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:	June 22 - August 2, 1997
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EXECUTIVE SUMMARY

Shearon Harris Nuclear Power Plant, Unit 1
NRC Inspection Report 50-400/97-08

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 radiation specialist, a regional reactor inspector, and a regional project engineer.

Operations

- The reactor tripped from 100 percent power at 2:56 a.m. on July 20, 1997 due to a failure of the turbine generator exciter. All safety-systems performed adequately. (Section O1.2)

- The post-trip review package was adequate. Plant Nuclear Safety Committee discussions about the package were good, but some attention to detail was lacking in that the package provided to the PNSC was not the final package ready for PNSC review and signature. (Section O1.3)

- Operator performance for the July 25 - 26, 1997 start-up was generally adequate. The synchronization to the grid was not as smooth as the previous start-up. (Section O1.4)

- The licensee performed adequate operations for the lifting, transporting, and unloading of a cask from the rail car to the spent fuel pool. (Section O1.5)

Maintenance

- Maintenance and surveillance testing observed were adequately conducted. (Sections M1.1 and M2.1)

- An apparent violation was identified for a programmatic problem concerning deficient Technical Specification surveillance testing procedures. (Sections M8.2 through M8.7)

- A Non-Cited Violation was identified against 10 CFR 50.73 for two late Licensee Event Reports associated with the apparent violation for TS surveillance procedure deficiencies. (Sections M8.2 and M8.4)

Engineering

- Two additional examples were identified where modification packages did not consider associated alarms during the design process. The affected alarms were the rod insertion limit alarm and a computer room ventilation alarm. These examples resulted in nuisance alarms in the control room. (Section E1.1)

- A deviation from the corrective action for violation 50-400/96-01-01 and Licensee Event Report 96-001-00 was identified in relation to not alarming Reactor Auxiliary Building Emergency Exhaust System doors as committed to. (Section E8.4)

Plant Support

- Primary and secondary chemistry parameters were maintained well within Technical Specification and licensee administrative limits. The water chemistry control program was effectively implemented. (Section R1.1)

- The licensee maintained an effective program to control radioactive effluents and thereby limited doses to members of the public to a small percentage of regulatory limits. The release of radioactive material to the environment was a small fraction of regulatory limits (Section R1.2)

- The radiological controls program was effectively implemented with good occupational exposure controls observed during normal plant operating conditions. (Section R1.3)

- One Non-Cited Violation was identified for failure to control contaminated material in accordance with procedure. (Section R1.3)

- The licensee implemented an effective program for packaging, preparation, and transport of radioactive material and conducted the program without incident. (Section R1.4)

- One violation was identified for failure to conduct 49 CFR 172 Subpart H training with training materials that matched current performance requirements. (Section R1.4)

- Fire protection equipment and activities observed were acceptable. The licensee was making progress in reducing the number of fire protection surveillances being performed in their grace period.

Report Details

Summary of Plant Status

Unit 1 began this inspection period at 100 percent power. The unit tripped from 100 percent power on July 20, 1997 due to a failure of the turbine generator exciter. The exciter was replaced and the unit went critical on July 25, 1997. Synchronization to the grid occurred on July 26, 1997. The unit reached 100 percent power the next day and continued 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; specific events and noteworthy observations are detailed in the sections below.

O1.2 Reactor Trip

a. Inspection Scope (93702)

The inspector reviewed plant response to the reactor trip from 100% power that occurred at 2:56 a.m. on July 20, 1997.

b. Observations and Findings

The inspector found that the trip was due to a turbine trip on generator lockout. This occurred due to a fault in the generator exciter. The Auxiliary Feedwater pumps started as designed on low-low level in all three steam generators. Operators responded to auxiliary feedwater flow when average reactor coolant system (RCS) temperature dropped below 557 degrees Fahrenheit by reducing flow to limit the cooldown as described in the Emergency Operating Procedure EPP-004, Reactor Trip Response, Revision 7. Average RCS temperature bottomed out at 547 degrees Fahrenheit. Numerous fans/air handlers and radiation monitors tripped due to the voltage transient that occurred with the generator problem. The inspector observed that operators responded to the alarms per the alarm response procedures and operating procedures.

c. Conclusions

All safety systems responded as designed. Operator response was in accordance with plant procedures.

01.3 Post-trip Review

a. Inspection Scope (71707)

The inspector reviewed the post-trip review for the reactor trip that occurred at 2:56 a.m. on July 20, 1997 to determine if the cause of the trip was addressed and if procedure OMM-004, Post-trip/Safeguards Actuation Review, Revision 8/2, was followed.

b. Observations and Findings

The inspector observed the failed main generator exciter and attended licensee meetings related to determining the cause of the exciter failure. The inspector observed that the licensee analyzed operating experience for other plants that have had exciter failures. In addition, the manufacturer of the exciter participated in the investigation. The inspector found that the reactor trip root cause discussions were thorough and were participated in by many levels of site management. A new exciter was purchased from the manufacturer and installed prior to startup.

The post-trip review addressed the cause of the reactor trip and the cause for the various equipment problems. The reactor trip was due to turbine trip on generator lockout. The equipment problems were due to the voltage transient caused by the exciter failure. The inspector found all alarms that occurred due to the trip adequately evaluated and explained in the post-trip review package. In addition, all equipment that stopped or changed state after the trip was adequately analyzed and explained in relation to the voltage transient.

The inspector found one administrative error in the Reactor Trip/Safeguards Actuation Report which is Attachment 1 to the post-trip review package. In Section 1.5, Annunciators, the reactor "first outs" were listed. One of the first outs was listed as ALB 12 4-3 (Alarm Light Box 12, window 4-3) and was described as "RX trip Power Range Hi Flux trip". The inspector confirmed that this alarm was not a power range high flux trip but a power range high flux rate trip, which was an expected alarm on a reactor trip due to the inward rod motion. This documentation error had no safety significance.

The inspector attended the Plant Nuclear Safety Committee (PNSC) meeting on July 30, 1997 where the post-trip review package was discussed. Procedure OMM-004 describes this review under Section 5.4, Follow-up Review. The PNSC's agenda was to review and approve the post-trip review package. The version reviewed by the PNSC did not contain the restart authorization signatures and did not contain the administrative correction described above that the inspector pointed out on July 25, 1997. The missing signatures were noted by several PNSC members, but the administrative error was not detected. The inspector observed that, despite the administrative errors, the discussions by the PNSC members were good and the cause of the trip and corrective actions were thoroughly discussed.

c. Conclusions

The inspector concluded that the post-trip review was adequate. PNSC discussions were good, but some attention to detail was lacking in that the package provided to the PNSC was not the final package ready for PNSC review and signature.

01.4 Unit Startup

a. Inspection Scope (71707)

The inspector observed the unit startup to determine if procedures were followed. Procedures GP-4, Reactor Startup (Mode 3 to Mode 2), Revision 16, and GP-5, Power Operation (Mode 2 to Mode 1), Revision 17, governed these activities.

b. Observations and Findings

The inspector observed that procedures were followed during the reactor startup. Reactor startup occurred on July 25, 1997 and the unit was synchronized to the grid on July 26, 1997. Synchronization was not as smooth as the last startup (June 9, 1997, described in Inspection Report 50-400/97-06). The inspector noticed that the synchronization was accomplished at about 6.5 percent indicated reactor power as compared to the 8-9 percent power on June 9, 1997. The inspector observed that operators were using diverse indications and controlling power based on the highest indication. Loop delta temperature was the highest indication of reactor power (8 percent) which was used for the synchronization instead of nuclear instrumentation. Synchronization at a higher power allows for a smoother transfer of steam demand from the condenser steam dumps to the turbine generator. The inspector observed that the turbine picked up approximately 60-65 megawatts instead of the planned 45 megawatts. The additional load also contributed to the rougher transfer.

The inspector also noted that operators kept feedwater regulating valves in manual until 30 percent power. These valves are normally placed in automatic at approximately 20 percent power. There were no particular problems identified with the performance of the valves during the startup. The inspector considered this an anomaly that was picked up by the oncoming shift, which immediately placed the valves in automatic.

c. Conclusions

Operator performance for the July 25 - 26, 1997 start-up was generally adequate. The synchronization to the grid was not as smooth as the previous start-up.

01.5 Spent Fuel Cask Unloading Operation

a. Inspection Scope (86700)

The inspectors observed portions of the spent fuel cask unloading operation (from the rail car to the spent fuel pool) to verify that the activities were performed in accordance with applicable procedures.

b. Observations and Findings

The licensee found an unreviewed safety question in regard to some steps of the cask operations as submitted in a letter dated March 14, 1997 and as reported in LER 97-004-00. During cask lifting and movement, an increase in radiation could occur if casks were dropped with only 4 of the 32 head closure bolts installed and/or with the valve covers removed. A cask drop without all 32 bolts installed and/or the valve cover protection in place was not analyzed and documented in the FSAR and became an unreviewed safety issue. The licensee evaluation was approved by NRC on June 26, 1997, allowing cask operations to resume. No procedure changes were required.

The procedures used in the unloading operation for the spent fuel casks transported from Robinson Nuclear Plant, another nuclear power plant of Carolina Power and Light Company, to Harris Nuclear Plant were:

- Procedure CM-M0300, Spent Fuel Cask Handling (IF-300 Cask), Rev. 20.
- Procedure FHP-014, Fuel and Insert Shuffle Sequence, Rev. 12
- Procedure FHP-040, RNP (Robinson) Spent Fuel Handling Operations, Rev. 2

The inspectors observed the licensee perform the following activities for the cask unloading:

- Lifting and transporting the cask from the rail car at the rail bay to the decontamination pit
- Preparation and radiation level survey for cask unloading
- Detention and removal of all but four cask head closure bolts, leaving one in each quadrant 90 degrees apart
- Lifting the cask from the decontamination pit into the isolated unloading pool
- Removing the cask closure head and storing it inside the decontamination pit
- Unloading the spent fuel assemblies through the transfer canals into the assigned cells in the spent fuel pool B

The licensee followed approved written procedures for the cask movement. The lifting, transporting, detensioning, and unloading of the cask proceeded without incident. The inspectors also reviewed the data recorded in the working copy of the procedures and found them to be adequate.

c. Conclusions

The inspectors concluded that the licensee performed adequate operations for the lifting, transporting, and unloading of the cask from the rail car to the spent fuel pool.

07.1 Licensee Self-Assessment Activities (40500)

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

- Plant Nuclear Safety Committee (PNSC) meetings on July 2, 1997; July 16, 1997 and July 30, 1997;
- Plant Review Meeting on July 31, 1997
- Condition Reports

Self-assessment activities were adequately performed. The Plant Review Meeting on July 31, 1997 was attended by upper level corporate management and was very probing in relation to site problems and the corrective actions being taken.

08 Miscellaneous Operations Issues (92901)

08.1 (Closed) VIO 50-400/96-11-01: Failure to follow procedure for chart recorder marking and temperature monitoring.

The inspector reviewed the licensee's response dated March 3, 1997 and reviewed the corrective actions taken. Example 1 related to chart recorders not marking and operators signing the chart during that period. Several felt tip pen installations were reviewed in inspection report 50-400/97-06. The felt tip pen modification improved the reliability of the marking pens. Several additional instances of not properly marking chart recorders was identified by the licensee's Nuclear Assessment Section on April 2, 1997 (CR 97-01417). Corrective action included counseling. The inspectors have observed improved performance by both operators and site management in relation to the recorder problems.

Example 2 involved operators not adequately responding to temperature monitoring alarms. The licensee revised procedure APP-111, Freeze Protection and Temperature Maintenance, Revision 8, procedure, OP-161.01, Revision 3, and procedure OMM-002, Shift Turnover Package, Revision 11, to provide definitive guidance to radwaste control room operators, main control room operators, and building operators. The guidance was to ensure that the building operator knew when alarms were

locked in so that more frequent monitoring of the temperature monitoring panels could be conducted. The inspector verified that these changes were made. The inspectors have also observed shift turnovers to verify that procedural requirements were implemented.

The number of logged operator workarounds increased from 13 to 39 shortly after the violation was identified indicating a new employee sensitivity to plant deficiencies.

This item is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707)

The inspectors observed all or portions of the following work activities:

- WR/JO 97-AGYJ1 "B" Emergency Service Water expansion joint replacement
- WR/JO 95-AKIB1 M-12 Digital Rod Position Indication problems
- WR/JO AGGY-001 "A" Charging/Safety Injection Pump (CSIP) speed changer coupling inspection
- WR/JO AKFR-002 Calibrate stop-auto-start differential pressure switch for "A" CSIP
- WR/JO AMPF-001 Inspect and Clean "A" Emergency Diesel Generator jacket water heat exchanger

b. Observations and Findings

The inspectors found the work performed under these activities to be professional and thorough. All work observed was performed with the work package present and in active use. Technicians were experienced and knowledgeable of their assigned tasks. The inspectors frequently observed supervisors and system engineers monitoring job progress, and quality control personnel were present whenever required by procedure. When applicable, appropriate radiation control measures were in place.

c. Conclusions

The maintenance observed was adequately conducted.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Surveillance Observation

a. Inspection Scope (61726)

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

- MST-I0151, Nuclear Instrumentation System Source Range N32 Calibration, Revision 5
- OST-1007, CVCS/SI System Operability Train A Quarterly Interval Modes 1-4, Revision 10
- OST-1073, 1B-SB Emergency Diesel Generator Operability Test Monthly Interval Modes 1-6, Revision 10
- MST-I0320, Train B Solid State Protection System Actuation Logic & Master Relay Test, Revision 15

b. Observations and Findings

The inspector found that the testing was adequately performed.

c. Conclusions

The surveillance performances were adequately conducted.

M8 Miscellaneous Maintenance Issues (61700, 92700, 92902)

M8.1 (Closed) LER 50-400/95-015-00: Failure to identify Engineering Safety Features response time testing requirements during a modification to the flow control valve circuitry for the Motor Driven Auxiliary Feed Water pumps.

This LER discussed the failure to perform required response time testing for the motor-driven auxiliary feedwater (MDAFW) flow control valves after they were modified in 1994 to include an automatic open feature upon receiving an Engineered Safety Features Actuation System (ESFAS) signal. As a result of the new automatic feature, response time testing was required for these valves by Technical Specification 4.3.2.2. This item was discussed previously in NRC inspection report 50-400/96-01 at which time a Non-cited Violation was issued. The LER remained open at that time pending the licensee's completion and NRC inspectors' review of corrective actions. The licensee's corrective actions included revising procedures OST-1044, ESFAS Train A Slave Relay Test Quarterly Interval Modes 1 - 4 and OST-1045 ESFAS Train B Slave Relay Test Quarterly Interval Modes 1 - 4 to incorporate the testing. The inspectors verified that all corrective actions had been completed and that the valves responded satisfactorily during the most recent response time test in refueling outage 7. This LER is closed.

M8.2 (Closed) LERs 50-400/96-002-00, 96-002-02, 96-002-03, 96-002-04, 96-002-05, 96-002-06, 96-002-07, 96-002-08, 96-002-09, 96-002-10, 96-002-11, 96-002-12, and 96-002-13: Failure to properly perform Technical Specification surveillance testing.

(Open) LER 50-400/96-002-01: Failure to properly perform Technical Specification surveillance testing.

The technical aspects of the above LERs have all been discussed in detail in previous NRC inspection reports. They all involved long-standing deficiencies in the original procedures used to test safety-related logic circuits or, in a few cases, problems resulting from inattention to detail during the procedure change process. Collectively, these procedural deficiencies represented a programmatic problem. Since 1994, the licensee has reported to the NRC approximately 50 surveillance procedure deficiencies that resulted in Technical Specification violations.

Background

The licensee initially began finding problems with safety-related logic circuit testing in 1994. The earlier findings were few in number and were considered to be isolated cases. In mid-1995, the licensee discovered several examples of missed testing requirements prompting a comprehensive TS surveillance review which identified 36 additional reportable violations of TS surveillance requirements. These 36 examples were reported in LER 50-400/96-002 and its 13 supplements.

Many of the procedural deficiencies were caused by a lack of understanding of logic test requirements with respect to testing parallel or overlapping logic circuit paths. Many of the missed testing requirements were not explicitly described in the Technical Specifications (TS), but involved components whose operations were crucial to the function being tested, and were therefore implicit in the TS requirements. In some cases, where two or more independent circuits caused the same actuation, the licensee's procedures had not verified each circuit individually by isolating the other paths during the test. In other instances, components that received indirect actuation signals from auxiliary relays following master or slave relay actuations were not being verified to operate.

The NRC had issued previous enforcement actions for some of the findings including Violations 50-400/95-02-01 and 50-400/96-11-02. These violations were either NRC-identified (96-11-02) or required significant NRC involvement before the licensee implemented the appropriate corrective actions (95-02-01). As mentioned in paragraph M8.1 above, a Non-Cited Violation was issued in 1995 for failing to perform response time testing on MDAFW flow control valves following a 1994 modification to the valves.

The remaining 1994 and 1995 items were reported in LERs 50-400/94-001-00, 95-003-00, and 95-007-00. These involved a total of seven violations of TS surveillance requirements which were all licensee-identified and involved testing deficiencies that existed since the procedures were originally developed. In LER 50-400/95-007, the licensee committed to its comprehensive review of Technical Specification Surveillance Requirements. The three LERs were previously closed in Inspection Reports 50-400/96-10 and 50-400/97-06 after the licensee's corrective actions for the specific deficiencies were verified by the inspectors to be completed.

A total of 43 reported items appeared in LERs 50-400/94-001-00, 95-003-00, 95-007-00, 96-002-00, and related LER supplements. Forty-two of those were related to deficient surveillance test procedures. The following table list each reported TS violation and related TS requirement in order by LER number.

Item No.	LER	Item sequence for multiple examples in same LER included in parentheses (). Item sequence for LER 96-002 based on licensee's assigned numbers (1)-(35) for items reported in all 13 supplements. Description of Issue or item not tested:
1	94-001-00	Equipment drain isolation valve 1ED-121 was not verified to isolate during slave relay K623 testing in accordance with TS 4.3.2.1.
2	95-003-00	(1) Emergency service water room coolers AH-86A and AH-86B and related cooling coil isolation valves (1SW-1000, 1SW-1001, 1MP-70, and 1MP-71) were not tested by auxiliary starting contacts per TS 4.3.2.1.
3	"	(2) For screenwash valve 3SC-41, a portion of the circuit was not tested per TS 4.3.2.1 due to installation or removal of jumpers during test.
4	"	(3) Containment spray pump and containment spray suction valves (1CT-102 and 105) contacts were not properly verified to operate per TS 4.3.2.1.
5	"	(4) Main feedwater preheater bypass isolation valve solenoids were not tested per TS 4.3.2.1 by independent "A" and "B" train actuations.
6	"	(5) K601 slave relay for emergency diesel generators (EDGs) was not properly verified during Safety Injection (SI) actuation testing per TS 4.8.1.1.2.
7	95-007-00	Trip Actuation Device Operational Testing (TADOT) was not performed for 86UVX relay that started the turbine-driven auxiliary feedwater (AFW) pump as required by TS 4.3.2.1.

Item No.	LER	Item sequence for multiple examples in same LER included in parentheses (). Item sequence for LER 96-002 based on licensee's assigned numbers (1)-(35) for items reported in all 13 supplements. Description of Issue or item not tested:
8	96-002-00	Slave relay testing was not performed for high head SI pump alternate miniflow motor-operated valves (1CS-746 and 752) per TS 4.3.2.1.
9	96-002-01	(1) MDAFW pump FCV automatic open feature from slave relays K635 and K640 was not tested quarterly per TS 4.3.2.1 after feature was added in 1994.
10	"	(2) SI & Containment Spray manual actuation switches were not tested per TS 4.3.2.1 (due to their redundant switches being tested exclusively during each refueling outage).
11	"	(4) Loss-of-power isolation feature was not tested for six radiation monitors per TS 4.3.3.10.
12	"	(5) Overlap circuit for Fuel Handling Building ventilation actuation on high radiation signal from radiation monitor RM-FR-3567A-SA was not tested per TS 4.9.12.
13	96-002-02	(6) Control Room emergency filtration fans (R2-A and B) parallel paths from high radiation start circuit was not tested per TS 4.3.2.1.
14	"	(7) Thermal overload bypass feature was not verified per TS 4.3.2.1 for the Reactor Auxiliary Building electrical equipment room inlet isolation dampers (1CZ-7 and 8) associated with isolation from Control Room Ventilation Isolation Signal.
15	"	(8) TADOT for main feedwater pump trip on SI signal did not test partial section of wiring in accordance with TS 4.3.2.1, due to lifting leads or installing jumpers.
16	96-002-03	(9) For certain radioactive effluent monitors for building ventilation stacks, the channel out-of-service and Control Room alarm inputs were not tested in accordance with TS 4.3.3.11.
17	"	(10) Fourteen blocking relays (that block non-emergency control signals from actuating affected components) associated with sequencer panels were not tested per TS 4.8.1.1.2.
18	96-002-04	(11) Post-accident dampers (CV-D1,3,5, and 7) for containment building fan coolers were not verified full open (verified "not closed" instead) in accordance with TS 4.6.2.3.

Item No.	LER	Item sequence for multiple examples in same LER included in parentheses (). Item sequence for LER 96-002 based on licensee's assigned numbers (1)-(35) for items reported in all 13 supplements. Description of Issue or item not tested:
19	96-002-05	(12) A start-inhibit feature (before emergency sequencer load block eight) for the chilled water system chillers was not verified per TS 4.8.1.1.2.
20	"	(13) Chilled water chillers anti-recyle feature bypass was not tested per TS 4.8.1.1.2.
21	"	(14) For the containment spray automatic sump swapover logic, Refueling Water Storage Tank valve limit switch continuity was not tested for valves 1CT-102 and 105 in accordance with TS 4.3.2.1.
22	"	(15) Containment spray suction valves 1CT-102 and 105 actuation from relay K741 was not tested per TS 4.3.2.1 (only the K731 path was tested).
23	"	(16) Control Room Dampers (CK-D7-1 and 2; CK-D4-1 and 2; CK-D8-1 and 2; and CK-B11-1 and 2) were not tested from K603 relay [Control Room Isolation Signal (CRIS)] in accordance with TS 4.3.2.1.
24	96-002-06	(17) Computer room and communication room dampers were not tested on Control Room Isolation Signals in accordance with TS 4.3.2.1.
25	"	(18) Emergency Safeguards Sequencer (ESS) Block 2 and Block 4 start circuits for containment spray pumps were not verified independently per TS 4.8.1.1.2.
26	"	(19) Electrical breakers 1A3A and 1B3B were not verified to open following load shed from the ESS per TS 4.8.1.1.2.
27	"	(20) Gross Failed Fuel Detector isolation on SI actuation was not verified for valve 1CC-304 in accordance with TS 4.3.2.1.
28	96-002-05	(21) Computer and communication room dampers next to the main control room (CK-D11-1 and 2; CK-D12-1 and 2) were not verified properly during CRIS testing (verified "not shut" vs. "full open") in accordance with TS 4.3.2.1.
29	96-002-06	(22) Certain EDG loads were not calculated every 18 months per TS 4.8.1.1.2.f.8. However, the additional loads did not violate any design or FSAR limits for the EDGs.
30	"	(23) Several dampers with indirect signals from fans were not verified for control room area ventilation actuation in accordance with TS 4.8.1.1.2.f.

Item No.	LER	Item sequence for multiple examples in same LER included in parentheses (). Item sequence for LER 96-002 based on licensee's assigned numbers (1)-(35) for items reported in all 13 supplements. Description of Issue or item not tested:
31	96-002-07	(24) A inhibit interlock circuit was not tested for primary shield & reactor support fans per TS 4.8.1.1.2.f.
32	96-002-08	(25) Fuel Handling Building emergency damper automatic closure feature following high radiation was not tested for a parallel path involving indirect closure from fans E12 and E13 starting in accordance with TS 4.9.12.
33	96-002-09	(26) TADOT was not performed for 6.9KV emergency bus degraded grid voltage secondary relays in accordance with TS 4.3.2.1. Only primary undervoltage relays had been tested in the past.
34	"	(27) Emergency Safeguards Sequencer (ESS) LOCA-1 and LOCA-2 XS actuation relay contacts and the 2D-2E and 1E-1F reset contacts were not tested per TS 4.3.2.1.
35	96-002-10	(28) ESS timing between load blocks was not adequately verified per TS 4.8.1.1.2.f.3.
36	"	(29) Parallel start signals from either "A" or "B" train recirculation fans were not tested for computer and communication room inlet dampers CK-D7-1 and 2 in accordance with TS 4.3.2.1.
37	96-002-11	(30) Emergency Service Water pump room exhaust fans (E-88A and B) indirect start signal from temperature switch when greater than 90 degrees Fahrenheit was not tested in accordance with TS 4.8.1.1.2.
38	"	(31) Battery Room Exhaust Fans (E-28 and E-29) operation from a CRIS signal (following an SI actuation) was not tested in accordance with TS 4.3.2.1.
39	"	(32) An indirect start signal from AH-5A and 5B fans was not tested for the main control room normal supply inlet dampers (CZ-D1SA and D2SB) per TS 4.3.2.1.
40	96-002-12	(33) MDAFW pump pressure control valves were not verified per TS 4.7.1.2 to control pressure (at runout conditions) following AFW actuation. They were previously tested after flowrate had already been adjusted.
41	96-002-13	(34) Independent verification of Train "A" vs. Train "B" logic for tripping non-emergency containment building fans following a Phase "A" isolation (slave relay K622) was not performed in accordance with TS 4.3.2.1. This also involved valve 1SW-231.

Item No.	LER	Item sequence for multiple examples in same LER included in parentheses (). Item sequence for LER 96-002 based on licensee's assigned numbers (1)-(35) for items reported in all 13 supplements. Description of Issue or item not tested:
42	"	(35) Parallel circuit paths were not tested per TS 4.3.2.1 for slave relays actuating containment building ventilation isolation components, including dampers 1CP-4,7, and 10; and fans AH-82A and B, AH-81A and B, and E-5A and B.

The preceding table included 42 of the total 43 reported items. Of those 42, 39 involved procedures that were deficient since their initial development after the plant received its operating license. The other three were caused by plant personnel errors during the procedure revision process or because a plant modification package did not identify the appropriate testing requirements for a newly revised circuit. The one item not in the above table was reported in LER 50-400/97-006-01 as example number 3. That example involved a personnel performance issue which was unrelated to the surveillance procedure program issue. LER 50-400/96-002-01 will be reviewed separately at a later date in relation to surveillance performance issues.

Safety Significance

For the 42 procedure-related deficiencies listed in the table above, each circuit was either retested or evaluated as acceptable based on data from a previously run similar test or an actual event. In all of the retests, the circuits performed as required. Only one set of components (two containment cooler post-accident dampers) failed a retest, but those failures were due to lubrication and actuator sizing problems with the components themselves, and did not involve failed logic circuitry.

Regulatory Significance

With one exception, all of the 42 items were reported in accordance with requirements in 10 CFR 50.73. The one exception was an item (Example 21 in LER 50-400/96-002-05) for which the licensee identified that they missed the 30-day reporting requirement. The TS non-compliance was identified on February 26, 1996 and reported on May 16, 1996. The late LER was caused by personnel error within the organization responsible for communicating/resolving potentially reportable items generated from the comprehensive logic review. Proper corrective actions were taken for the late reported item. Failure to report the TS non-compliance within 30 days of identification was considered a violation of 10 CFR 50.73. 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 50-400/97-08-01).

The 42 logic circuit testing deficiencies were considered in the aggregate to represent a programmatic problem in the area of surveillance test procedures. This problem primarily existed because of a common misunderstanding of TS testing requirements among site personnel responsible for developing, reviewing, and revising the affected test procedures. This lack of understanding was carried forward through years of plant operation until industry generic communications and a heightened sense of awareness among licensee personnel resulted in the identification of several related findings in 1994 and 1995.

Technical Specification 6.8.1.a and Regulatory Guide 1.33, Appendix A, Section 8.b requires that written procedures shall be established, implemented, and maintained for each surveillance test, inspection, or calibration listed in the Technical Specifications. Technical Specification 4.0.1 requires that Surveillance Requirements shall be met during the Operational Modes or other conditions specified for individual Limiting Conditions for Operation unless otherwise stated in an individual Surveillance Requirement. This is further delineated in specific testing requirements located throughout Technical Specification Sections 3.0 and 4.0, Limiting Conditions for Operation and Surveillance Requirements. TS surveillance testing is an integral part of assuring that safety systems will perform their intended functions when called upon during an accident situation. The licensee's failure to establish adequate surveillance testing procedures to demonstrate that components and systems would perform their intended function was considered an Apparent Violation of Technical Specification 6.8.1.a (EEI 50-400/97-08-02).

The inspectors confirmed that corrective actions have been either completed or planned for all of the reported deficiencies. Those procedures needed before and during Refueling Outage 7 were revised prior to being used. Action items have been generated through the licensee's corrective action program for outstanding changes to procedures that will not be performed until Refueling Outage 8 (Fall 1998). All of the above LERs, with the exception of LER 50-400/96-002-01, are closed. As stated above, LER 96-002-01 will be closed upon further NRC review of the performance issues related to example 3.

The licensee's comprehensive review of logic circuits had been considered thorough by the inspectors in Inspection Report 50-400/97-03. The licensee has completed its review of logic circuit testing but is continuing with its comprehensive review of other Technical Specification Surveillance Requirements. Several Condition Reports have already been generated by this continuing review project. The inspectors will address each additional item as they are identified.

M8.3 (Closed) LER 50-400/96-007-00: Failure to perform Technical Specification surveillance testing in accordance with Specification 4.7.6.d.3.

This LER was associated with not performing pressure differential testing of all adjacent areas to the control room. The control room must be higher in pressure to assure that leakage during an accident will be out of the control room, not into it. The inspector reviewed the corrective actions which included testing the adjacent areas per procedure OST-9021T, Temporary Procedure to Measure Delta P between the PIC Room and Surrounding Areas, Revision 0, and revising procedure OST-1231, Control Room Emergency Filtration System, Revision 6. An additional problem was identified in that the computer room was capable of being pressurized, as described in the FSAR. However, this was in conflict with Technical Specification 3.7.6 in that the computer room was not included in the control room envelope. The computer room damper was failed shut to prevent pressurization and the area successfully tested. A temporary modification was developed to make this configuration change. The inspector reviewed ESRs 96-00275 and 97-00024 which supported making the temporary change. The ESRs were not prompt which resulted in the modification being identified as an additional item of concern in Violation 50-400/96-11-06 for using clearance tags as a temporary modification (Section E8.3). The temporary modification was completed prior to the end of Refueling Outage 7. The inspector verified that the corrective actions were completed.

The inspectors concluded that the item discussed in this LER represented a longstanding procedural deficiency with a similar root cause to that of the programmatic problem discussed in Section M8.2 of this report (licensee personnel not understanding the full scope of Technical Specification testing requirements and how they were implemented by procedures). The inspectors considered that this surveillance procedure deficiency was identified as a result of the licensee's overall increased awareness and sensitivity to literal compliance with Technical Specification surveillance requirements. Because of the similarities between this example and the issue discussed in Section M8.2, this violation of Technical Specifications is considered another example of Apparent Violation 50-400/97-08-02. The LER is closed.

M8.4 (Closed) LER 50-400/96-010-00, -01, and -02: Surveillance testing deficiencies that caused past entries into TS 3.0.3.

The original LER was previously discussed in Inspection Report 50-400/96-009. The LER described test procedure deficiencies that resulted in system alignments that rendered both trains of the Residual Heat Removal (RHR) system inoperable and both trains of the Containment Vacuum Relief System inoperable. The licensee's analysis of past operability concluded that these deficiencies had caused multiple inadvertent entries into TS 3.0.3. In the case of the RHR system, the test methodology incorporated into procedures in October 1992 resulted in cross-tying the two redundant "A" and "B" trains while verifying the backseat capability of the "A" train RHR pump discharge check valve.

The alignment could have resulted in a significant reduction in low head safety injection flow to the Reactor Coolant System in the event of an accident. Procedure OST-1008, 1A-SA RHR Pump Operability Quarterly Interval, Revision 8; and OST-1092, 1B-SB RHR Pump Operability Quarterly Interval, Revision 4, were both revised to eliminate the cross-connecting of the two RHR trains. In the case of the Containment Vacuum Relief System, a monthly relay actuation logic test for the Containment Ventilation Isolation System generated a signal which blocked the automatic containment vacuum relief function of both redundant vacuum breakers. The deficient test procedure (MST-I0417, Containment Ventilation Isolation Area Radiation Monitors Relay Actuation Logic Test, Revision 5) caused the Containment Vacuum Relief System to be inoperable for approximately 45 minutes during each monthly test. As a result of this finding, the procedure was revised to prevent the inoperability of both trains of the system simultaneously.

LER 50-400/96-010-01 discussed that the containment vacuum relief discrepancy was initially identified by operators in 1995. However, plant personnel then did not realize the reportability of short duration entries into TS 3.0.3 caused by surveillance testing. This item resurfaced while the licensee was investigating the RHR situation. The licensee took appropriate corrective actions for the missed reportability. The requirement of TS 3.0.3 were met. The failure to report the TS 3.0.3 entries caused by MST-I0417 when the problem was initially discovered in 1995 is considered a violation of the requirements of 10 CFR 50.73. This licensee-identified and corrected violation is being treated as the second example of Non-Cited Violation 50-400/97-08-01 discussed in paragraph M8.2 above, consistent with section VII.B.1 of the Enforcement Policy.

Concerning the procedural deficiencies, the inspectors concluded that each case was related to the programmatic surveillance procedure problem described in Section M8.2 above. Each case represented longstanding problems with surveillance procedure technical content due to the licensee's lack of understanding as to how these procedures implemented TS testing requirements. Because of the similarities, the items identified in LERs 50-400/96-010-00 through -02 are being included as additional examples of Apparent Violation 50-400/97-08-02. The LER and its supplements are closed.

M8.5 (Closed) LER 50-400/96-016-00: Failure to perform reactor trip bypass breaker surveillance testing required by Technical Specifications.

This LER was associated with testing the reactor trip bypass breaker's remote manual shunt trip feature with the breakers in service. Technical Specification (TS) Table 4.3-1 requires a remote manual shunt trip test prior to placing the reactor trip bypass breakers in service. Testing of the remote manual shunt trip at Harris had been previously conducted after the reactor trip bypass breakers were racked into the connected position and closed. FSAR section 7.2.2.2.3.10 contained conflicting wording regarding the testing. The inspectors reviewed the corrective action which included procedure revision, FSAR clarification

and event review with Maintenance and Operations personnel. Procedures MST-I0001 (MST-I0320), Train A (B) Solid State Protection System Actuation Logic and Master Relay Test, Revision 10(11) and OP-104, Rod Control System, Revision 11 were revised to implement this TS requirement. The inspector verified that the corrective actions were adequately completed.

The inspectors concluded that the item discussed in this LER represented a longstanding procedural deficiency with a similar root cause to that of the programmatic problem discussed in Section M8.2 of this report (licensee personnel not understanding the full scope of Technical Specification testing requirements and how they were implemented by procedures). The inspectors considered that this surveillance procedure deficiency was identified as a result of the licensee's overall increased awareness and sensitivity to literal compliance with Technical Specification surveillance requirements. Because of the similarities between this example and the issue discussed in Section M8.2, this violation of Technical Specifications is considered another example of Apparent Violation 50-400/97-08-02. The LER is closed.

M8.6 (Closed) LER 50-400/96-009-00: Reactor Auxiliary Building Emergency Exhaust System testing deficiency.

This LER was associated with a failure to verify that Reactor Auxiliary Building Emergency Exhaust System (RABEES) maintained a negative pressure greater than or equal to 1/8 inch water gauge in the Charging/Safety Injection Pump (CSIP) Rooms as required by TS 4.7.7.d.3. On May 30, 1996, it was discovered that no pressure sensing taps were located in the CSIP Rooms and past testing had not verified this TS requirement. An additional concern was identified in that the Waste Processing Building and Fuel Handling Building normal ventilation exhaust fans had been running during previous testing which aided the RABEES system in maintaining RAB negative pressure. Corrective action included procedure revision, retesting, and evaluating the acceptability of the Reactor Auxiliary Building (RAB) differential pressure indication installed in the main control room. Procedure OST-1052, RAB Emergency Exhaust System Operability 18 Month Interval All Modes, Revision 7/1 was revised and retesting was performed. The retesting was described in NRC Inspection Report 50-400/96-05. The evaluation of the main control room RAB differential pressure installed instrumentation concluded that the instrumentation should not be used for TS surveillance verification. Instead, local manometer instrumentation should be used for TS 4.7.7.d.3 verification. The inspectors reviewed the corrective actions which were adequately completed.

The inspectors concluded that the item discussed in this LER represented a longstanding procedural deficiency with a similar root cause to that of the programmatic problem discussed in Section M8.2 of this report (licensee personnel not understanding the full scope of Technical Specification testing requirements and how they were implemented by procedures). The inspectors considered that this surveillance procedure deficiency was identified as a result of the licensee's overall

increased awareness and sensitivity to literal compliance with Technical Specification surveillance requirements. Because of the similarities between this example and the issue discussed in Section M8.2, this violation of Technical Specifications is considered another example of Apparent Violation 50-400/97-08-02. The LER is closed.

M8.7 (Closed) LER 50-400/96-011: Inadequate surveillance procedures failed to provide a means for identifying deactivated automatic containment isolation valves which are to be subjected to verification every 31 days in accordance with Technical Specifications.

This LER was previously discussed in Inspection Report 50-400/96-09. The licensee identified and reported the failure to verify the deactivated shut status of two containment isolation valves, 1FW-221 and 1FW-223, on a monthly basis as required by Technical Specification (TS) Surveillance Requirement 4.6.1.1.a. Valve 1FW-221 had failed a stroke time test in December 1995 and, along with 1FW-223, was deactivated shut at that time to comply with TS 3.6.3 requirements. In June of 1996, an operator questioned whether the monthly verification procedure had included these valves. The licensee discovered that the monthly surveillance procedures (OST-1029, Containment Penetration Outside Isolation Valve Verification Monthly Interval, Modes 1-6; and OST-1069, Containment Building Penetration Inside Manual Isolation Valve Verification Quarterly Interval, Mode 5) which implemented TS 4.6.1.1.a did not include those motorized valves that were deenergized shut to comply with the TS 3.6.3 requirement. Upon discovery, the licensee revised the test procedures, along with plant procedure PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report, which now include the requirement to verify the valves' deactivated shut status every 31 days. The licensee found no other examples of this situation occurring with other valves.

The missed surveillances were caused by the licensee's misinterpretation of the requirement contained in TS 4.6.1.1.a. The error occurred during initial procedure development and was brought forward through numerous procedure revisions. The inspectors concluded that this example was representative of the programmatic problem discussed in report sections M8.2 through M8.6, concerning the licensee's earlier lack of understanding of Technical Specification requirements. Accordingly, the inspectors considered this issue to be another example of Apparent Violation 50-400/97-08-02 discussed in the aforementioned report sections. The LER is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Engineering Design Inputs

a. Inspection Scope (37551)

The inspector reviewed numerous Engineering Service Requests (ESRs) during review of corrective actions for various open items. These ESRs were reviewed against the requirements in procedure EGR-NGGC-0005, Engineering Service Requests, Revision 4, to determine if procedures were followed.

b. Observations and Findings

The inspector observed two additional examples of the ESR implementation weakness identified in Inspection Report 50-400/97-06, Section E1.1. Section 01.5 of that same report identified that a rod insertion limit alarm had not cleared during the start-up. The licensee investigated the cause during this inspection period and found that during the core design for fuel cycle 8 the park position for the rods was changed to 225 steps as a control rod wear distribution step. During this process, procedure PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report, Revision 15, was changed to include the 225 step park position. These changes did not consider the rod insertion limit alarm reset point at 225.5 steps and is considered an additional example of the weakness where a design input/alarm was not considered during the design change.

Section E8.3 pertaining to the closure of violation 50-400/96-11-06, discusses another example in relation to an alarm in the control room caused by ESR implementation. ESR 9700024, related to computer room ventilation, caused a nuisance alarm in the control room which necessitated a field change for correction.

c. Conclusions

The inspector concluded that the additional examples of not considering alarms as design inputs when designing modifications caused additional nuisance alarms.

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 (325 by the end of the inspection period). The results from this program will be reviewed in the closure of Unresolved Item 50-400/96-04-04, Tracking FSAR Discrepancy Resolution. The inspectors did not find any additional discrepancies other than those identified by the licensee.

E8 Miscellaneous Engineering Issues (92700, 92903)

E8.1 (Closed) VIO 50-400/96-10-01: Failure to promptly submit a Technical Specification change for main reservoir level.

The inspector reviewed the licensee's responses dated January 20, 1997 and February 7, 1997. The corrective actions included submitting a Technical Specification change request (October 31, 1996) for main reservoir level, reviewing other technical specification interpretations (TSIs), revising procedure AP-107, Technical Specification Interpretations, a lessons learned review for licensing personnel, and a review of the new emergency service water "A" pump after installation to determine if an additional license amendment was needed. One other TSI was identified in the response as needing a license amendment, and was submitted on February 18, 1997.

The inspector reviewed procedure, AP-107, Revision 11, and found that the changes incorporated included the performance of a 10 CFR 50.59 review for TSIs and included words that TSIs may not be used to meet 10 CFR 50.36 instead of submitting a license amendment. The inspector reviewed the licensee's TSI review program (TSI Action Plan, Revision 5, July 16, 1997) which currently projects to reduce the number of TSIs from 29 (at time of violation) to approximately 6. The licensee was performing 10 CFR 50.59 reviews for all existing TSIs. This has resulted in 2 LERs (97-008 and 97-011). The inspector noted that two additional Technical Specification changes had been submitted as a result of this effort, and that three additional ones were projected to be submitted.

The inspector reviewed the performance of the new "A" Emergency Service Water pump in NRC Inspection Report 50-400/97-06. The licensee had committed in the February 7, 1997 supplemental response to submit a license amendment if the new pump did not meet the projected performance. A license amendment will not be needed per Engineering Service Request 9700428, Revision 0.

The inspector reviewed the corrective actions taken and concluded that this violation had been corrected. This item is closed.

E8.2 (Closed) VIO 50-400/96-10-02: Failure to provide an up-to-date FSAR amendment for main reservoir level.

The inspector reviewed the licensee's response dated January 20, 1997 and reviewed the corrective actions taken. FSAR change request Review Approval Form (RAF) 2180 was approved November 22, 1996 which adequately addressed the FSAR changes necessary to correct the violation. The inspector verified that RAF 2180 would be incorporated in the next FSAR annual submittal (amendment 48). This item is closed.

E8.3 (Closed) VIO 50-400/96-11-06: Failure to identify and correct deficiencies associated with deletion of ESW flow from AH-86.

The inspector reviewed the licensee's response dated March 3, 1997 and reviewed the corrective actions taken. OMM-014, Operation of the Work Control Center, Revision 15, was revised to include in the quarterly clearance audit the requirement to write a condition report for clearances that are more than three months old. The system engineer was required to evaluate these items through the condition reports. The inspector verified that this requirement was being complied with. The audits had identified several items that were similar to the AH-86 item and the response committed to having those resolved prior to the completion of Refueling Outage 7. The inspector verified that these were completed and the clearance tags removed. During review of these items the inspector noted an additional example of a weakness identified in IR 50-400/97-06 with ESR implementation associated with consideration of alarms during design changes. During review of the corrective actions, the inspector noted that a field change to ESR 9700024 resulted from not considering an alarm during the design change process. As a result, the modification caused a nuisance alarm in the control room which necessitated the field change. The ESR field change adequately corrected the nuisance alarm. The inspector concluded that the corrective actions for the LER issue were adequately completed. This item is closed.

E8.4 (Closed) VIO 50-400/96-01-01: Inadequate corrective actions for improper control of RABEES doors.

The inspector reviewed the licensee's response dated April 8, 1996, LER 50-400/96-001-00, and reviewed the corrective actions taken. The cause of the violation was attributed to inadequate controls to ensure that the doors are closed or properly controlled. The corrective action was to install a modification to provide alarming capability for the RABEES boundary doors by September 30, 1996. The inspector verified that the modification to alarm certain RABEES boundary doors had been completed and the alarms were functional. No other examples of RABEES doors being blocked open have occurred since completion of the modification. However, not all RABEES doors were provided with the alarms. The inspector found that the doors to the charging/safety injection pump rooms, RHR heat exchanger rooms, and the door from the Reactor Auxiliary Building (RAB) 236-foot elevation mechanical penetration room to the north hallway were not alarmed, but were locked.

The inspector found that the root cause investigation was approved the same day that LER 50-400/96-001 was signed. The inspector reviewed ESR 95-00979 which installed the alarms and found that the ESR provided for the doors to be locked rather than alarmed. The locking was accomplished under ESR 9600199. The failure to provide alarms for all RABEES doors as committed to in the violation response and LER 50-400/96-001-00 is identified as a Deviation from a written commitment (50-400/97-08-03).

The inspector questioned how locking the RAB 236-foot elevation mechnical penetration room door would address this issue since access to this area could be obtained from unlocked doors in the personnel air lock area and the sample sink area. This item is adequately addressed in the licensee's supplemental response to the initial violation, which was received after the end of this inspection period. This item is closed.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Water Chemistry Controls

a. Inspection Scope (84750)

The inspectors evaluated the licensee's water chemistry control program for maintaining reactor coolant system chemistry parameters within Technical Specification (TS) requirements. The licensee's water chemistry program was evaluated against the specific requirements of TS 3.4.7 (Tables 3.4-2 and 3.4.8) which specify the concentration limits for dissolved oxygen (DO), chloride (CL), fluoride (FL) and dose equivalent iodine (DEI) in the Reactor Coolant System (RCS). The water chemistry program was also evaluated against the requirements of TS Tables 4.4-3 and 4.4-4 which specify required surveillance frequencies.

b. Observations and Findings

The licensee's water chemistry control procedures included provisions for sampling and analyzing reactor coolant at the prescribed frequency for the parameters required to be monitored by TSs. Action levels and responses for out of limit chemistry parameters were also reviewed. The licensee's water chemistry procedures included provisions for monitoring water quality based on established industry guidelines and standards. The inspectors noted that licensee procedures specified the sampling frequency and typical values for each parameter to be monitored. Action levels applicable to various operational modes were given where appropriate. Guidance was also provided for actions to be taken if analytical results exceeded prescribed limits. The inspectors determined that the licensee's procedures were consistent with applicable TS requirements.

The inspectors reviewed chemistry statistical analysis reports, primary chemistry data, related data trend plots, and records of analytical results for selected parameters at power operations and at shutdown during the period January 1, 1996 through June 24, 1997. The parameters selected included dissolved oxygen, fluorides, chlorides, sulfates, boron, and dose equivalent iodine-131. A review of chemistry data disclosed that the licensee had an elevated RCS sulfate sample during the recently completed refueling outage RFO-7. Although within administrative limits {118 parts per billion (ppb) sample value versus 150 ppb limit}, upon investigation, the elevated reading was explained based on a specimen cup used for sample dilution that was a source of sulfate cross contamination. Dissolved oxygen reached a high level of 800 ppb during RFO-7, which exceeded the TS limit applicable during modes 1-4 of power operations of 100 ppb. The elevated level was permitted, however, during refueling when the RCS was open to atmosphere. The licensee also entered administrative action levels for primary and secondary water chemistry, in accordance with administrative procedures, on several occasions during the period of review with small variances from normal parametric values indicated during power operations. In each of these cases evaluated by the inspector, the licensee was able to provide an adequate basis for the RCS anomaly such as a reactor trip, expended cleanup filters, or a planned reactor evolution that affected water chemistry values. All anomalous values were determined to be within TS or administrative limits.

c. Conclusions

Primary and secondary chemistry parameters were maintained well within TS and licensee administrative limits. The licensee's water chemistry control program for maintaining water quality was effectively implemented.

R1.2 Annual Radioactive Effluent Release Report

a. Inspection Scope (84750)

TS 6.9.1.4 required the licensee to submit an Annual Radioactive Effluent Release Report covering liquid and gaseous effluent releases resultant from facility operations during the prior year of operation. In addition to activity released in liquid and gaseous effluents, the report provided required estimates of radiation doses to members of the public from effluents released to unrestricted areas. The inspector evaluated the licensee's effluent release program to determine if the licensee had implemented an effective program to monitor and control radiation doses associated with effluent releases. Data on solid radwaste shipments was also provided in the report and evaluated.

b. Observations and Findings

The inspectors evaluated report feeder data to identify adverse effluent trends, identify increases in estimated doses to the public from effluents, if any, and explain these variances in the context of

operational experience. The inspector evaluated supporting raw data for effluent release reports covering 1996 and 1997 through May with emphasis on identifying elevated release trends or data anomalies. As shown in the effluent release summary below, the amount of activity released during 1996 and 1997 through May in liquid effluent streams remained relatively stable at low levels, and well within regulatory release limits. The amounts of activity released during 1996 as fission gases, iodines, and particulates in gaseous effluents were also at low levels and within release limits. Minor variances in gaseous effluent parameters within operational limits were identified between 1996 and 1997 indicative of normal steady state power operations. No abnormal releases were identified during the period. However, one unplanned release occurred in March 1997 when the licensee failed to maintain a negative pressure for 46 hours in the reactor auxiliary building. The calculated release to the environment through auxiliary building penetrations amounted to a relatively low 1.788E-3 curies of predominantly noble gases. Licensee corrective actions were found to be appropriate.

Harris Radioactive Effluent Release Summary

	1996	1997(to 5/31)
Abnormal Releases		
Liquid	0	0
Gaseous	0	0
Activity Released (curies)		
a. Liquid		
1. Fission and Activation Products	6.00E-02	2.96E-02
2. Tritium	4.61E+02	1.76E+02
3. Gross Alpha	<LLD	<LLD
b. Gaseous		
1. Fission and Activation Products	4.29E+01	1.74E+01
2. Iodines	9.53E-07	8.25E-06
3. Particulates	4.04E-05	1.36E-04
4. Tritium	2.50E+01	7.80E+00

The January 1996 through May 1997 data indicated above was trended against data from the years 1991 through 1995. This analysis indicated either a stable or gradually declining trend in liquid and gaseous releases with no significant anomalies identified. Slight variances were explained adequately by the licensee based on operational history. Tritium release levels, which remained well within limits, were slightly elevated in 1996 when compared with 1995 liquid release levels, but remained well below the approximate 1000 curies of tritium released in liquid effluents in 1994. Although tritium releases are within regulatory limits, the licensee recognized elevated concentrations of tritium in Harris Lake as an area for improvement and initiated a Radioactive Effluent Reduction Plan approved for implementation on

July 31, 1996. The objective of this plan is to significantly reduce detectable radioactivity in Harris Lake to include Tritium. The licensee's goal is to reduce concentrations in Harris Lake from the current approximate 4000 picocuries per liter to 900 picocuries per liter by the end of 1999. Short-term tritium reduction strategies were judged by the inspector to be reasonable and included recycling tritium back into the plant and restricting releases of tritiated liquids to periods of high rainfall in order to benefit from dilution factors.

The inspectors evaluated for 1996 and 1997 through May the maximum annual dose estimates to the public from gaseous and liquid effluent streams. Dose limits are provided in the TS and include a limit of 3 millirem for the total body from liquid effluents, 10 millirem for the liquid critical organ dose, and 15 millirem for the airborne critical organ dose. Doses were calculated by the licensee in accordance with the methodology in the licensee's Offsite Dose Calculation Manual (ODCM) as a function of the release point, the isotopic mix, total curies released, and exposure pathways. All calculated doses from liquid and gaseous releases were determined to be less than 1 percent of applicable TS dose limits. The licensee also achieved reductions in doses for all dose pathways during 1996 over 1995 and offsite doses were generally on a favorable reducing trend.

The licensee has undertaken initiatives to reduce solid radwaste volume during 1996 and 1997. Ongoing efforts in radwaste include radwaste volume reduction and minimization initiatives. The licensee is currently shipping most of its low level radwaste offsite for processing and volume reduction due to the unavailability of offsite low level radwaste storage for radwaste generators in North Carolina. During 1996, licensee operations resulted in a relatively low 4.16 cubic meters of solid radwaste (62 curies) for interim storage onsite after processing. This was reduced from 9.059 cubic meters (77 curies) during 1995. This radwaste was processed offsite and returned to the licensee for interim storage until final disposition. The inspector noted that current radwaste performance resulted in continued reduction in radwaste generation overall. However, during the recently completed RFO-7 refueling outage, the licensee exceeded its goal for solid radwaste volume generated (136 cubic meters generated against a goal of 89 cubic meters). This was due primarily to an unanticipated extended outage duration with expanded outage scope.

c. Conclusions

The licensee maintained an effective program to monitor and control liquid and gaseous radioactive effluents and thereby limited doses to members of the public to a small percentage of regulatory limits. The release of radioactive material to the environment from liquid and gaseous effluents for 1996 and 1997 through May 31 was a small fraction of the 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits.

R1.3 Radiological Controls During Power Operations

a. Inspection Scope (83750)

The inspectors evaluated the adequacy of licensee radiological controls with emphasis on external occupational exposure controls during normal plant operations. Areas inspected included radiation area postings, radiation work permit controls, and effectiveness of the As Low As Reasonably Achievable (ALARA) program. The inspector toured the radiation controlled area (RCA) and observed compliance of licensee personnel with radiation protection procedures for routine work evolutions.

b. Observations and Findings

The inspectors verified observed controls for external occupational exposures met applicable regulatory requirements and were designed to maintain exposures ALARA. The inspector reviewed several radiation work permits (RWPs) utilized to control ongoing work within the RCA and noted that the controls observed were appropriate for the described tasks and radiological conditions. Interviews were conducted with radiation workers in order to determine the level of understanding of radiation work permit requirements from a representative cross-section of plant workers. The workers interviewed were verified to have signed onto an RWP, were wearing dosimetry appropriate to their work activities within the RCA in accordance with plant procedures, and were performing specific work activities on appropriate RWPs. The workers generally demonstrated a good knowledge of RWP requirements and of radiological working conditions.

The inspectors noted good posting practices throughout the plant. During a tour of the spent fuel pool the inspector observed no items hanging from the side of the pool and good radiological controls in place in this area overall. During peak traffic periods radiation workers were observed exiting the RCA in accordance with procedures for frisking out of the RCA to include properly clearing small articles with the small articles monitor. Pre-job RWP work planning and ALARA briefings for observed ongoing work evolutions were found to be conducted in an effective manner. During tours of the plant, the inspectors observed Radiological Control technicians performing radiation and contamination surveys in accordance with procedure. Also, during inspection of the tool issuance rooms, good controls for slightly contaminated tools inside the RCA were noted. The licensee's ALARA program overall continues to be effective in achieving reductions in site exposure during normal power operations. However, during refueling outage RFO-7, the licensee incurred 135.09 person rem outage dose which exceeded the outage goal of 121.40 person rem. This was attributable to unanticipated expanded outage duration and growth in scope.

During a routine plant walkdown the inspector observed a 55-gallon drum of miscellaneous scaffold parts located in the hallway outside the gas decay tank valve gallery of the 236-foot elevation of the waste processing building. The drum was open, not controlled or labelled as radioactive material, and was readily accessible to workers passing through or working in the area. Upon survey, two scaffold knuckles were identified that had removable surface contamination (5000-6000 dpm/100 sq. cm.) which exceeded the procedural limit of 1000 dpm/100 sq. cm. as specified in HPS-NGGC-0003, Radiological Posting, Labeling and Surveys, Rev. 2, Paragraphs 3.4 and 9.1.7. HPS-NGGC-0003 requires contaminated material with these levels of removable surface contamination to be controlled as contaminated material in a posted Contamination Area. Another scaffold knuckle was identified that had 12000 dpm/100 sq.cm. fixed contamination that was not controlled in accordance with paragraph 9.2.4 of the same procedure. The licensee issued a condition report on these NRC-identified adverse conditions (CR 97-03207 dated 6/24/97) and took prompt actions to correct these contaminated material control discrepancies. Licensee actions included a full sweep of the RCA to confirm if any other examples of improperly controlled radioactive material could be identified and none were. Based on the licensee's corrective actions, the relatively low safety significance of the contaminated material control discrepancies identified, this failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation consistent with Section IV of the NRC Enforcement Policy. This is designated NCV 50-400/97-08-04: Failure to control contaminated material in accordance with procedure HPS-NGGC-0003.

c. Conclusions

The radiological controls program was being effectively implemented with good occupational exposure controls observed during normal plant operating conditions. One non-cited violation was identified for failure to control contaminated material in accordance with procedure.

R1.4 Transportation of Radioactive Material

a. Inspection Scope (86750, TI 2515/133)

10 CFR Part 71 established the requirements for packaging, preparation for shipment, and transportation of licensed material. 10 CFR Part 71.5 required the licensee to comply with the applicable requirements of the Department of Transportation (DOT) in 49 CFR Parts 170 through 189 when transporting licensed material outside of the confines of the plant. The inspector evaluated the licensee's transportation of radioactive materials program for implementation of these requirements as well as implementation of the revised 49 CFR Parts 100 through 179 and 10 CFR Part 71.

b. Observations and Findings

The inspectors evaluated the licensee's preparation of packages for transport and discussed applicable procedural controls with the licensee for shipments conducted during 1996 and 1997 through the end date of inspection. The inspectors evaluated detailed checklists prepared by the licensee at the time of shipments to ensure proper packaging, labeling, and placarding of vehicles had occurred prior to shipping radioactive material offsite. The inspectors determined, based on a sample of shipments conducted, that provisions for marking and labeling packages and for placarding vehicles were in accordance with the requirements. The inspector determined that licensee procedures included provisions for performing required surveys and for assuring that the radiation and contamination limits were met for each package offered for shipment. The inspectors reviewed the licensee's records for several shipments of radioactive material and found that those records indicated the required surveys had been performed and the radiation and contamination limits had been met. The inspectors determined that the licensee's procedures included provisions for preparing shipping papers and manifests in accordance with the above requirements and for recording the required information thereon. The inspectors reviewed the shipping papers for selected shipments of radioactive materials and determined that they had been prepared in accordance with procedure.

Licensee procedures for shipping radioactive materials included provisions for providing drivers with required instructions and the inspector verified shipping papers for selected shipments included a copy of those instructions. Interviews with two drivers for resin shipments that occurred during the period of inspection were conducted. It was determined during these interviews that the drivers were adequately knowledgeable of emergency response procedures although more in depth knowledge would enhance their response in the event of an accident. The inspectors determined that the licensee's procedures for shipping radioactive materials included provisions for making the required advance notifications and that the licensee's records for selected shipments included copies of the forms used to make the required notifications. The inspectors reviewed selected shipping records and determined that the required information was being retained as required. The licensee classified and characterized waste shipments through the use of the current release of RADMAN computer software. Radionuclide concentrations and physical description data for packaged waste were input to the computer and the program generated a manifest form. The printed manifest form included the information required to be included on waste manifests and the certifications that the waste had been properly classified, described, packaged, marked, and labeled; and were in proper condition for transport in accordance with applicable State and federal regulations.

Concurrent with this evaluation of the licensee's implementation of transportation and shipping programs, the inspector verified that the licensee had revised their procedures to be consistent with the revised DOT and NRC transportation regulations. This evaluation included a review of training and qualification of personnel on the new regulations, changes made to the licensee's procedures for the processing and packaging of low specific activity (LSA) and surface contaminated objects (SCO), the use of the international system of units (SI), expansion of the radionuclide list and related changes in limits, and use of the transport index and related changes in fissile material classification.

The inspectors reviewed training materials prepared by the licensee to comply with the requirements of 49 CFR Part 172, Subpart H, Section 172.704, Training Requirements, which specified that hazmat employee training shall include general awareness/familiarization training. The inspector reviewed the training material entitled "DOT Hazardous Material General Awareness Training," designated lesson number EV601G, and determined that it met the scope and intent of the training requirement but that the training had not been updated or made current with the revised transportation rule which was effective April 1, 1996. Specifically, the training did not contain any reference to SI units or to revised definitions such as LSA or to any other aspect of the revised transportation rule needed to provide radiation workers with a general awareness of the basic changes to the transportation rule. The inspector had verified that all radioactive material receipt and shipping procedures being utilized in the plant had been revised prior to the effective date of the new transportation rule to incorporate the performance requirements of the new rule. The inspectors verified that the licensee had conducted training of hazardous material workers during 1997 that used the out-of-date lesson plan and training materials. The finding that training being provided to workers was not current or updated with current plant implementing procedures was contrary to the requirements of Plant Operating Manual, Volume 8, Part 1, Procedure Number TPP-100, "Conduct of Training", Rev. 4, Paragraph 5.2.5.c, which states that training shall be conducted using current training materials that match job knowledge and/or performance requirements. The licensee was informed that the failure to conduct training using current training materials that match performance requirements was a violation of a procedural requirement. This is designated Violation 50-400/97-08-05, Failure to conduct training using current training materials.

c. Conclusions

The licensee implemented an effective program for packaging, preparation, and transport of radioactive material and had conducted the program without incident during the period reviewed. One violation was identified for failure to conduct training using current training materials that matched current performance requirements.

R8 Miscellaneous Plant Support Issues (92904)

R8.1 (Closed) URI 50-400/97-300-03: Placing contaminated items outside HP boundary

The inspectors reviewed posting and procedural upgrades completed by the licensee in response to an NRC concern that small articles that cleared the small article monitors (SAMs) at the RCA exit are placed across the RCA boundary prior to the worker's hands being checked for contamination. The inspectors did not identify any examples where contaminated items were improperly released from the RCA. However, this practice could have resulted in loose contamination outside the RCA. The licensee revised plant procedures and upgraded postings at the SAM to require hand frisking while small articles were being monitored and prior to moving SAM cleared articles outside the RCA boundary. The inspector observed radiation worker compliance with the new procedure and determined that these upgrades adequately address the NRC concern. This item is closed.

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. During the conduct of tours the inspector noted a security guard that was less than fully alert on the top of the reactor auxiliary building. The licensee wrote CR 97-03736 and counselled the individual. Compensatory measures were posted when necessary and properly conducted.

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 inspector observed that the licensee was making progress in reducing the number of fire protection surveillances being performed in their grace period (IR 50-400/97-04, Section F7).

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 August 4, 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. 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, Maintenance
J. Dobbs, Manager, Outage and Scheduling
J. Donahue, Director Site Operations, Harris Plant
J. Eads, Supervisor, Licensing and Regulatory Programs
R. Duncan, Superintendent, Mechanical Systems
W. Gurganious, Superintendent, Environmental and Chemistry
M. Hamby, Supervisor, Regulatory Compliance
M. Keef, Manager, Training
D. McCarthy, Superintendent, Outage Management
B. Meyer, Manager, Operations
K. Neuschaefer, Superintendent, Radiation Protection
W. Peavyhouse, Superintendent, Design Control
W. Robinson, Vice President, Harris Plant
G. Rolfson, Manager, Harris Engineering Support Services
D. Tibbitts, Manager, Nuclear Assessment

NRC

V. Rooney, 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 61700:	Surveillance Procedures and Records
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 83750:	Occupational Radiation Exposure
IP 84750:	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86700:	Spent Fuel Pool Activities
IP 86750:	Solid Radioactive Waste Management and Transportation of Radioactive Materials
IP 92700:	Onsite Followup of Events
IP 92901:	Followup - Plant Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering
IP 92904:	Followup - Plant Support
IP 93702:	Onsite Response to Events
TI 2515/ 133:	Implementation of Revised 49 CFR Parts 100-170 and 10 CFR Part 71

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-400/97-08-01	NCV	Failure to provide Licensee Event Report within 30 days for missed technical specification surveillance. (Sections M8.2 and M8.4)
50-400/97-08-02	EEI	Surveillance Procedure Program breakdown. (Sections M8.2 through M8.7)
50-400/97-08-03	DEV	Failure to provide alarms for RABEES doors as committed to in VIO 50-400/96-01-01 and LER 50-400/96-001. (Section E8.4)
50-400/97-08-04	NCV	Failure to control contaminated material in accordance with procedure HPS-NGGC-0003. (Section R1.3)
50-400/97-08-05	VIO	Failure to conduct training using current training materials. (Section R1.4)

Closed

50-400/97-08-01	NCV	Failure to provide Licensee Event Report within 30 days for missed technical specification surveillance. (Sections M8.2 and M8.4)

50-400/97-08-04	NCV	Failure to control contaminated material in accordance with procedure HPS-NGGC-0003. (Section R1.3)
50-400/96-01-01	VIO	Inadequate corrective actions for improper control of RABEES doors. (Section E8.4)
50-400/96-10-01	VIO	Failure to promptly submit a Technical Specification change for main reservoir level. (Section E8.1)
50-400/96-10-02	VIO	Failure to provide an up-to-date FSAR amendment for main reservoir level. (Section E8.2)
50-400/96-11-01	VIO	Failure to follow procedure for chart recorder marking and temperature monitoring. (Section O8.1)
50-400/96-11-06	VIO	Failure to identify and correct deficiencies associated with deletion of ESW flow from AH-86. (Section E8.3)
50-400/95-015-00	LER	Failure to identify Engineering Safety Features response time testing requirements during a modification to the flow control valve circuitry for the Motor Driven Auxiliary Feed Water pumps. (Section M8.1)
50-400/96-002-00	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-02	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-03	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-04	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-05	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-06	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-07	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-08	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-09	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-10	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-11	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-12	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-002-13	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)
50-400/96-007-00	LER	Failure to perform Technical Specification surveillance testing in accordance with Specification 4.7.6.d.3. (Section M8.3)
50-400/96-009-00	LER	Reactor Auxiliary Building Emergency Exhaust system testing deficiency. (Section M8.6)
50-400/96-010-00	LER	Surveillance testing deficiencies that caused past entries into TS 3.0.3. (Section M8.4)

50-400/96-010-01	LER	Surveillance testing deficiencies that caused past entries into TS 3.0.3. (Section M8.4)
50-400/96-010-02	LER	Surveillance testing deficiencies that caused past entries into TS 3.0.3. (Section M8.4)
50-400/96-011-00	LER	Inadequate surveillance procedures failed to provide a means for identifying de-activated automatic containment isolation valves which are to be subjected to verification every thirty one days in accordance with Technical Specifications. (Section M8.7)
50-400/96-016-00	LER	Failure to perform reactor trip bypass breaker surveillance testing required by Technical Specifications. (Section M8.5)
50-400/97-300-03	URI	Placing contaminated items outside HP boundary. (Section R8.1)

Discussed

50-400/96-002-01	LER	Failure to properly perform Technical Specification surveillance testing. (Section M8.2)