U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-400
License No:	NPF-63
Report No:	50-400/98-01
Licensee:	Carolina Power & Light (CP&L)
Facility:	Shearon Harris Nuclear Power Plant, Unit 1
Location:	5413 Shearon Harris Road New Hill, NC 27562
Dates:	January 18 - February 28, 1998
Inspectors:	J. Brady, Senior Resident Inspector G. MacDonald, Project Engineer (Section O8.2, M8.1, and E8.1) G. Wiseman, Reactor Inspector (Sections F1.1, F2.1, F5.1, F5.2, and F7.1) W. Miller, Reactor Inspector (Sections F1.1, F2.1, F5.1, F5.2, and F7.1)
Approved by:	M. Shymlock, Chief, Projects Branch 4 Division of Reactor Projects

Enclosure 2

EXECUTIVE SUMMARY

Shearon Harris Nuclear Power Plant, Unit 1
NRC Inspection Report 50-400/98-01

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 6-week period of resident inspection; in addition, it includes the results of announced inspections by two regional Reactor Inspectors and a regional Project Engineer:

Operations

- Operations performance during the period was acceptable. Operators appropriately responded to alarms and abnormal conditions (Section O1.1).

- Communications system alarm testing was being conducted as committed to in the FSAR, although documented acceptance criteria was considered weak (Section O1.2).

- Self-assessment activities were acceptable, even though the PNSC's discussion associated with a root cause investigation for a missed surveillance did not identify that a root cause had not been addressed (Section O7.1).

- The licensee identified an additional example of failing to ensure main control room chart recorders were properly marking and timing, which was identified as a violation. Corrective action for violation 50-400/97-09-02 was not effective and additional corrective actions had been identified from a root cause investigation for the additional occurrence. The root cause investigation found that chart recorder timing had not been properly checked but it was not addressed as an inappropriate act because the investigation was focussed on marking only. This narrow focusing diluted the significance of the overall finding of the root cause investigation (Section O8.1).

- Further review of the "C" steam generator blowdown system water hammer event that occurred in December 1997, revealed that failure to enter Technical Specification 3.7.8 Limiting Condition For Operation when a blowdown system isolation valve snubber was removed was an isolated case and did not result in a Technical Specification violation (Section O8.2).

Maintenance

- Maintenance activities observed were generally adequate. A paper wipe was found in the "B" diesel generator lube oil tank that was apparently left there during the 1997 refueling outage (RF07). This was identified as a Non-Cited Violation for failing to establish adequate foreign material exclusion controls. Engineering performed an inspection of several Agastat relays in the load sequencers and inadequate solder connections were found and the relays were replaced (Section M1.1).

- A violation was identified for inadequate rod control system work instructions. The inadequate work instructions were the result of incomplete initial trouble-shooting (Section M1.2).

- The surveillance performances observed were adequately conducted (Section M2.1).

- A failure to conduct a shutdown margin calculation as required by TS Surveillance Requirement 4.1.1.1.1.a. when control rods were declared inoperable on January 29, 1998, was identified as a violation (Section M7.1).

- Steam generator blowdown system water hammer events were reviewed by the maintenance rule expert panel after the December 1997, water hammer event and determined to have been appropriately evaluated. The expert panel meeting on the issue was thorough and exhibited a proper safety focus (Section M8.1).

Engineering

- The engineering operability evaluation for a paper wipe found in the diesel generator lube oil suction tank was thorough and concluded that the paper wipe would not have affected the diesel (Section E1.1).

- The short term operability determination for containment recirculation sump brackets was adequate. It concluded that foreign material exclusion cover brackets installed during construction could remain in the sump and the sump would still perform its intended function. The conclusion was based on tack welds having been strength tested during the outage (RF07), on calculations which showed that if the brackets came loose they wouldn't be transferred into the sump, and that grout installed during RF07 would hold the brackets in place (Section E1.2).

- A trend in corporate procedure inadequacies was identified. Trending of corporate related adverse condition reports were being diluted because the condition reports were spread through all three sites corrective action data bases. The licensee had identified that trending program guidance in general was weak and was determining a course of action to address this issue (Section E7.2).

- Management, including the Plant Nuclear Safety Committee, was appropriately focussed on determining the root cause of the event and ensuring corrective actions provide a permanent solution. Condition report trending had not revealed a trend related to the blowdown events, which had resulted in a lack of management attention prior to the event (Section E8.1).

Plant Support

- The control of contamination and dose for the site was good and was attributable to good teamwork between the various departments (Section R1.1).

- The performance of security and safeguards activities were good. Security staff responded appropriately to the discovery of a gun during processing of employee belongings in the access area X-ray machine Section S1.1).

- A violation was identified for failure to adequately implement and maintain in effect the applicable provisions of the fire protection program for fire barrier penetration seals P 3008, P 447A, and E 156. (Section F1.1).

- The licensee did not perform engineering evaluations that followed the guidance of NRC GL 86-10 for deviations from fire barrier configurations qualified by tests. This was considered an engineering program weakness (Section F1.1).

- The surveillance inspection procedure for the fire barrier penetration seals was adequate. The three most recent inspections had been satisfactorily implemented. However, a large number of fire protection surveillance procedures continued to be implemented within the grace period of the procedure. Action had been implemented by the licensee to address this issue and corrective action was anticipated (Section F2.1).

- The fire brigade demonstrated good response and fire fighting performance during a simulated fire brigade drill conducted during this inspection period (Section F5.1).

- The fire barrier penetration seal installer was appropriately trained to accomplish fire barrier penetration seal installation work and Quality Control inspectors were qualified to perform the appropriate verification for installation and repairs made to the fire barrier penetration seals (Section F5.2).

- The licensee's 1998 Nuclear Assessment Section assessment of the facility's fire protection program was of good quality and effective in identifying fire protection program performance to management. Corrective actions in response to the identified assessment issues were being implemented and completion was anticipated in 1998 (Section F7.1).

Report Details

Summary of Plant Status

Unit 1 began this inspection period at 100% percent power. The unit maintained approximately 100% power for the entire period.

I. Operations

01 Conduct of Operations

01.1 General Comments

a. Inspection Scope (71707)

The inspectors conducted frequent reviews of ongoing plant operations to determine if procedures were followed and technical specification (TS) requirements were met.

b. Observations and Findings

In general, the conduct of operations was professional and safety-conscious. Routine activities were adequately performed. Operations shift crews were appropriately sensitive to plant equipment conditions and maintained a questioning attitude in relation to unexpected equipment responses. Operators were appropriately responding to plant alarms and abnormal conditions. In particular, the performance of post-maintenance testing on the rod control system caused a rod sequencing problem, as discussed in section M1.2, and resulted in entering Abnormal Operating Procedure AOP-1, Malfunction of Rod Control and Indication System, Revision 11. Operators appropriately responded to this situation and the shift superintendent was involved in the trouble-shooting to ensure that the problem was appropriately resolved. One operations error was described in section M7.1 related to a missed surveillance.

c. Conclusions

Operations performance during the period was acceptable. Operators appropriately responded to alarms and abnormal conditions.

01.2 Alarm Testing

a. Inspection Scope (71707)

The inspectors observed weekly alarm testing to determine if it adequately satisfied Final Safety Analysis Report (FSAR) commitments.

b. Observations and Findings

The inspector observed that the sections of Operation Management Manual OMM-1, Conduct of Operations, Revision 25 applicable to this test contained references to FSAR sections 9.5.2 and American National Standards Institute (ANSI) N18.7/ANS3.2. The inspector observed that the ANSI standard discussed periodic testing of the communications system. FSAR section 9.5.2, Communications Systems, described inspection and testing in subsection 9.5.2.7, which indicated that all systems were to be inspected regularly and undergo operational checks to ensure service readiness and effectiveness. The inspector found that the operational checks were implemented by OMM-1. In addition, the licensee indicated that the inspection and testing requirements were implemented per checklist in the preventive maintenance system under preventive maintenance route CL-E0013. The inspector found that OMM-1 did not have any test acceptance criteria. When operators were asked what criteria they used to determine test adequacy, they responded that they could hear the alarm, and with some uncertainty, the fact that there was an absence of a communications system trouble alarm. The criteria stated were not described in OMM-1.

The licensee initiated CR 98-00353 to address this issue. The licensee determined that the approach to alarm testing did not follow the general guidance laid out in procedure AP-004, Description of the Plant Operating Manual, Revision 7. Tests that fulfill regulatory commitments other than TSs were to be placed in periodic test procedures (OPT, MPT, etc.). The alarm tests were regulatory commitments, and identified as such in procedure OMM-1 by providing an "R" next to the steps that require the weekly alarm testing. The licensee intends to remove this test from OMM-1 and write an operational performance test (OPT) with the appropriate acceptance criteria. The PM checklist was also being reviewed for inclusion in a maintenance performance test (MPT).

The inspector found that the FSAR testing and inspection criteria were being implemented. However, the testing and documentation criteria were weak.

c. Conclusions

Communications system alarm testing was being conducted as committed to in the FSAR, although documented acceptance criteria were considered weak.

07 Quality Assurance in Operations

07.1 Licensee Self-Assessment Activities

a. Inspection Scope (40500)

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

- Plant Nuclear Safety Committee (PNSC) meetings conducted on February 11 and 19, 1998;
- Nuclear Safety Review Committee (NSRC) meeting conducted on February 18, 1998;
- Nuclear Assessment Section Audits on Environmental and Radiation Control Assessment (HNAS 98-005);

b. Observations and Findings

The portion of the NSRC meeting observed exhibited a good questioning attitude. The inspector also reviewed NSRC comments on the corrective action program as captured by the training manager in a February 20, 1998, E-Mail. NSRC comments in the E-Mail were focussed on industry experience with various aspects of the program and provided best practice recommendations for the site to consider. The program was in the final development process for a corporate corrective action procedure which site personnel were reviewing.

The PNSC meeting on February 11, 1998, discussed the steam generator blowdown event root cause investigation (CR 975320) from December 1997. A discussion of that meeting is contained in section E8.1. The meeting was good and in general exemplified a good questioning attitude.

For the portion of the PNSC meeting observed on February 19, 1998, the inspector found the committee thorough, with one exception. The exception dealt with the discussion of a root cause investigation for condition report (CR) 98-00340, pertaining to a missed surveillance on January 29, 1998, for not performing a shutdown margin determination with shutdown rod bank "C" on the hold bus (TS 4.1.1.1.a). The root cause investigation indicated that a condition report (CR 97-04513) had identified an inconsistency between TS 3.1.3.1, 3.1.1.1, and 4.1.1.1.a. on October 6, 1997. The root cause described that the inconsistency in the requirement for shutdown margin had caused the operations crew to miss the surveillance on January 29, 1998. The inconsistency was determined to be the root cause, and was agreed to and approved by the PNSC.

However, the inspector determined that the root cause was not the inconsistency, but lack of management action to the 1997 CR when the inconsistency was first identified. The inspector observed that in 1997, the surveillance was not missed. Also, at the time, the

operations and regulatory affairs organizations had collectively determined the appropriate meaning of the TS. However, the failure to communicate that determination to the remaining operators resulted in the surveillance being missed in 1998 and was determined by the inspector to be the root cause. As a result, no corrective action was identified to address the root cause of the missed surveillance. After the inspector discussed this issue with the PNSC chairman, the PNSC reconvened and appropriately addressed this item. This item will be reviewed further after submission of the LER.

c. Conclusions

Self-assessment activities were acceptable, even though the PNSC's discussion associated with a root cause investigation for a missed surveillance did not identify that a root cause had not been adequately addressed.

08 Miscellaneous Operations Issues (92901)

08.1 (Open) Violation 50-400/97-09-02: Failure to properly check main control room chart recorder. The inspector reviewed the violation response, dated November 12, 1997 and the licensee's corrective actions which indicated they would be complete by December 1, 1997. The corrective actions were completed, but were not effective, as evidenced by an additional occurrence identified by the licensee. However, the licensee also chose not to close the condition report for the violation based on the additional occurrence. Condition Reports 97-05121 and 97-05167 were written to address the additional instance which occurred on November 30, 1997 where main control room chart recorders were not properly marking and were not detected by the operators over two shift turnovers and one marking period.

The inspector reviewed the root cause investigation for the additional occurrence, completed on December 18, 1997, which identified that the wide range recorder for steam generator "B" was not marking on recorder LR-477 (green pen). In addition, the root cause investigation identified that the chart had not been set on the correct time and was approximately 12 hours off. Procedure OMM-16, Operator Logs, Revision 14, indicated in paragraph 5.1.2.b that the chart recorders are to be checked once per shift to ensure that they are marking properly and timing correctly. The chart had not been timing correctly and nine different individuals had not identified this although the chart was initialed and marked with the time the check was performed. The inspector found that the root cause investigation findings collectively displayed a general misunderstanding of the OMM-16 requirement and management expectations for its implementation.

The inspector discussed this root cause investigation with the licensee who intends to address the timing aspect during real time training for the operators (an identified corrective action in the root cause investigation). The licensee stated that the failure to time the recorder properly was listed as an inappropriate act in the initial

version of the root cause investigation, but was removed in the final version. That decision was based on focussing on recorder pen marking as opposed to the broader issue of operators checking the recorders once per shift to ensure they would perform their function of trend recording (marking and timing correctly). This narrow focussing diluted the significance of the overall finding of the root cause investigation. After discussion with the licensee, the licensee informed the inspector that corrective actions identified in the root cause were being reassessed and that a revised response to violation 50-400/97-09-02 was being prepared.

This is considered an additional example of failing to implement procedure OMM-16 as required by TS 6.8.1.a. This failure to follow procedures is designated violation 50-400/98-01-01, example 1; Failure to Properly Check Main Control Room Chart Recorders.

c. Conclusions

The licensee identified an additional example of failing to ensure main control room chart recorders were properly marking and timing, which was identified as a violation. Corrective action for violation 50-400/97-09-02 had not been effective and additional corrective actions were identified from a root cause investigation for the additional occurrence. The root cause investigation found that chart recorder timing had not been properly checked but it was not addressed as an inappropriate act because the investigation was focussed on marking only. This narrow focussing diluted the significance of the overall finding of the root cause investigation.

08.2 (Open) Violation 50-400/97-13-01: "C" Steam Generator Blowdown (SGBD) System Water Hammer.

This Unresolved Item (URI) was opened in NRC Inspection Report 50-400/97-13 to further review the removal of safety-related snubber 1BDH-169 adjacent to the containment isolation valve, without entering a TS action statement and for review of the root cause and repetitive nature of water hammer events on the SGBD System, including their continued occurrences. Additionally, the inspectors reviewed the treatment of this event under the maintenance rule 10 CFR 50.65. Refer to section M8.1 of this report for the discussion of SGBD water hammer event review under the maintenance rule and section E8.1 for the discussion of the review of the root cause evaluation of this event.

The inspectors reviewed CR 9705329, Operator Logs, Engineering Service Request (ESR) 9700949 Revision 0, and TS sections 3.7.8, 3.6.3, and TS Interpretation (TSI) 87-004, Revision 5. No Equipment Inoperability Record (EIR) was written following removal of the snubber due to miscommunication and misunderstanding of ESR 9700949. EIR 97-1352 was written after questioning by the NRC. The snubber was restored within the TS action statement time requirements. The inspectors concluded that the licensee's CR evaluation of the condition was adequate. An additional work request (97AHRZ1) involving snubber 1BDH-169 was

reviewed and the inspectors verified that an EIR was opened for this work activity and TS requirements were met. The inspectors concluded that this was an isolated event and that the licensee did not violate TS requirements.

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 98-AACD1 "B" diesel lube oil changeout
- WR/JO 98-AAZB-G "B" sequencer Agastat relay inspection
- WR/JO 98-AAQM1 Fuse holder replacement in PIC-3

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. Peer-checking and self checking techniques were being used.

The inspector discussed with the licensee the circumstances surrounding a paper absorbent wipe that was found in the "B" emergency diesel generator lube oil tank on January 29, 1998 during lube oil replacement. Condition Report 98-00327 was issued to address this condition. The inspector observed that there were two tanks, one on the suction to the lube oil pumps and one on the discharge from the engine. The wipe was in the tank on the suction to the three lube oil pumps. The wipe was found during performance of work under WR/JO 98-AACD1 to change the lube oil. While removing the lube oil below a baffle that separates the upper and lower half of the tank, workers noticed the wipe came floating out from the side of the tank. The workers concluded that the wipe had been left in the tank since it was cleaned during the refueling outage (RF07).

The inspector reviewed procedure MMM-011, Cleanliness, Housekeeping, Foreign Material Exclusion (FME), Classification of Work Practices, Revision 14, and its predecessor procedure AP-619, Foreign Material Exclusion. Section 5.3.5 of MMM-11 discusses FME zones and provides the minimum requirements for each zone. The lube oil sumps had been a Zone 4 FME area. As discussed in the Operability Evaluation, ESR 9800061, the licensee has identified that this area should have included

logging of material in and out of the tank. Section 5.3.5 indicates that supervisors are responsible for setting appropriate Zone 4 FME controls. The controls for the lube oil tank were inadequate to ensure that the wipe was removed prior to the diesel generator being declared operable. This is identified as a violation of TS 6.8.1.a and procedure MMM-011 for failing to follow procedure to establish adequate foreign material exclusion criteria for the diesel generator lube oil tank. This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. This item is designated NCV 50-400/98-01-02, Inadequate Foreign Material Exclusion Controls for Diesel Generator Lube Oil Tank. The operability evaluation review is contained in section E1.1.

The Agastat relay inspection was prompted by a 10 CFR 21 notification. from the vendor about a potential bad solder connection. The licensee found three relays installed that were suspect. All had performed without problems during prior load sequencer testing. All three relays were replaced. Engineering performed the inspection of the relays after they were removed by maintenance personnel and inadequate solder connections were found. The inspector considered the establishment of acceptance criteria by Engineering to be good.

c. Conclusions

Maintenance activities observed were adequately performed. A paper wipe was found in the "B" diesel generator lube oil tank that was apparently left there during the 1997 refueling outage (RF07). This was identified as a Non-Cited Violation for failing to establish adequate foreign material exclusion controls. When inspected due to a 10 CFR 21 notification, several Agastat relays in the load sequencers were found with inadequate solder connections and were replaced.

M1.2 Rod Control Urgent Failure Alarm

a. Inspection Scope (62707)

The inspector observed trouble-shooting and post-maintenance testing for a rod control urgent failure alarm received on February 24, 1998. The work was performed under WR/JO 98-ABMA1.

b. Observations and Findings

The inspector observed that initial trouble-shooting to determine the cause of the urgent failure alarm adequately determined the cause of the alarm. The trouble-shooting found that a multiplexer relay in the 1BD rod control logic cabinet had failed. The failure occurred while the operators were trying to insert control bank "D".

After the relay was replaced and the urgent failure alarm was cleared, the post maintenance testing required rods to be moved in two steps and out two steps. When the testing was accomplished, the wrong group of

control bank "D" stepped in first causing the rod sequence to be improper (≥ 2 steps between groups). The trouble-shooting had failed to recognize that the bank and group counters in the rod control system had become misaligned when the urgent failure occurred. The inadequacy in the trouble-shooting resulted in inadequate work order instructions (WR/JO). The instructions should have required the counters to be checked and set to the proper settings comparable to the rod height for the Bank "D" group I and II rods. Procedure ADM-NGGC-0104, Work Management Process, Revision 3, indicated in 9.8.7.9.d that the work instructions shall contain a level of detail appropriate to the complexity of the task to be accomplished. The failure to have adequate work instructions for repair of the rod control system is a violation of TS 6.8.1.a. and procedure ADM-NGGC-0104. This is considered a second example of failure to follow procedures and is designated violation 50-400/98-01-01, example 2, Inadequate Work Instructions for Rod Control System.

The trouble-shooting of the rod sequencing problem was initially not well coordinated. However, once the shift superintendent of operations was involved the trouble-shooting process improved considerably and provided favorable results. The rod control counters were reset and the post-maintenance test was conducted successfully.

c. Conclusions

A violation was identified for inadequate rod control system work instructions. The inadequate work instructions were the result of incomplete initial trouble-shooting.

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:

- OST 1036, Shutdown Margin Calculation Modes 1-5, Revision 11
- MST I0269, Lo-Lo Tave P-12 Interlock (T-0422) Operational Test, Revision 8
- MST I0320, Train B Solid State Protection System Actuation Logic and Master Relay Test, Revision 18

b. Observations and Findings

The inspector found that the testing was adequately performed.

c. Conclusions

The surveillance performances observed were adequately conducted.

M7 Quality Assurance in Maintenance Activities

M7.1 Missed Surveillance on Shutdown Margin

a. Inspection Scope (40500)

The inspector reviewed the circumstances surrounding a January 29, 1998, missed surveillance for shutdown margin. The inspector reviewed TS 3.1.3.1, 3.1.1.1, and 4.1.1.1.1.a, condition report 98-00340 and attended the PNSC meeting where the root cause investigation was discussed (Section 07.1).

b. Observations and Findings

The operators had placed the shutdown bank "C" rods on the hold bus to facilitate replacement of a power supply. Placing rods on the hold bus will illuminate the rod control urgent failure alarm. Alarm Response Procedure APP-ALB-013 for rod control urgent failure directs the operator to Procedure AOP-001, Malfunction of Rod Control and Indication Systems. The operators declared the rods on the hold bus inoperable per TS 3.1.3.1. The oncoming shift identified that a shutdown margin evaluation had not been conducted as required by TS 4.1.1.1.1.a when the rods were declared inoperable. Condition report 98-00340 was written to address that failure.

The root cause investigation described that operators did not correctly interpret the TS wording and therefore, failed to perform the shutdown margin calculation. TS 4.1.1.1.1.a requires a shutdown margin be performed within one hour after a control rod(s) is determined inoperable. After identification by the oncoming shift, the surveillance was accomplished approximately 19 minutes after the TS surveillance 4.1.1.1.1.a required one hour time limit.

The root cause investigation also noted that condition report 97-04513 was written on October 6, 1997 to identify that there was inconsistent wording between TS 3.1.3.1., 3.1.1.1, and 4.1.1.1.1.a. The condition report identified that the surveillance could be missed since there was nothing to point an operator to TS 4.1.1.1.1.a when TS 3.1.3.1 was entered for a rod control urgent failure alarm. The condition report was written after a rod control urgent failure alarm had been received. The inspector noted that CR 97-04513 was still open and that action had been assigned to train operators. However, there was no interim action identified to clarify the identified inconsistency.

The inspector observed that the licensee was already aware of the inconsistency on January 29, 1998, but had not promptly addressed the issue. There were no interim measures in place to alert operators to the identified inconsistency and operator training had not been completed. Consequently, the occurrence of the January 29, 1998, missed surveillance can be directly attributed to management not implementing interim corrective actions for a previous condition report. The root cause investigation identified corrective actions which included a

direct link between the alarm response procedure and the shutdown margin TS.

The failure to conduct a shutdown margin evaluation within the required one hour is considered a violation of TS 4.1.1.1.1.a and is designated violation 50-400/98-01-03, Failure to Conduct Shutdown Margin Surveillance Within One Hour.

c. Conclusions

A failure to conduct a shutdown margin calculation as required by Technical Specification Surveillance Requirement 4.1.1.1.1.a. when control rods were declared inoperable was identified as a violation.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Open) URI 50-400/97-13-01: "C" Steam Generator Blowdown Water Hammer

A significant water hammer event occurred on the "C" SGBD system piping on December 22, 1997. The maintenance rule data base for the steam generator blowdown system was reviewed. The inspectors observed that the licensee was documenting system and equipment failures in the maintenance rule data base including water hammer events. The SGBD was currently in A(1) status due to valve stroke time issues unrelated to the water hammers.

The licensee reviewed this event and the scoping of the SGBD system at a Maintenance Rule Expert panel meeting. The panel thoroughly discussed the issue and concluded that the event did not constitute a maintenance rule preventable functional failure as presently scoped. The panel determined that the present scoping was adequate and that the plant corrective action program was adequately and appropriately tracking resolution of the SGBD system water hammer problems. The expert panel meeting on the issue was thorough and exhibited a proper safety focus. Additional reviews of this event are contained in Section E8.1.

III. Engineering

E1 Conduct of Engineering

E1.1 Diesel Generator Lube Oil Tank Paper Wipe

a. Inspection Scope (37551)

The inspectors reviewed Engineering Service Request (ESR) 9800061, Operability Assessment- Wipe Found in 1B-SB LO Tank, Revision 0 to determine if procedure EGR-NGGC-005, Engineering Service Request, Revision 5, was being followed. ESR 9800061 evaluated the operability of the diesel with the paper wipe in the lube oil tank.

b. Observations and Findings

The ESR evaluated the probable location of the wipe in the tank and concluded that it was most likely crimped between one of the baffle plate sections and its mounting point, which probably held it in place until the baffle plate was removed to allow access to the tank. The wipe had a crimp in it. In discussing the ESR with the licensee, the inspector learned that the licensee had placed one of these wipes in a barrel of oil and after several days it had sunk to the bottom. If that had happened in the tank the pumps would probably have sucked up the wipe. In addition, the conclusion was based on the fact that the engine had been operated 75 hours since the last refueling outage, which was the last time the tank was opened and that the suctions to the three lube oil pumps should have picked up a loose wipe. The ESR also evaluated what would have happened if the pumps had picked up the wipe. The ESR concluded that the wipe most likely would have been shredded and captured in the 10 micron duplex strainer down stream of the pump. The shredded theory was supported by a statement from a knowledgeable diesel engine vendor engineer who was familiar with these pumps and had seen a higher strength cotton rag pass through similar screw type pumps during factory testing.

c. Conclusions

The engineering operability evaluation for a paper wipe found in the diesel generator lube oil suction tank was thorough and concluded that the wipe would not have affected the diesel.

E1.2 Containment Sump Concerns

a. Inspection Scope (37551)

The inspector reviewed licensee actions to an investigation of concerns related to potential loose parts in the containment sump that was identified in CR 98-00295 to determine if the concerns were properly addressed. During initial construction four brackets and attached threaded studs were weld to the top edge of pipes located in the bottom of the containment sump. The pipes are suction pipes for containment spray and residual heat removal pumps. The brackets were used during construction to attach foreign material exclusion cover over the suction pipes. These brackets were not part of permanent plant design and were not being controlled. The potential existed that a bracket or part could come loose and fall into the pipe, damaging one of the pumps. It was noted that during the past refueling outage a part of a bracket was found loose.

b. Observations and Findings

The inspector observed several team meetings that were conducted to determine the short term Justification for Continued Operation. The team was composed of several members from the Engineering Organization. In addition, a regulatory affairs person with root cause and human

factors training was assigned to assist. The team's investigation found that a portion of the bracket had come loose and was removed during the past refueling outage (RF07). The engineer who removed the bracket was on the team. In addition, a design control engineer from a different organization was assigned responsibility to be an independent assessor of the information the team gathered. The independent assessor was assisted by the regulatory affairs team member in the human factors and root cause investigation aspect. The inspector found that only one member of the team had been involved with the containment sump work in RF07, the engineer who removed the portion of the bracket. The rest of the team and the independent assessor were all independent of the RF07 containment sump work.

During RF07, the issue with the brackets was addressed as part of the containment liner and sump issues. The liner was discussed in NRC Inspection Report 50-400/97-04. As part of the liner issue the sumps were regrouted to eliminate leakage of borated water from the sump to the gap between the containment and the liner. During the regrouting, one of these brackets was apparently found loose when bumped by an individual involved with the work. Engineering addressed the loose bracket in ESR 9700374, Sealing of Recirculation Sumps, Revision 1, with a statement in Section 9, Installation Instruction, that "if feasible, remove the temporary metal brackets that are welded to the 30" pipe penetration." The inspector found no other statements concerning the brackets in ESR 9700374 through revision 2.

The team conducted a short term operability evaluation which was documented in ESR 9800042, Revision 0. The ESR was based on interviews and reviews of documents. A containment entry was planned but found not to be necessary based on first hand information from engineers, quality control inspectors, and workers who were in the sump and involved with the sump regrouting effort. The licensee found pictures which showed large portions of the bracket. These pictures agreed with the descriptions obtained from the interviews. The combination of the pictures and interviews, combined with documentation, were considered sufficient information by the licensee to perform the ESR.

The inspector reviewed the ESR, observed the pictures of the bracket, and discussed the team's findings with licensee personnel. The team was thorough and objectively approached the identified problems. The team found that only the portion of the bracket that was loose had been removed. The team considered what would happen if a bracket broke off. This included seismic and hydraulic flow analysis of the broken off part to determine whether it would be carried into the sump in an accident situation. The basis for the determination that the part would not be carried into the sump was:

- Seismic and hydraulic (flow) loads imposed during design basis events are low.

- The one bracket that came loose was removed during RF07. The remaining brackets were strength tested during RF07 by striking with a one pound hammer. No others were found to have failed.

- Grouting activities completed during RF07 provide more than adequate support for the brackets.

The licensee concluded that the recirculation sumps and the residual heat removal and containment spray systems were operable. The brackets are planned to be removed during RF08. A root cause investigation was prepared and was presented to the Plant Nuclear Safety Committee on February 19, 1998. The presentation was observed by the inspector.

c. Conclusions

The short term operability determination for containment recirculation sump brackets was adequate. It concluded that foreign material exclusion cover brackets installed during construction could remain in the sump and the sump would still perform its intended function. The conclusion was based on tack welds having been strength tested during the outage (RF07), on calculations which showed that if the brackets came loose they wouldn't be transferred into the sump, and that grout installed during RF07 would hold the brackets in place.

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 inspectors did not find any additional discrepancies other than those identified by the licensee.

E7.2 Trending of Corporate Condition Reports

a. Inspection Scope (40500)

The inspector reviewed NRC violations for the past several years to determine if trends existed. The inspector also discussed with the resident inspectors at the Brunswick and Robinson Nuclear Plants any trends related to common activities such as corporate procedures or activities. The inspector also reviewed trending of deficiencies for the corporate nuclear procedures used.

b. Observations and Findings

The inspector observed that corporate personnel use the Harris corrective action program to document adverse conditions. The licensee explained that a separate subunit of the Harris corrective action program was used for corporate generated condition reports. Trending of the corporate condition reports was conducted by Harris plant personnel, separate from the Harris trending program. However, trend reports were not generated for the corporate subunit like they were for the Harris plant generated condition reports.

The inspector observed that a number of the new Nuclear Generation Group (NGG) procedures were identified in NRC inspections as having errors and were the subject of NRC enforcement action. The errors included:

- allowing configuration changes to the plant without providing appropriate design verification,
- not requiring monitoring of occupational exposure to radiation by declared pregnant women likely to receive a dose in excess of ten percent of the applicable limit of 500 millirem,
- not specifying time requirements for the updating of Environmental Qualification Data Packages to maintain them current for installed plant equipment,
- not controlling the computer software design process to ensure that design activities did not affect software installed at the sites, and
- allowing clearance records not to be designated as Quality Assurance Records.

The specific NRC Inspection Reports where these errors were documented are 50-325,324/97-02, 50-325,324/96-16 50-325,324/97-12 and 50-325,324/97-13 for the Brunswick facility, and 50-400/97-04 and 50-400/97-12 for the Harris facility. The specific procedures involved include Procedures EGR-NGGC-0005, DOS-NGGC-0002, EGR-NGGC-0156, EGR-NGGC-0007, CSP-NGGC-2501, 2502, and 2503, and OPS-NGGC-1301.

The errors identified above suggest a trend in corporate procedural inadequacy which is of concern for two reasons:

- Corrective actions implemented to address specific procedural inadequacies may not adequately address program-level reasons why the procedures are not adequate. If program-level reasons contributed to the inadequacies, and if corrective actions do not address those reasons, then this trend in procedural inadequacy could continue.

- Licensee staff did not identify and recognize this trend before the inspectors did. This suggests that no program currently in place effectively trends and corrects corporate-wide problems.

In discussing these issues with Harris plant corrective action program personnel, the inspector became aware that corporate procedure or process inadequacies could be identified at the Brunswick and Robinson Nuclear plant sites but not be entered into the corporate corrective action program subunit at Harris. As a result, common problems with corporate activities would not be trended in the same data base, diluting a potential trend such that it would not be identified. The inspector also learned that the Harris corrective action program trending guidance and requirements were limited to approximately three lines in procedure AP-615, Condition Reporting. The guidance is basically to do quarterly trending. The licensee had already identified this weakness and was determining a course of action to address this issue.

c. Conclusions

A trend in corporate procedure inadequacies was identified. Trending of corporate related adverse condition reports were being diluted because the condition reports were spread through all three sites corrective action data bases. The licensee had identified that trending program guidance in general was weak and was determining a course of action to address this issue.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Open) Unresolved Item 50-400/97-13-01: "C" Steam Generator Blowdown System Water Hammer.

This Unresolved Item (URI) was opened in NRC Inspection Report 50-400/97-13 to review the root cause evaluation of the steam generator blowdown (SGBD) event of December 22, 1997, and to review the repetitive nature of water hammer events on the SGBD System, including their continued occurrences.

The inspectors reviewed the history of SGBD water hammer events as documented by the licensee's corrective action system. A total of five CRs were identified which documented water hammer events on the SGBD lines from December 21, 1996, to present. The first documented event occurred in April, 1987, which was documented in LER 87-029-01.

A 1996 Nuclear Assessment Section (NAS) audit identified that no formal process existed to document evaluations following water hammer events including meeting post water hammer snubber requirements. Procedure PLP-631, Water Hammer Assessment Program, was implemented in March 1997, and established the current water hammer documentation and evaluation process.

Review of water hammer data indicated that prior to PLP-631, documentation of water hammer events was weak and inconsistent. Following implementation of PLP-631, the sensitivity to water hammers has increased and the licensee was documenting water hammers using the condition report (CR) and maintenance rule processes and evaluating the effects of water hammers using the ESR process. Data indicated that the process is being followed.

Several changes were made to the SGBD line valves and operating procedures were changed but the problems were not resolved.

CR 975320 was a level 1 CR, which requires a root cause investigation (RCI), and was assigned to Engineering. The CR concluded that the root cause was inadequate original design, that improper communications of the issue between Operations and Engineering, and inadequate post modification testing following SGBD system modifications were contributing causes. The CR/RCI presented procedural enhancements identified by the system engineer as short term water hammer solutions with long term resolution via hardware modifications to the system to provide slow fill and warmup capability. The inspectors concluded that the CR/RCI did not look at all SGBD design documents and did not thoroughly review the implementation of previous SGBD modifications intended to prevent water hammers during system initiation.

The inspectors reviewed a description of the metallurgical analysis performed on the failed section of SGBD piping. The evaluation was performed by the Metallurgy Labs at the Harris Energy and Environmental Center. The conclusion was that the pipe section failed due to an overload failure of the pipe consistent with a significant water hammer loading and did not indicate a fatigue problem or a problem due to cumulative effects.

The inspectors attended the PNSC meeting conducted February 11, 1998, which reviewed CR 975320 Root Cause Investigation (RCI). The PNSC performed a thorough discussion of the RCI and requested an additional root cause to be added for organizational acceptance of water hammers and raised several other questions for the incident investigation team to address. The PNSC rejected the CR/Root Cause Investigation and requested that it be revised. The inspector concluded that management, including the PNSC, was appropriately focussed on determining the root cause of the event and ensuring corrective actions provide a permanent solution.

The inspectors concluded that the SGBD water hammers during SGBD initiation was a long standing problem which the licensee's corrective action program had not corrected. The Root Cause Investigation concluded that original design was the root cause and hardware modification corrective action is planned. The Root Cause Investigation was reviewed by the PNSC and will be revised.

The inspector discussed trending with the licensee, particularly in relation to the steam generator blowdown water hammer event, and in general. The licensee had already identified trending as an area that needed improvement. A new Correction Action Program manager had been assigned in the last four months with guidance to review the trending area. The inspector observed that trending was being conducted in relation to maintenance rule, maintenance work orders, and condition reports.

The inspector concluded that trending continues to be an area of weakness. However, improvement was being made. The inspector considered the lack of trending program procedural guidance a significant contributor to the weakness. The integrated site-wide trending approach was not adequately defined to ensure consistent implementation. The URI will remain open pending review of the revised CR/Root Cause Investigation.

Conclusions

Management, including the Plant Nuclear Safety Committee, was appropriately focussed on determining the root cause of the event and ensuring corrective actions provide a permanent solution. Condition report trending had not revealed a trend related to the blowdown events, which had resulted in a lack of management attention prior to the event.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 General Comments

a. Inspection Scope (71750)

The inspector observed radiological controls during the conduct of tours and observation of maintenance activities.

b. Observations and Findings

The inspector found radiological controls 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.

c. Conclusions

The control of contamination and dose for the site was good and was attributable to good teamwork between the various departments.

S1 Conduct of Security and Safeguards Activities

S1.1 General Comments

a. Inspection Scope (71750)

The inspector observed security and safeguards activities during the conduct of tours and observation of maintenance activities.

b. Observations and Findings

The inspector found the performance of these activities was good. Compensatory measures were posted when necessary and properly conducted. The inspector noted from review of condition reports and from discussion with operations and security staff that a gun was discovered during passage of an individual's articles through the access area X-ray machine on January 22, 1998, at 6:14 a.m. The individual was appropriately isolated from the weapon by the security staff. The security staff interviewed the individual and determined that the individual had accidentally left the gun in their belongings. The security staff determined that no malevolence occurred. A site-wide news bulletin was put out that same day to review the actions taken and remind the plant staff of the prohibition on weapons in the protected area.

The inspector observed work conducted on the protected area security fence to add razor wire under contract XXA7000484. This wire was being appropriately installed. The addition of the wire was in excess of the requirements of the security plan.

The licensee made a 50.72 report in relation to granting access to an individual that should not have been granted access. This issue will be reviewed in detail after the licensee submits a safeguards event report.

c. Conclusions

The performance of Security and Safeguards activities were good. Security staff responded appropriately to the discovery of a gun during processing of employee belongings in the access area X-ray machine.

F1 Control of Fire Protection Activities

F1.1 Design Basis of Fire Barrier Penetration Seals

a. Inspection Scope (64704)

The inspectors reviewed the fire barrier penetration seal designs and testing for compliance with the facility's licensing requirements identified in FSAR, sections 9.5.1.2, Barriers and Access; 9.5.1.5.4, Quality Assurance Program; 17.3, HNP Quality Assurance Program Description; and Carolina Power and Light's (CP&L) Corporate Quality

Assurance Manual, section 15.0, Quality Assurance Program for Fire Protection Systems.

The inspectors compared selected as-built fire barrier penetration seals to fire endurance test configurations to verify that those seals were qualified by appropriate fire endurance tests and representative of the design and construction of the fire endurance test specimens. During plant walkdowns the inspectors observed the installation configurations of selected accessible fire barrier penetration seals to confirm that the licensee had established an acceptable design basis for those fire barriers used to separate safe shutdown functions.

b. Observations and Findings

Fire barriers include penetration seals, wraps, walls, structural member fire resistant coatings, doors, and dampers, etc. Fire barriers are used to prevent the spread of fire and to protect redundant safe shutdown equipment. Laboratory testing of fire barrier materials is done only on a limited range of test assemblies. In-plant installations can vary from the tested configurations. Under the provisions of Generic Letter (GL) 86-10, Implementation of Fire Protection Requirements, licensees are permitted to develop engineering evaluations justifying such deviations.

The inspectors reviewed the fire barrier penetration seal design records, Harris construction control system (CCS) computer database design records, quality assurance and quality control (QA/QC) installation records, penetration seal typical detail drawings and testing records. The review included nine mechanical and electrical fire barrier penetration seals.

In the review of penetration seals, the inspectors used FSAR sections 9.5.1.2, Barriers and Access, 9.5.1.5.4, Quality Assurance Program and 17.3, HNP Quality Assurance Program Description; CP&L Corporate Quality Assurance Plan, section 15.0, Quality Assurance Program for Fire Protection Systems, Revision 18; Harris Civil Modification Procedure No. CMP-010, Installation of Penetration Seals, Revision 8; Harris Nuclear Safety Evaluations Nos. 1288 and 1413, concerning NRC Information Notice (IN) 88-04, dated March 17, 1988; Harris Nuclear Safety Evaluation No. 1406 concerning NRC IN 88-56, dated October 25, 1988; Harris Nuclear Safety Evaluation No. 1209 concerning NRC Information Notice (IN) 94-28, dated April 15, 1994; selected penetration seal typical vendor (Promatec) detail drawings 1364-93035 through 1364-93072; selected composite penetration location drawings 2167-S-002 through 2167-S-208; and recognized industry fire penetration seal testing guidance of American Society for Testing and Material (ASTM) Standard E814-1988, Standard Test Method for Fire Tests of Through-Penetration Fire Stops and Institute of Electrical and Electronics Engineers (IEEE) Standard 634-1978, IEEE Standard Cable Penetration Fire Stop Qualification Test.

Using the FSAR Fire Hazards Analysis (FHA) Figures 9.5A-1 through 9.5A-41 to determine the location and description of the plant fire areas, the inspectors conducted walkdowns and inspected penetration seal installations. The inspectors' review focused on verifying that the following design and installation parameters for the as-built configurations were adequately bounded by tests or justified by licensee's engineering evaluations:

- penetration type and opening size;
- seal material type and depth;
- damming material type and orientation;
- types and thermal mass of penetrating items;
- clearances of penetrating items; and
- fire test results for unexposed surface temperatures

The following penetration seals were visually inspected and the QA/QC engineering and construction penetration closure verification package records for these seals were reviewed to determine whether the as-built plant seal configurations were representative of those utilized in fire seal qualification tests:

PENETRATION SEAL SUMMARY			SEAL MATERIAL	DAMMING MATERIAL	
IDENTIFICATION/ NUMBER	LOCATION / SIZE (INCHES)	DESIGN DETAIL	DEPTH / TYPE	TYPE / ORIENTATION	FIRE TEST REPORTS / QUALIFICATION
ELECTRICAL CABLE TRAY PENETRATION E 156	REACTOR AUXILIARY BUILDING / WALL BETWEEN FIRE ZONES 1-A-EPA AND 1-A-BAL / 78 X28	EL-1	4"- LOW DENSITY SILICONE ELASTOMER	KAOWOOL BOARD - 1"--TWO SIDES	CTP 1063.1 3 HOURS
ELECTRICAL CABLE TRAY PENETRATION E 103	REACTOR AUXILIARY BUILDING / FLOOR BETWEEN FIRE ZONES 1-A-EPA AND 1-A-3-MP / 26 X28	ES-3	10"- SILICONE FOAM	KAOWOOL BOARD - 1"- BOTTOM SIDE	CTP 1001A- 3 HOURS
ELECTRICAL CABLE TRAY PENETRATION E 2797	REACTOR AUXILIARY BUILDING / WALL BETWEEN FIRE ZONES 1-A-SWGRA AND 1-A-SWGRB / 28 X42	EL-1	4"- LOW DENSITY SILICONE ELASTOMER	KAOWOOL BOARD - 1"--TWO SIDES	CTP 1063.1- 3 HOURS
ELECTRICAL CONDUIT INTERNAL PENETRATION E 520K	REACTOR AUXILIARY BUILDING /FLOOR BETWEEN FIRE ZONES 12-A-CR AND 1-A-CSR-A / 4	EC-1	4"- LOW DENSITY SILICONE ELASTOMER	KAOWOOL CERAMIC FIBER - 1"--TWO SIDES	CTP 1063.1- 3 HOURS
MECHANICAL PIPE PENETRATION P 3624	DIESEL GENERATOR BUILDING/ WALL BETWEEN FIRE ZONES 1-D-DTB AND 1-D-1-DGB-RM / 6	MS-5	6"- SILICONE FOAM	KAOWOOL BOARD - 1"--TWO SIDES	CTP 1001A- 3 HOURS
MECHANICAL SEISMIC GAP PENETRATION P 4393	REACTOR AUXILIARY BUILDING / WALL BETWEEN FIRE ZONES 1-A-EPA AND 1-A-46-ST / 2X312	GS-1	6"- SILICONE FOAM	KAOWOOL CERAMIC FIBER - 1"--TWO SIDES	CTP 1001A- 3 HOURS
MECHANICAL PIPE PENETRATION P 3683	DIESEL GENERATOR BUILDING/ WALL BETWEEN FIRE ZONES 1-D-DTA AND 1-D-1-DGA-RM / 6	MS-5	6"- SILICONE FOAM	KAOWOOL BOARD - 1"--TWO SIDES	CTP 1001A- 3 HOURS
MECHANICAL COPPER TUBE PENETRATION P 447A	REACTOR AUXILIARY BUILDING /FLOOR BETWEEN FIRE ZONES 1-A-BAL AND 1-A-3PB / 6	ML-2	4"- LOW DENSITY SILICONE ELASTOMER	KAOWOOL BOARD - 1"- BOTTOM SIDE	CTP 1063.1 CTP 1024- 3 HOURS
MECHANICAL PIPE PENETRATION WITH TWO PIPE PENETRANTS P 3308	REACTOR AUXILIARY BUILDING / WALL BETWEEN FIRE ZONES 1-A-EPA AND 1-A-46-ST / 18X38	MR-5	48'- PROMATEC RADFLEX	KAOWOOL BOARD - 1" -TWO SIDES	CTP 1002 CTP 1063.9- 3 HOURS

The inspectors noted that the licensee's evaluations of Information Notices 88-04, 88-56, and 94-28 did not identify any fire barrier penetration seal problems at Harris. The inspectors' visual inspections did not identify any missing seals and verified that the installed fire barrier penetration seals were continuous with no gaps, cracks, or holes in the barrier material that would indicate the seals were inoperable.

The inspectors reviewed the fire barrier penetration design documentation for mechanical penetration fire seals P 3308 and P 447A. Fire barrier seal P 3308 consisted of an 18-inch by 38-inch block out with two non-sleeved 14-inch pipe penetrants in a concrete wall. The entire depth of the block out was filled with Promatec Radflex silicone material. Design drawing 1363-93047, Flexible Mechanical Seals-Radflex, Revision 1, and qualifying fire test reports CTP 1002 and 1063.9 for this type of seal indicated that fire tests had been conducted only on single sleeved pipe penetrations and not on block out penetration designs. Fire barrier seal P 447A included a 6-inch diameter sleeve with a single two and one-half inch copper tube penetrant in a concrete floor. Qualifying fire test report CTP 1001A for this seal type indicated that fire tests had been conducted only on steel pipe penetrants. No copper tube penetrant had been tested.

Based on these reviews, the inspectors concluded that the licensee failed to have adequate test documentation to demonstrate that the as-built penetration seal configurations of fire seals P 3308 and P 447A had been qualified by fire tests. The penetration seal configurations were significantly different from the tested typical seal types and configurations and were not bounded by the vendor's design and test documentation. Also the licensee had not conducted engineering evaluations that followed the guidance of GL 86-10 to justify the adequacy of these penetration seal configuration deviations from the fire barrier configurations qualified by tests.

The inspectors also conducted a review of the fire barrier penetration design documentation for electrical fire barrier penetration seal E 156. This penetration seal consisted of a 78-inch by 28-inch block out (2184 square inch seal area) with six vertical stacked cable tray and conduit penetrants in a concrete wall. Qualifying fire test report CTP 1063.1 for this seal type indicated that successful fire tests had been conducted on a maximum block out size of 42-inch by 46-inch which designated 1932 square inches as the maximum seal area limit. The licensee's field engineering and construction penetration closure verification package for electrical penetration fire seal E 156, dated December 15, 1986, noted a QA/QC hold point verification inspection of a subdivision of the seal. Penetration installation procedure CMP-010, step 7.0.12, indicated that Engineering shall specify size and location of subdividing partitions and material to be used on large floor/ceiling penetrations requiring subdividing as specified on typical detail drawings. The licensee's penetration seal typical detail drawing 1364-93035, sheet 3, Revision 0, General Note No. 4 indicated that a penetration seal be subdivided by partitions if the maximum seal area limit is exceeded. The note also required that the penetration engineers prepare sketches/drawings of the subdividing design and the materials (including structural support elements) installed and that this subdividing design documentation become a permanent part of the engineering documentation package of the seal. However, no sketches/drawings of the subdividing design and the materials installed were identified in the engineering documentation package of penetration fire seal E 156 provided to the inspectors. At the request of the

inspectors, the licensee also examined the field design and construction penetration documentation for two additional large floor/ceiling electrical penetration fire seals requiring subdividing. The licensee was unable to locate the penetration seal subdividing design documentation that demonstrated the as-built configurations were bounded by the vendor's design and test documentation. Also, the licensee provided no engineering evaluation documentation that evaluated the adequacy of these subdivided penetration seal configurations. This does not follow the guidance of GL 86-10. The inspectors concluded that the licensee had not implemented and maintained the design engineering documentation for large subdivided electrical floor/ceiling penetration fire seal configurations that demonstrated the as-built configurations were bounded by the vendor's design and test documentation.

FSAR sections 9.5.1.2 and 9.5.1.5.4 indicated that penetration seal designs are qualified by tests and that the Fire Protection Quality Assurance Program elements are included in FSAR section 17.3. FSAR section 17.3.2, Performance/Verification indicates, in part, that design documents and procedures are controlled to reflect design modifications and as-built conditions, and, that sufficient records are maintained to provide documentary evidence of the quality of items and the accomplishment of activities affecting quality. CP&L Corporate Quality Assurance Plan, Revision 18, Section 15.0, Quality Assurance Program for Fire Protection Systems implements the FSAR fire protection quality assurance requirements and indicates in paragraph 15.4, that design activities shall be accomplished in accordance with procedures that assure the applicable design requirements are included. Harris TS 6.8.1.h indicates that written procedures shall be established, implemented, and maintained covering the fire protection program implementation.

Based on these reviews, the inspectors determined that the licensee failed to adequately implement and maintain the applicable design control documentation requirements of the fire protection program as described in the FSAR to demonstrate that the as-built configurations of fire barrier penetration seals P 3008, P 447A, and E 156 were bounded by the vendor's design and test documentation. This is a violation of the facilities' operating license condition 2.C.F. and is identified as Violation 50-400/98-01-04, Failure to Properly Implement and Maintain the Applicable Fire Protection Program Design Control Documentation Requirements for Fire Barrier Penetration Seals. In addition, the licensee did not perform engineering evaluations that followed the guidance of NRC GL 86-10 for deviations from fire barrier configurations qualified by tests. This was considered an engineering program weakness.

c. Conclusions

A violation was identified for failure to adequately implement and maintain in effect the applicable provisions of the fire protection program for fire barrier penetration seals P 3008, P 447A, and E 156. In addition, the licensee did not perform engineering evaluations that

satisfied the guidance of NRC GL 86-10 for deviations from fire barrier configurations qualified by tests. This was considered an engineering program weakness.

F2 Status of Fire Protection Facilities and Equipment

F2.1 Surveillance of Fire Protection Features and Equipment

a. Inspection Scope (64704)

The inspectors reviewed procedure FPT-3550, "Fire Barrier Seal Inspection 18 Months Interval," Revision 10, and the inspection data for the surveillance procedures which were completed December 2, 1992, March 15, 1994, and June 3, 1995. These were reviewed for compliance with the requirements of FSAR Section 9.5.1.

b. Observations and Findings

Surveillance procedure FPT-3550 required a visual inspection each 18 months of a random sample of 10 percent of each type of fire barrier penetration seal. The sample inspections were required to include fire barrier seals that had not been inspected within the past 15 years. Each seal was inspected for any apparent change in appearance and signs of abnormal degradation. If any abnormality was found, an additional 10 percent was required to be inspected. The inspection and selection process was to continue until an acceptable sample was found.

The inspectors reviewed Procedure FPT-3550 and concluded that the procedure met the frequency requirements of Procedure FPP-014, Fire Protection Surveillance Requirements, Revision 8, Section 5.5.1.c and met the commitments made to the NRC.

The penetration seal surveillance inspections completed December 2, 1992, March 15, 1994, and June 3, 1995 were reviewed by the inspectors. No discrepancies were noted. The surveillance inspection due January 1998 had not been completed and was in process during this inspection. The completion of this inspection was in the grace period.

As previously documented in NRC Inspection Report 50-400/97-04, the number of fire protection surveillances being performed in their grace period was approximately 60 percent for long term (quarterly to 18-month) surveillances. This was considered an excessive number and resulted in the program being considered not fully effective. Action had been taken by the licensee to correct this issue. As of December 1997, 47 per cent of the surveillance procedures were performed in the grace period, with 45 percent of these being performed within seven days of the scheduled date. Twenty percent of the surveillances were performed early. By January 1998 this number had been further reduced such that 41 percent of the surveillances were performed in the grace period, with 92 percent of these surveillances performed within seven days of the scheduled date. Twenty-eight percent of the surveillances were performed early. Continued improvements in this area

were anticipated by the licensee. The NRC will continue to monitor the licensee's performance in this area.

c. Conclusion

The surveillance inspection procedure for the fire barrier penetration seals was adequate. The three most recent inspections had been satisfactorily implemented. However, a large number of fire protection surveillance procedures continued to be implemented within the grace period of the procedure. Action had been implemented by the licensee to address this issue and corrective action was anticipated.

F5 Fire Protection Staff Training and Qualification

F5.1 Fire Brigade

a. Inspection Scope (64704)

The inspectors reviewed a fire brigade drill for compliance with the licensee's site procedures and the requirements of FSAR Section 9.5.1.

b. Observations and Findings

The inspectors witnessed a fire brigade drill conducted on February 3, 1998, at 9:00 P.M. This drill involved a simulated fire on the 1A-SA steam driven auxiliary feedwater pump located on elevation 236 of the auxiliary building. The response by the fire brigade to the simulated fire included a fire brigade leader and two fire brigade members from operations, one fire brigade member from maintenance and one fire brigade member from health physics. Three security officers, three auxiliary unit operators and one health physics employee also responded to provide additional assistance to the brigade, as required. The fire brigade members responded to the simulated fire in full turnout gear and each one was equipped with self contained breathing apparatus. The response was timely and the brigade demonstrated the proper use of fire fighting equipment and tactics. The brigade leader's direction and performance was good. Following the drill, a critique was conducted to discuss the brigade's performance and recommendations for future enhancements.

c. Conclusions

The fire brigade demonstrated good response and fire fighting performance during a simulated fire brigade drill conducted during this inspection period.

F5.2 Fire Barrier Penetration Seal Installers and QC Inspectors

a. Inspection Scope (64704)

The inspectors reviewed training records for the maintenance employee designated to install and repair fire barrier penetration seals and the QC inspectors designated to inspect the penetration seals for compliance with the requirements of FSAR Section 9.5.1.

b. Observations and Findings

Only one site employee was qualified to install and repair the facility's fire barrier penetration seals. This employee had received initial classroom training and practical application in the installation of the types of fire barrier penetration seals used at the Harris facility. This training was conducted by the vendor who supplied the seal material for the various fire barrier penetration seals installed at the facility. This employee had received appropriate annual retraining and recertification to maintain up to date knowledge and performance in the installation of these seals. The inspectors witnessed the repairs to a degraded penetration seal performed by this individual. The employee demonstrated an excellent knowledge of fire barrier penetration seal installation requirements and the repair work was of a high quality.

The fire barrier penetration seal installation procedures contained hold points for QC inspections of the principle installation features. Five QC inspectors were performing QC inspections and verifications of fire barrier penetration seal installations. The inspectors reviewed the training records of two of these employees and verified that the training and certification records for these employees were current for the installation of fire barrier penetration seals. In addition, the inspectors witnessed the performance of a QC inspector during the oversight and verification of repairs to a fire barrier penetration seal. The QC inspectors demonstrated appropriate oversight and verification activities for these repairs.

c. Conclusion

The fire barrier penetration seal installer was appropriately trained to accomplish fire barrier penetration seal installation work and QC inspectors were qualified to perform the appropriate verification for installation and repairs made to the fire barrier penetration seals.

F7 Quality Assurance in Fire Protection Activities

F7.1 Fire Protection Audit Reports

a. Inspection Scope (64704)

The inspectors reviewed the Nuclear Assessment Section (NAS) Audit Report HNAS 98-011, Harris Fire Protection Assessment, dated January 29, 1998, for compliance with the licensee's site procedures and commitments made to the NRC.

b. Observations and Findings

The licensee's Nuclear Assessment Section performed an assessment of the fire protection program on January 5-16, 1998. The report for this assessment was report No. HNAS 98-011. The assessment team determined that the fire protection program was effective in support of the operation of the facility. Findings from the assessment were categorized as strengths, issues, or weaknesses. The assessment report identified two strengths, no issues and five weaknesses. The assessment report also identified eight previously identified 1995-1997 audit issues and weaknesses that remained open. The licensee's corrective actions for these outstanding audit items were being implemented and completion was anticipated in 1998.

c. Conclusions

The licensee's 1998 Nuclear Assessment Section assessment of the facility's fire protection program was of good quality and effective in identifying fire protection program performance to management. Corrective actions in response to identified assessment issues were being implemented and completion was anticipated in 1998.

V. Management Meetings

XI Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on March 4, 1998. 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. Cook, Manager, Outage and Scheduling
J. Donahue, Director Site Operations, Harris Plant
J. Eads, Supervisor, Licensing and Regulatory Programs
R. German, Manager, Plant Support
W. Gurganious, Superintendent, Environmental and Chemistry
M. Keef, Manager, Training
B. Meyer, Manager, Operations
K. Neuschaefer, Superintendent, Radiation Protection
W. Peavyhouse, Superintendent, Design Control
W. Robinson, Vice President, Harris Plant
S. Sewell, Superintendent, Mechanical Systems
D. Tibbitts, Manager, Nuclear Assessment
C. VanDenburgh, Manager, Regulatory Affairs

NRC

S. Flanders, 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 62707:	Maintenance Observation
IP 64704:	Fire Protection Program
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92901:	Followup - Plant Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-400/98-01-01	VIO	Failure to follow procedures: 1) properly check main control room chart recorders, and; 2) inadequate work instructions for rod control system (Section O8.1 and Section M1.2).
50-400/98-01-02	NCV	Inadequate foreign material exclusion controls for diesel generator lube oil tank (Section M1.1).
50-400/98-01-03	VIO	Failure to conduct shutdown margin surveillance within one hour (Section M7.1).
50-400/98-01-04	VIO	Failure to properly implement and maintain the applicable fire protection program design control documentation requirements for fire barrier penetration seals (Section F1.1).

Closed

50-400/98-01-02	NCV	Failure to conduct shutdown margin surveillance within one hour (Section M7.1).

Discussed

50-400/97-09-02	VIO	Failure to properly check main control room chart recorder (Section O8.1).
50-400/97-13-01	URI	"C" steam generator blowdown system water hammer (Sections O8.2, M8.1, and E8.1).