for a year and questioned the use of the clearance process for long-term isolation of the AH-86 fan coils. A condition report, CR 96-02741, was generated and

assigned to Operations for resolution. Although an action item was generated from the CR review for Engineering to complete a permanent modification to procedures and drawings, licensee personnel determined (as stated in the CR resolution) that no inappropriate acts had occurred with the use of the clearance process (instead of a modification) to isolate the coils. Additionally, no temporary modification was processed pending completion of the permanent modification.

NRC Finding

During this inspection period, the inspector questioned the licensee's CR resolution and determined that the following inappropriate acts had not been considered:

1) The system operating procedure OP-139, Service Water System, Revision 11, and flow diagrams (CPL-2165-S-0588, Miscellaneous Systems, Revision 15; and CPL-2165-S-0547, Circulating & Service Water Systems, Revision 29) depicted the fans' cooling water supply and drain valves in positions that conflicted with those required to meet the new system flow calculations and FSAR specifications.

2) The clearance process was used instead of the temporary modification process to ensure that the new ESW system flow requirements related to the AH-86 fans were being met. A note in procedure AP-020, Plant Clearance and Tagging Procedure, Revision 8, stated that the equipment clearance procedure will not be used for long term or permanent disabling or removal of plant equipment. The licensee's engineering procedure, EGR-NGGC-0005, Engineering Service Requests, Revision 2; and Attachment 6 to NGG-EGR-0001, ESR Training Guide, Revision 1; described a temporary change to in-service plant equipment that does not conform to approved drawings or other design documents as constituting a temporary modification. The temporary modification process was the appropriate vehicle to incorporate the valve position changes in drawings and procedures until a permanent modification could be completed.

3) Operations' quarterly audits from previous quarters failed to identify or question the long-term status of clearance 95-01286 or the EIRs for the automatic isolation valves. The inspector's concern was elevated by the fact that the engineering memorandum was attached to each EIR announcing the licensee's intentions to permanently eliminate the ESW tie to the AH-86 units.

4) The EIRs failed to inform operations that not only would the deenergized valves need to satisfy past-due TS surveillance tests upon power restoration, but that revisions to flow balance procedures, system calculations, and the FSAR would be required before returning the cooling water supply to service. In essence, the EIRs failed to mention that realigning coolant from ESW to the

fan coils without considering overall ESW system impact could make both trains of ESW or its supported components inoperable.

5) When CR 96-2741 was resolved, licensee personnel failed to recognize the need for a temporary modification even while issuance of the permanent modification, ESR 96-00284, was still pending. Furthermore, the permanent ESR was not issued until three weeks (December 11, 1996) after the CR-specified completion date of November 22, 1996.

The inspector presented the above concerns to licensee personnel who have since issued ESR 96-00284. This modification will incorporate the isolation of fans AH-86A and AH-86B into approved system procedures and drawings. A safety evaluation per 10 CFR 50.59 was included. The inspector verified that Revision 12 of service water operating procedure OP-139 incorporated the new valve positions. At the close of the inspection, the modification had not yet been incorporated into all related procedures and drawings.

Regulatory Significance

Although the fan coils remained isolated for the 15 months between clearance 95-01286 being issued and the issuance of ESR 96-00284, this NRC finding was significant because it illustrated deficiencies and nonconformances in several licensee program areas. These included the failure to use the temporary modification process to implement the above-described changes even after the deficiency was initially identified in CR 96-2741, the failure to completely document restoration requirements for valves affecting the safety-related ESW system on the EIR forms, and the failure to follow requirements in clearance procedure AP-020. The licensee identified the problem with the use of the long-term clearance, but failed to adequately investigate and correct the associated problems outlined above.

10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. This requirement is further delineated in the licensee's Corporate Quality Assurance Program Manual, Section 12.0, Conditions Adverse to Quality (CATQ) and Corrective Action, Revision 18. Licensee personnel failed to identify and/or correct deficiencies in the implementation of administrative controls used to isolate the AH-86 fan coils from the safety-related ESW system. This failure is considered a violation of 10 CFR 50, Appendix B, Criterion XVI (50-400/96-11-06).

c. Conclusions

This inspection uncovered weaknesses in several areas including the implementation of temporary modifications, adherence to clearance program requirements, documentation of restoration requirements for inoperable equipment, and the identification and correction of adverse

conditions. One violation was identified against 10 CFR 50, Appendix B, Criterion XVI, Corrective Action.

E2 Engineering Support of Facilities and Equipment

E2.1 Support For Steam Leak and Unit Off-Line Problems

a. Inspection Scope (37551)

The inspector observed engineering support for the steam leak and problems encountered during the unit off-line period. This subject is also discussed in section 01.2.

b. Observations and Findings

The inspector observed that Engineering was heavily involved in the evaluation of the steam leak. Engineering personnel pulled drawings and identified the most likely cause of the leak. The licensee took ultrasonic measurement of wall thickness around the hole and determined that thinning had occurred from the piping orifice to approximately 16 inches toward the moisture separator reheater from the orifice. This was expected since that was the direction of steam flow. The licensee removed the section of pipe and replaced it with a chromium molybdenum steel pipe section, which has proven to provide improved performance in this application. The inspector observed the removed pipe section and confirmed that thinning had occurred. The hole visually appeared to be from erosion and was not the result of a pit. The hole was about 1/4 inch in diameter and the shape of a star. The area downstream of the orifice block showed visual signs of erosion for about 16 inches. The licensee also took measurements on an addition pipe in an identical arrangement and found it was thinned downstream of the block orifice also, but was no where near ready to break through. The thinned section was replaced also. The inspector observed this removed section which had greater than half the pipe wall thickness remaining.

The inspector also observed engineering personnel involved with the problems that occurred during secondary plant recovery discussed in Section 01.2. Engineering personnel promptly responded to problems as they occurred and provided good recommendations to Operations on the course of action necessary to fix them. Support was observed to be good.

c. Conclusions

Engineering support was good during the steam leak, repair, and recovery.

E7 Quality Assurance in Engineering Activities

E7.1 Special FSAR Review (37551)

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the FSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the FSAR that related to the areas inspected.

The licensee made a presentation to the NRC on May 31, 1996 concerning their corporate-wide plan for reviewing the FSAR at the CP&L sites. The program has generated a large number of condition reports at the Harris Plant (275 by the end of the inspection period). One was identified and reported under 10 CFR 50.72 and 50.73 as discussed in section E8.1. The results from this program will be reviewed in the closure of Unresolved Item 50-400/96-04-04, Tracking FSAR Discrepancy Resolution. URI 50-400/96-11-03 in Section M2.2 noted an inconsistency between the wording in the FSAR and plant procedures in relation to use of the auxiliary feedwater system from the auxiliary control panel.

E8 Miscellaneous Engineering Issues (92700,90712)

E8.1 (Open) LER 50-400/96-023-00: Design Deficiency in Emergency Diesel Generator Protection Circuitry.

This LER discussed a design deficiency in the protection circuitry for both emergency diesel generators (EDGs). Specifically, Section 8.3.1.1.2.14.g of the Harris Plant Final Safety Analysis Report (FSAR) stated that protection is provided for the diesel generator and the safety-related electrical system during periodic testing of the diesel generator coincident with a loss of offsite power (LOOP) by the voltage restrained overcurrent relay (51V) at the diesel generator feeder. This relay senses overcurrent due to overloading of the diesel generator in conjunction with reduction in voltage. The relay is arranged to trip the feeder breaker to the diesel generator.

A licensee engineering review questioned the ability of the installed 51V relay configuration to provide the FSAR-described protection during a LOOP, and on December 4, 1996, concluded that it would not perform the function. The relay was determined to provide backup EDG overload protection for distribution system faults and degrading conditions, not for a LOOP event. As a result of this condition, the licensee concluded that a scenario existed while the EDG is synchronized to the offsite electrical grid during testing that could result in a possible EDG overspeed or a potential for the emergency sequencer to not recognize a LOOP event and initiate load sequencing onto the safety bus. The licensee concluded that this condition had constituted operation outside the design basis of the plant.

This condition was promptly reported to the NRC on December 4, 1996 per 10 CFR 50.72. Immediate corrective actions discussed in the LER included revising test procedures to verify that stable grid voltage existed before paralleling to the grid during testing. Additionally, each diesel will be declared inoperable and Technical Specification Limiting Condition for Operation action statements will apply during periodic testing until a permanent modification corrects the 51V relay discrepancy. The licensee will provide additional information pertaining to root cause, safety significance, and corrective actions in a supplement to the LER.

The inspectors discussed this condition and the licensee's proposed actions with licensee management and concluded that the interim corrective actions were appropriate. This LER will remain open pending NRC receipt of the additional information and licensee implementation of permanent corrective actions.

E8.2 (Open) LER 50-400/96-024-00: Common Mode Failure in the Reactor Auxiliary Building Electrical Equipment Protection Rooms Ventilation System.

This LER discussed a common mode failure that could prevent both RAB Electrical Equipment Protection Rooms Supply Fans AH-16A and AH-16B from operating. This failure was related to two nonsafety-related ionization detectors in the AH-16 ductwork that are wired in parallel to form a fire detection zone permissive. Due to the system's design, a failure of either detector would preclude satisfying the fan's start permissive and prevent the fans from maintaining area temperatures to ensure the operability of safety-related equipment, following a safety injection signal. This deficiency had been identified on November 21, 1996 while preparing to perform a periodic test procedure. The licensee's investigations of this issue concluded that the condition was contrary to the design basis of the plant.

The licensee reported this deficiency to the NRC in accordance with 10 CFR 50.72 on December 4, 1996 as a condition outside of the design basis of the plant.

The licensee determined the safety significance of this deficiency to be minimal because the fans are not taken credit for in the Harris Plant Probabilistic Safety Analysis and would therefore not impact the calculated core damage frequency. Additionally, the fans would be manually started by the control room staff, as directed by operating procedures following a safety injection signal.

Interim corrective actions for this problem included revising procedures to provide operators with guidance on manually starting the AH-16 fans, revising the test procedure to test only one set of relay contacts at a time and reviewing other air duct detector circuits. Later actions will include installing a plant modification to resolve the AH-16 single failure susceptibility.

This LER will remain open pending the inspector's independent review of the significance of this condition and the licensee's completion of the plant modification.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 General Comments (71750)

The inspector observed radiological controls during the conduct of tours and observation of maintenance activities and found them to be acceptable. The general approach to the control of contamination and dose for the site was good. Teamwork between the various departments continued to be a major contributor to the good control of dose.

R4 Staff Knowledge and Performance in RP&C

R4.1 General Comments (71750)

The inspector reviewed radiation protection performance data for calendar year 1996. The licensee was able to achieve its 1996 goals in several areas including personnel dose, personnel and floor contamination, and radwaste generation and processing. The licensee's achievements in 1996, a non-outage year, represented their best numbers ever in all major categories.

Personnel dose for 1996 was 17.23 person-rem versus a goal of 30 person-rem. The number of personnel contamination events was 41 (versus a goal of 50) which was better than the previous non-outage record of 45. Contaminated floor space averaged 4183 square feet for 1996, down from 6362 square feet in 1995 and below the 1996 goal of 4600. The amount of radwaste generated for 1996 was 146 cubic meters (goal was 155), and the total waste processed was 14.4 cubic meters.

The inspectors and licensee management acknowledged that this improved performance was due to the combined efforts of the radiation protection organization and plant workers. Notwithstanding the good performance in 1996, the licensee will face additional challenges in the coming months as staffing and radiation work activities are increased for the upcoming refueling outage.

S1 Conduct of Security and Safeguards Activities

S1.1 General Comments (71750)

The inspector observed security and safeguards activities during the conduct of tours, and observation of maintenance activities, and found them to be good. Compensatory measures were posted when necessary and properly conducted. The licensee made a change to access control in response to a safeguards event at the H.B. Robinson facility. The

change was to allow only one person within approximately seven feet of a turnstile at a time. The response to the event at Robinson was good.

F1 Control of Fire Protection Activities

F1.1 General Comments (71750)

The inspector observed fire protection equipment and activities during the conduct of tours and observation of maintenance activities and found them to be acceptable. The Fire Panel Alarm Response Procedure, APP-FP-016, Local Fire Detection Panel - 16-1, Revision 1 for panel 1-LFDCP-16-1 in the Security Building was not the latest Revision. The difference between the two revisions related to the alarms normally illuminated on the panel and the picture contained in the procedure. Revision 2 was available in the control room. This discrepancy was promptly corrected.

V. Management Meetings

X1 Exit-Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 10, 1997. 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.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Alexander, Supervisor, Licensing and Regulatory Programs
D. Batton, Superintendent, On-Line Scheduling
D. Braund, Superintendent, Security
B. Clark, General Manager, Harris Plant
A. Cockerill, Superintendent, I&C Electrical Systems
J. Collins, Manager, Training
J. Donahue, Director Site Operations, Harris Plant
W. Gautier, Manager, Maintenance
W. Gurganious, Superintendent, Environmental and Chemistry
M. Hamby, Supervisor, Regulatory Compliance
M. Hill, Manager, Nuclear Assessment
D. McCarthy, Superintendent, Outage Management
K. Neuschaefer, Superintendent, Radiation Protection
W. Peavyhouse, Superintendent, Design Control
W. Robinson, Vice President, Harris Plant
G. Rolfson, Manager, Harris Engineering Support Services
S. Sewell, Manager, Operations
T. Walt, Manager, Performance Evaluation and Regulatory Affairs

NRC

T. Le, Harris Project Manager, NRR
M. Shymlock, Chief, Reactor Projects Branch 4

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observations
IP 62700:	Maintenance Implementation
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71714:	Cold Weather Preparation
IP 71750:	Plant Support Activities
IP 90712:	In-office Review of LERs
IP 92700:	Onsite Followup of Events

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-400/96-11-01	VIO	Example 1: Failure to assure steam generator feed flow "A" chart recorder marking, paragraph O2.1; Example 2: Failure to notify control room of temperature monitoring alarms, paragraph O2.3
50-400/96-11-02	VIO	Failure to test 1RC-115 per TS, Paragraph M2.2
50-400/96-11-03	URI	MDAFWP manual initiation from ACP, Paragraph M2.2
50-400/96-11-04	NCV	Failure to properly complete emergency service water (ESW) surveillance, Paragraph M7.1
50-400/96-11-05	NCV	Failure to land lead in correct location for reactor auxiliary building (RAB) ventilation system, Paragraph M8.1
50-400/96-11-06	VIO	Failure to identify and correct deficiencies associated with deletion of ESW flow from AH-86 fans, Paragraph E1.1

Closed

50-400/96-11-04	NCV	Failure to properly complete ESW surveillance, Paragraph M7.1
50-400/96-11-05	NCV	Failure to land lead in correct location for RAB ventilation system, Paragraph M8.1

Discussed

50-400/96-022-00	LER	Wiring discrepancy found in RAB ventilation system circuitry, Paragraph M8.1
50-400/96-023-00	LER	Design deficiency in EDG protection circuitry, Paragraph E8.1
50-400/96-024-00	LER	Common mode failure in the RAB electrical equipment protection rooms ventilation system, Paragraph E8.2