U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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Report No.: 50-395/96-11

Licensee: South Carolina Electric & Gas (SCE&G) Company

Facility: V. C. Summer Nuclear Station

Location: P. O. Box 88
Jenkinsville, SC 29065

Dates: September 8 - October 26, 1996

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ENCLOSURE 2

EXECUTIVE SUMMARY

V. C. Summer Nuclear Station
NRC Inspection Report 50-395/96-11

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 7-week period of resident inspection and in addition, it includes the results of announced inspections by regional reactor inspectors.

Operations

- In general, the conduct of operations was professional and safety-conscious (Section O1.1).

- Two crews of licensed operators were observed on three shifts over two days. The informality of temporary operator shift relief and poor control panel monitoring practices are areas of concern. However, insufficient information exists from this set of observations to make a definitive conclusion that operator performance is declining or that there is a problem here. However, it is noted that a recent dilution event at another facility was associated with an informal and incomplete temporary shift relief by operators. Additional control room observation of routine shift activities is needed to validate the extent of the weaknesses observed (Section O1.2).

- A review of two plant transients during the inspection period concluded that control room operators had demonstrated good plant awareness and knowledge (Section O4.1).

- The training department procedures were complete and were being followed by the training staff, but some typographical errors needed to be corrected. The training observed was detailed, accurate, and comprehensive, and was taught by competent and knowledgeable instructors (Section O5.1).

- The initiative to replace the off-normal occurrence program with one that covers more areas and lowers the threshold of documentation was considered a significant improvement. The review of the condition evaluation report program indicated that, although needed improvements were identified, the administration and support of the program was adequate (Section O7.1).

Maintenance

- Maintenance activities were completed thoroughly and professionally (Section M1.1).

- The lifting and movement of the B service water pump motor out of the service water building was conducted safely and met the assumptions in the Control of Heavy Loads lifting analysis. The maintenance activities on the B service water pump were conducted thoroughly and professionally (Section M1.2).

- All observed surveillance activities were conducted in a professional manner and resulted in a high degree of confidence that the tested components would perform as designed (Section M2.1).

- A Non-Cited Violation (NCV) was identified for failure to follow a maintenance procedure for adjusting the packing of valves. As a result of this error, during automatic make-up to the Volume Control Tank (VCT) the boric acid valve was mechanically bound and could not open on demand. This created the potential for an inadvertent dilution of the core (Section M3.1).

- An NCV was identified for failure to establish a containment penetration isolation verification surveillance procedure that adequately described the penetrations to be verified closed. The inspectors also identified a weakness in the conduct of this procedure by Operations in that the procedural deficiencies were not identified during the conduct of the surveillance. The inspectors also identified that the Final Safety Analysis Report (FSAR) incorrectly described two Reactor Vessel Level Indication System (RVLIS) containment penetrations (Section M3.2).

- Plant management was proactive in conducting a plant wide work standdown to heighten awareness and sensitivity to personnel errors and the need for self-verification and effective communication. This effort was received positively by the plant work force (Section M4.1).

Engineering

- The inspectors concluded that the licensee had adequately justified not previously testing the refueling water storage tank relays and the emergency feed water swapover relays since they were not considered engineered safety feature relays. The licensee exhibited conservative decision making in testing these relays (Section E1.1).

- The inspectors concluded that the licensee, as required by the maintenance rule, is practicing goal setting which includes a cause and corrective action, and is monitoring the effectiveness of the corrective actions for a specific duration. The inspectors also concluded that the (a)(1) systems are receiving appropriate management attention (Section E1.2).

- The resolution of the core flux tilt, static trip device issues, and Component Cooling Water (CCW) heat exchanger cavitation were examples of effective problem identification and resolution (Section E1.3).

- An Unresolved Item (URI) was identified concerning the adequacy and methodology of post maintenance testing following turbine driven emergency feedwater pump governor and linkage work. A weakness was identified due to a lack of adequate documented justification of turbine driven emergency feedwater pump operability following an overspeed event prior to the equipment being declared operable (Section E2.1).

- The inspectors concluded that the licensee's recognition of a higher than normal 7300 process system card failure rate and efforts to replace high risk cards, identify the root causes, and participation in efforts to identify new technologies were good initiatives (Section E2.2).

- A review of a change on a main control board annunciator alarm circuit that added a half-second time delay to prevent nuisance alarms concluded that the licensee was justified in using the work order process to make changes to this non-safety related system (Section E2.3).

- Engineering response to plant problems as documented in the station deficiency reporting system was appropriately thorough and timely. The exception noted in the violation for inadequate corrective action did not reflect typical licensee performance in this area. Several examples of Engineering initiatives and design changes demonstrated good engineering support of Operations (Section E2.4).

- The age, quantity, and significance of engineering backlogs indicated that plant issues assigned to engineering were appropriately prioritized, evaluated, and resolved (Section E4.1).

- The transition of Design Engineering's (DE's) role from oversight to increased design development and custodian of the design basis documentation was well planned. Implementation of the plan was at an appropriate pace to preclude a degradation of design product quality. The assumption of the role of design basis document custodian provides a mechanism for the licensee to verify the completeness of their design basis documentation (Section E6.1).

- The Quality Assurance (QA) group was found to be performing the internal audits as required. Several of the audit findings were substantive and provided a good independent self-assessment in a broad range of areas. A negative trend in line managements responsiveness to QA findings was identified. Plant management was taking action to correct the negative trend (Section E7.2).

Plant Support

- An URI was opened to review the causes of contaminated material found outside the Radiation Control Area (RCA) (Section R2.2).

- On September 11, 1996, the licensee conducted an emergency preparedness drill with the inspectors observing activities in the Technical Support Center. No concerns were identified (Section P5.1).

- The licensee has developed a satisfactory plan for the resolution of the Thermo-Lag issue (Section F1.1).

- The maintenance backlog on the fire protection systems had been reduced to a manageable number and the maintenance, operability and performance of these systems were good. Completion of the installation of the new

fire alarm system, resolution of the emergency lighting problems, and the scheduled upgrades to the fire protection system engineer's evaluation data should enhance the overall fire protection program (Section F2.1).

- The completed surveillance tests of the fire protection systems reviewed by the inspector were appropriately completed and met the acceptance criteria (Section F2.2).

- The fire protection program implementing procedures met the commitments to the NRC. The procedures did not require each fire brigade member to participate in at least two drills per year. This was identified as an URI. Implementation of the fire protection and prevention procedures was satisfactory. The general housekeeping and control of combustibles were good (Section F3.1).

- The fire brigade organization and training met the facility's procedure requirements and the performance by the fire brigade to a drill during this inspection was satisfactory (Section F5.1).

- The cocrdination and oversight of the facility's fire protection program met the licensee's commitments to the NRC. The personnel assigned to implement the principle functions of the fire protection program were working together as a team resulting in a program that was effectively implemented during the past few months (Section F6.1).

- The audits and assessments of the facility's fire protection program were thorough and appropriate corrective actions were taken in a timely manner to resolve the identified issues (Section F7.1).

- The evaluations for the reviewed Information Notices (INs) were appropriate and the required corrective actions had been completed except for IN 92-18 and 95-36. An URI was identified for IN 92-18 concerning the potential for a hot short to affect operation of some motor operated valves and the licensee was reevaluating IN 95-36 for applicability at Summer.

Report Details

Summary of Plant Status

Unit 1 began the inspection period at full power. The unit reduced power to 35 percent on September 14 to replace a turbine Electo-Hydraulic Control System power supply and a Reactor Coolant System flow transmitter. Unit 1 returned to full power on September 15 and remained at or about full power throughout the remainder of the inspection 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 Main Control Room Observations (71715)

a. Inspection Scope

During the period September 25-26, 1996, the inspectors observed the licensed operators on shift perform their main control room functions. Specific areas observed included shift turnover, dayshift activities, backshift activities, temporary shift relief, steam dump valve leakage testing, and other routine shift activities.

b. Observations and Findings

In general, the licensed operators basically complied with the requirements of the licensee's conduct of operations procedure. The inspectors observed that the senior operator controlled access to the control room and the reactor operators were generally attentive to their control panels. When annunciator alarms were received, they were promptly announced and acknowledged. When the alarm was expected by the operator, this fact was communicated to the team as well. Face-to-face and telephone communications between operators were observed to be clear and complete. However, the inspectors observed that the reactor operators routinely stood facing away from their control panel. This was particularly noticeable when they were communicating with the senior operator. Periodically, the reactor operators would turn to scan their control panels but during more involved discussions, the operators were observed to be turned from their respective panel for extended intervals. The inspectors did not note any adverse consequences due to this practice but early identification of negative trends in plant performance may be missed as a result of not scanning the control panels more diligently.

The inspectors also observed temporary shift relief practices on three occasions. In all three cases, the turnover was quite informal. The discussion of current plant conditions was minimal or nonexistent and the fact that a temporary shift relief had occurred was never formally communicated to the other crew members. Plant conditions were steady state at 100 percent power with no activities in progress at the time. As a result, the inspectors did not note any direct adverse consequences due to this practice.

The inspectors observed one crew's response to a problem that occurred during leak testing of the steam dump valves on the backshift. The testing involved isolating a length of piping downstream of each steam dump valve (in succession), from the main condenser, and then measuring the valve leakage via a steam pressure increase in the pipe. The engineer in charge reported, following measurement on one steam dump valve, that pressure could not be reduced enough to allow reopening of the downstream isolation butterfly valve at the condenser. The engineer proposed mechanically forcing the valve open with a lever extension on the valve operator. However, the shift supervisor quickly recognized another solution. He suggested shutting a manual valve upstream of the steam dump valve to remove the source of steam from the leaking steam dump valve. This valve was easier to access and avoided possible mechanical damage to the butterfly valve. The engineer, the senior operators and an auxiliary operator reviewed the testing setup on appropriate piping diagrams. However, unnoticed by the operators, the engineer had identified the incorrect butterfly valve being used for the test on the piping diagram. Consequently, the crew started developing a tagout for the wrong part of the steam dump system. During his independent review of the testing being done and the proposed isolation valve to be closed, the senior operator identified that the wrong valve had been discussed on the piping diagram. The engineer acknowledged his error and concurred that the senior operator had identified the correct valve. The shift supervisor verified the new alignment and a tagout was issued. Pressure was quickly removed from the isolated section of piping which permitted the normal opening of the butterfly valve. Despite the inappropriate recommendation of the engineer to use force to open the butterfly valve and the initially incorrect reading of the piping diagram by the team, the inspectors noted the good teamwork and communication exhibited by the crew for this situation as well as the thorough verification performed by the senior operator.

c. Conclusions

Two crews of licensed operators were observed on three shifts over two days. The informality of temporary operator shift relief and poor control panel monitoring practices are areas of concern. However, insufficient information exists from this set of observations to make a definitive conclusion that operator performance is declining or that there is a problem here. However, it is noted that a recent dilution event at another facility was associated with an informal and incomplete temporary shift relief by operators. Additional control room

observation of routine shift activities is needed to validate the extent of the weaknesses observed.

02 Operational Status of Facilities and Equipment

02.1 Plant Walkdowns (71707)

The inspectors toured accessible plant areas and visually inspected major components. No general conditions that might degrade system operation were identified. The inspectors accompanied a plant operator on rounds of the intermediate building. The operator was knowledgeable of his duties.

04 Operator Knowledge and Performance

04.1 Operator Performance

a. Inspection Scope (71707)

The inspectors reviewed two unplanned operational events that occurred during the inspection period. Observations were also made during routine control room tours. Condition Evaluation Reports (CERs) were reviewed.

b. Observations and Findings

On September 12, operators responded promptly when valve FCV-113A, blender boric acid inlet flow control valve, failed to open during an automatic makeup to the VCT. The reactor operator immediately noted that FCV-113A had not opened and placed the makeup system in Off. Due to the potential for a dilution and exceeding core thermal limits the operators reduced power by 10 MWe (about one percent).

On October 23, Feedwater (FW) flow transmitter, FT-477, failed at mid-range actuating the FW Line Break annunciator. The operator promptly observed the failed instrument, placed the FW flow control valve in manual, restored level in the steam generator to the normal band, and swapped the controlling FW channel before returning the flow control valve back to automatic control.

The inspectors concluded that control room operators demonstrated good plant awareness and knowledge in responding to these minor plant transients.

c. Conclusions

A review of two plant transients during the inspection period concluded that control room operators had demonstrated good plant awareness and knowledge.

05 Operator Training and Qualification

05.1 Licensed Operator Requalification Program (71001)

a. Inspection Scope

During the period September 23-27, 1996, the inspectors reviewed the licensed operator requalification program. Specific areas of review included program implementation procedures, and operator weekly classroom and simulator training.

b. Observations and Findings

The V. C. Summer training program is documented in Nuclear Training Manual Chapters and Appendices. The inspectors found that several parts dealing with documentation and the requalification program had been revised in August 1995 following the NRC's previous requalification program inspection. The inspectors noted several typographical errors that made it difficult to cross-reference various parts of the training manual. The inspectors determined that the process of documenting individual operator performance weaknesses had been formalized and examples of this documentation were inspected. Documentation that performance results had been communicated to the operator in a timely manner was recorded by having the operator sign the evaluation form. For more detailed discussion of this area see Section 08.2.

The inspectors observed two sessions of normally scheduled licensed operator requalification training. The first session of training was a classroom presentation of electrical theory and emergency diesel generator electrical control. The inspectors noted that a dedicated classroom was set up for supporting the licensed operator requalification program. This set up included separate tables, procedures, and a complete set of one-line drawings for each operator in the class. Learning objectives were reviewed with the class at the beginning and end of the presentation. The inspectors observed that the instructor was very knowledgeable of his subject and made good use of the training aids of the classroom. The instructor made good use of examples in his lecture to emphasize the learning objectives. He frequently involved the operators in discussions of the training material to verify their understanding.

The second session of training was a simulator evaluation scenario for one of the operating crews that had demonstrated performance weaknesses during an earlier evaluation scenario at the beginning of the week. The inspectors observed that an operations supervisor was one of the evaluators for the scenario. The inspectors reviewed the administered scenario for event applicability, sequencing, and capability to make an effective evaluation of operator performance. The inspectors determined that the scenario was fairly complex, but did not appear to be very challenging. The scenario itself was coordinated well, and implemented as designed, by the simulator booth operator and the senior evaluator.

The inspectors also observed that the reactor operators frequently stood with their backs to the control panel throughout the course of the scenario. This was particularly true when an operator became involved in reviewing piping diagrams, or procedures, or speaking with outside operators on the telephone. This point emphasizes the observation made regarding the in plant control room operator performance. See Section 01.2.

c. Conclusions

The training department procedures were complete and were being followed by the training staff but some typographical errors needed to be corrected. The training observed was detailed, accurate, and comprehensive, and was taught by competent and knowledgeable instructors.

07 Quality Assurance in Operations

07.1 Condition Evaluation, Reporting, and Trending System

a. Inspection Scope (40500)

The inspectors reviewed the implementation of the Condition Evaluation Report (CER) program. This program is governed by Station Administrative Procedure (SAP)-1122, Condition Evaluation, Reporting, and Trending System, Revision 0, issued on July 16, 1996.

b. Observations and Findings

The licensee implemented the CER program as a replacement for the Off-Normal Occurrence (ONO) program in July 1996. The purpose of the program was to identify, document, evaluate, report, and verify resolution of conditions potentially adverse to quality and/or the reliability of the station. The CER program requires a CER to be written for a broader range of problems, deficiencies, or errors than under the ONO program. The reporting threshold was also lowered under the CER program to include problems and deficiencies that were not covered under the ONO program. As a result, a larger number of CERs was expected to be prepared compared to the ONO program. In addition, tracking and trending of plant problems was included as an integral part of the CER program.

In 1993 and 1994, 63 and 95 ONOs were written, respectively. In 1995, the ONO program was revised to lower the threshold at which an ONO would be generated. As a result, 226 ONOs were written in 1995. This change was temporary and was to remain in effect until the CER program was in place to replace the ONO program. Since July 22, 1996, approximately 273 CERs have been written. When the CER program was established, the licensee predicted that approximately 1000 CERs per year would be written. Based on the current rate of CER generation, 720 CERs will be written in 1996.

On September 23, the licensee completed the first assessment of the CER program and published the results in CER 96-205. The inspectors reviewed this CER which identified eight weaknesses and four recommendations for improvements to the program. The weaknesses and recommendations indicate the assessment was thorough and critical. The licensee plans to conduct more such self-assessments in the future to make the transition from the ONO program to the CER program as efficient as possible.

c. Conclusions

The initiative to replace the ONO program with one that covers more areas and lowers the threshold of documentation was considered a significant improvement. The review of the CER program indicated that, although needed improvements were identified, the administration and support of the program was adequate.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Open) Unresolved Item 50-395/96007-04: failure to meet control room human factor engineering criteria for control board instrumentation. As documented by NRC Inspection Report Nos. 50-395/95-15 and 50-395/96-07, a number of the instruments on the main control board were reading outside of their normal operating range as indicated by green identification bands. Drawing Nos. 201-321 through 201-334 provided details on the control board instrumentation and the range of these green bands. The inspectors noted that nine of these 14 drawings were marked to indicate that revisions to the control board green band instrumentation was to be performed by modification MRF 90102C. Modifications were required for 84 instruments. The green bands were being changed when the instruments were removed from service for their routine calibration. The green bands on 24 instruments where changed during the 1996 refueling outage. The green bands on the remaining instruments required to be changed were scheduled to be completed prior to the end of the first quarter in 1997. This item remains open pending completion of the modification.

O8.2 (Closed) URI 50-395/95010-01: documentation of records of training deficiencies noted during annual requalification examinations as required by 10 CFR 55.59(c). Inspection Report 50-395/95-10 identified that individual operator training records did not appear to document specific performance deficiencies noted during simulator evaluations. The licensee examiners formally documented crew performance weaknesses but individual weaknesses were tracked informally by the senior instructor. Since that inspection, the licensee has established a process to document individual performance deficiencies for each operator's training record. The inspectors verified these deficiencies were communicated to the operators in writing immediately following completion of their examinations. Also, the licensee developed a computer database to better track and evaluate the areas needing additional emphasis (focus training) for each operator during subsequent requalification training segments. The inspectors verified these facts

by review of seven (11 percent of all records), randomly chosen, operator training records and review of the new computer database.

08.3 (Closed) IFI 50-395/95010-02: use of WOG ERG based generic critical tasks for critical task development. Inspection Report 50-395/95-10 identified that some crew critical tasks did not have measurable performance indicators that reflected the V. C. Summer plant specific operating characteristics. Consequently, the use of these examination criteria were not an effective measure of crew performance. Since that inspection, the licensee has undertaken an upgrade program for all crew critical tasks. As critical tasks are used in support of training and evaluation simulator scenarios, instructors evaluated the tasks for validity and revised them as necessary. The inspectors independently reviewed a sample of ten critical tasks for validity. On paper, these critical tasks appeared to be appropriate and valid. The inspectors noted that the licensee's program was still in progress but that regular progress was being made towards their management goal of completing all critical task reviews by December 31, 1996.

08.4 (Closed) IFI 50-395/95010-03: lack of operations management participation in annual requalification examinations. Inspection Reports 50-395/95-10 and 50-395/94-300 identified that operations management routinely failed to observe the performance of the licensed operators during annual operating examinations and other evaluation simulator scenarios. Missing this independent participation in the training evaluation process, operations management lacked perspective for the significance of performance errors and oversights made by the operators and documented by the training department. Additionally, operations management, by its absence, was unable to reinforce their performance expectations to the operators. Based on direct observation of a simulator evaluation scenario, inspection of management observation documentation records, and an interview with the Manager of Operations, the inspectors confirmed the consistent presence of operations management during training evaluations over the last twelve months. The observations and comments made by the management participants were objective and often critical of specific operator performance. This information was routinely incorporated into the overall crew evaluation and feedback was provided directly to the operators on operations management expectations.

08.5 (Closed) IFI 50-395/95010-04: reactivation of licensed operators. Inspection Report 50-395/95-10 identified that Operations Administrative Procedure (OAP)-101.4, Operator Watchstanding Certification and Tracking, did not describe what was considered a complete plant tour as required by 10 CFR 55.53(f)(2). The inspectors reviewed OAP-101.4 and confirmed that it had been revised to delineate the vital plant areas the operator was to tour during the reactivation process. The inspectors determined the list was comprehensive and appropriate for the scope of a plant familiarization tour. The inspectors also interviewed

the Manager of Operations and confirmed that operations management expectations for the license reactivation process were consistent with the intent of 10 CFR 55.53.

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:

- PMTS PO164889, XPP0039B B Service Water Pump Inspect and Repair As Necessary.
- MWR 9604019, Determine Cause Of Valve Leaking By and Correct HCV00936-SI, C Accumulator Vent Control Valve.
- MWR 9603859, Investigate and Correct Cause of Frequent Alarms, SD Line Drain Pot Level HI-HI Alarm.
- MWR 225940362, Modification of Control Circuit For XVG-9684C-CC - Component Cooling Water to Charging Pump C.

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 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

Maintenance activities were conducted thoroughly and professionally.

M1.2 Review of Service Water (SW) Pump B Motor Removal and Maintenance

a. Inspection Scope (62707)

The inspectors observed the removal of the B SW pump motor from the service water building and verified that the licensee complied with their analysis for NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, during the SW pump motor lift. In addition, the work performed on the pump and pump motor was reviewed.

b. Observations and Findings

The inspectors observed the lift of the B SW pump motor out of the SW building. The motor weighed approximately 17,000 pounds.

The pump motor was moved on a hoist from its mounting on the pump to a cart near the SW building missile shield door and rolled out the building. As the licensee's analysis stated it was physically impossible for the hoist to travel over an operating SW pump and traveling screen while carrying this load. Although there were SW discharge lines below the floor over which the pump motor was carried, the licensee's structural analysis concluded that the floor could withstand the impact of a 10 ton load without severe loss of structural integrity of the floor. The motor was moved out of the building without incident. The inspectors concluded that the pump lift was conducted safely and that the licensee had adequately reviewed potential concerns for the lift of heavy loads.

The inspectors also observed portions of other work performed on the B SW pump motor and reviewed the completed Maintenance Work Request (MWR), MWR 95T3339, and PO164889. The inspectors identified no concerns.

c. Conclusions

The lifting and movement of the B service water pump motor out of the service water building was conducted safely and met the assumptions in the Control of Heavy Loads lifting analysis. The maintenance activities on the B service water pump were conducted thoroughly and professionally.

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:

- STP-501.001, Weekly Battery Surveillance A Battery, Revision 7.
- STP-501.002, Quarterly Battery Surveillance, Revision 7.
- STP-395.055, Refueling Water Storage Tank Level Instrument 1LT00991 Operational Test, Revision 5.
- STP-396.012, Emergency Feed Pump Pressure II Instrument (1PT03633) Operational Test, Revision 4.
- STP-503.003, Functional Test of SW TO EF Cross Connect Circuits, Revision 5.

- STP-170.011, Fire Switch Functional Test For XFN0046B And XFN0047, B And C Chg/SI Pump Rm Fans, Revision 2.

b. Observations and Findings

The inspectors found that the tests were conducted using correct procedures and test equipment. Personnel conducting the tests were knowledgeable and performed the testing as required.

c. Conclusions

All observed surveillance activities were conducted in a professional manner and resulted in a high degree of confidence that the tested components would perform as designed.

M3 Maintenance Procedures and Documentation

M3.1 Failure of FCV-113A To Open On Automatic Makeup to Volume Control Tank (VCT)

a. Inspection Scope (62707)

On September 12 when an automatic makeup to the VCT started, FCV-113A, the blender boric acid inlet flow control valve, did not open on demand. The inspectors reviewed the event, its causes and the licensee's response.

b. Observations and Findings

On September 12 at about 1:55 p.m., when an automatic makeup to the VCT started, the reactor operator observed that FCV-113A did not open and stopped the makeup. After discussion with the Control Room Supervisor (CRS) the operator reenabled the automatic makeup to verify that FCV-113A would not open on demand. The system was again secured when the valve did not open. The licensee calculated that approximately 50 gallons of reactor makeup water was added to the VCT before the makeup was secured. Due to the RCS dilution, turbine load was reduced about 10 MWe to prevent exceeding any core thermal limits. During this time boration capability was maintained from the boric acid tanks through the emergency boration valve.

The subsequent investigation determined that mechanical maintenance had earlier adjusted the packing on FCV-113A which mechanically bound the valve. After the packing adjustment, the valve had not been stroked.

A cause of this event was a miscommunication between the mechanical maintenance supervisor and the operations Shift Supervisor (SS). The SS when reviewing the task (MWR 96T3321) understood the work was to clean and inspect the valve. The work order stated that the valve was to be cleaned and adjusted. The SS was therefore unaware that a valve stroke test was necessary.

Another cause of this event was a failure by maintenance to follow their maintenance procedure. Mechanical Maintenance Procedure, (MMP)-445.001, Adjusting and Packing Valves, Revision 10, Section 7.7, Post Maintenance Testing, requires stroking a valve before returning it to service. The subsequent investigation in to this event identified that the procedure data sheet used during this maintenance was confusing in that it could be interpreted to mean that a valve stroke was not necessary. The inspectors reviewed the procedure and concluded that the data sheet could be misinterpreted, but the wording in the body of the procedure was clear in the requirement for a valve stroke test.

The licensee indicated that the maintenance procedure would be revised to clarify the valve retest requirements. This failure to follow procedure is a violation of TS 6.8.1. This licensee identified and corrected violation is being treated as an NCV, consistent with Section VII.B.1 of the NRC Enforcement Policy. This NCV is identified as 50-395/96011-01.

c. Conclusions

An NCV was identified for failure to follow a maintenance procedure for adjusting the packing of valves. As a result of this error, during automatic makeup to the VCT the boric acid valve was mechanically bound and could not open on demand. This created the potential for an inadvertent dilution of the core.

M3.2 Review of Penetration Isolation Verification Surveillance.

a. Inspection Scope (61726)

The inspectors reviewed monthly TS surveillance test procedure STP-115.001, Penetration Isolation Verification, Revision 11. The inspectors walked down the procedure to determine procedure accuracy and compared information in the FSAR with the containment penetrations listed in the surveillance.

b. Observations and Findings

The purpose of the surveillance test is to verify that all penetrations not capable of being closed by operable containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in their positions. The inspectors reviewed the containment penetrations listed in the FSAR against those listed in the procedure and found they did not completely agree. Penetrations listed in the FSAR as 230A,B,C,D,E and 417A,B,C,D,E were listed as penetrations 230 and 417 in the surveillance procedure. The inspectors found from the FSAR review that all the other appropriate penetrations to be verified closed in order to meet the surveillance requirement were listed in the procedure.

The inspectors' walkdown of the penetrations in the procedure identified that the procedure did not accurately describe the physical

configuration in the plant. The inspectors found that penetrations, 230A,B,C,D,E and 417A,B,C,D,E were not adequately described in the procedure. The penetrations were described in the procedure as spare tube seals. Penetrations 230A,B,C and 417A,B,C were RVLIS penetrations with small diameter tubing running from the containment wall to the RVLIS transmitters that provided isolation. Penetrations 230D,E and 417D,E were spares with small diameter capped tubing.

The inspectors were concerned that clear discrepancies between the surveillance procedure and the physical configuration of the plant had not been identified during the conduct of this surveillance. The inspectors concluded that this was a weakness in the performance of this procedure by Operations.

The inspectors concluded that the safety significance of this failure to establish an adequate procedure for these activities was minimal. Based on discussions with Operations personnel and the inspectors' plant walkdown there was no evidence identified to indicate that the penetrations were not closed or that the intent of the surveillance had not been met. This failure constitutes a violation of minor significance and is being treated as a NCV, consistent with Section IV of the NRC Enforcement Policy. This NCV is identified as 50-395/96011-02.

The inspectors' review of the FSAR identified that Section 6.2 of the FSAR incorrectly identifed penetrations 230A,B,C and 417A,B,C as reactor building pressure sensing lines. The FSAR describes all the instrument sensing lines that penetrate containment as provided with isolation valves in accordance with Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment, except for four lines necessary for sensing reactor building wide range pressure. The method of isolation for the RVLIS is not discussed in the FSAR although the RVLIS contains no isolation valves. The inspectors verified that there are four other containment penetration lines that sense reactor building pressure.

c. Conclusions

The inspectors identified an NCV for failure to establish a containment penetration isolation verification surveillance procedure that adequately described the penetrations to be verified closed. The inspectors also identified a weakness in the conduct of this procedure by Operations in that the procedural deficiencies were not identified during the conduct of the surveillance. The inspectors also identified that the FSAR incorrectly described two RVLIS containment penetrations.

M4 Maintenance Staff Knowledge and Performance

M4.1 Plant Work Standdown

a. Inspection Scope (62707, 40500)

The inspectors observed plant managements' activities to heighten awareness and sensitivity to personnel errors.

b. Observations and Findings

On September 19, the inspectors observed the licensee conduct a plant wide work standdown. The standdown was conducted by plant management to convey their concern to the plant workforce for the potential for personnel error and to reinforce ways to reduce error. Personnel errors have not been high and have not increased at V. C. Summer. Based on experience, however, plant management recognized that they were susceptible to an increase in personnel errors. The work standdown was conducted to reinforce to plant personnel the need for continued care.

Management discussed several recent significant personnel errors and their causes, discussed changes in plant policies to reduce employee distractions, an actual self-checking exercise was observed, a talk by an Institute of Nuclear Power Operations (INPO) trainer on personnel error was conducted, and a video on self-verification was presented.

The inspectors observed that this effort was received positively by the plant workforce and concluded that plant management was proactive in conducting the work standdown. This effort was effective in heightening awareness to personnel error and the need for self-verification and effective communication.

c. Conclusions

Plant management was proactive in conducting a plant wide work standdown to heighten awareness and sensitivity to personnel errors and the need for self-verification and effective communication. This effort was received positively by the plant workforce.

III. Engineering

E1 Conduct of Engineering

E1.1 Review of Instrument Loop Testing

a. Inspection Scope (37551)

The licensee identified during their review of Generic Letter 96-01, Testing of Safety-Related Logic Circuits, that energize to actuate relays in instrument loops for automatic transfer of the suctions of the emergency feedwater pumps to service water on low suction pressure, and automatic opening of the containment recirculation sump suction valves for the RHR and spray pumps on low-low refueling water storage tank level were not being tested. The inspectors reviewed the licensee's justification for not testing these relays previously and reviewed the revised surveillance procedures to test these relays.

b. Observations and Findings

The inspectors reviewed the licensee's justification for not having tested the Refueling Water Storage Tank (RWST) and Emergency Feedwater Water (EFW) relays in the past. The justification referenced the Technical Specification Bases and the FSAR. The inspectors reviewed the TS and FSAR sections referenced by the licensee.

The TS Bases 3/4.3.1 and 3/4.3.2 for reactor trip and engineered safety feature (ESF) actuation system instrumentation refer to these two automatic logic functions as not necessary for ESF system actuation but their functional capability at the specified setpoints enhances the overall reliability of the ESF functions. The FSAR sections 7.2.2, Reactor Trip System, and 7.3.2, Engineered Safety Features Actuation System, contain no specific requirements for testing of these functions.

The inspectors concluded that the licensee was justified in not previously testing these two functions. The inspectors also concluded that the licensee had exhibited conservative decision making in deciding to be consistent with other functions tested and test these input relays on a quarterly basis with other analog channel operational tests.

The inspectors reviewed the elemenlary wiring diagrams and the licensee's procedural changes to STP-395.055, Refueling Water Storage Tank Level Instrument 1LT00991 Operational Test, Revision 5, and STP-396.012, Emergency Feed Pump Pressure II Instrument (1PT03633) Operational Test, Revision 4, and concluded that the revisions tested the relays in a safe manner.

c. Conclusions

The inspectors concluded that the licensee had adequately justified not previously testing the RWST relays and the EFW swapover relays since they were not considered ESF relays. The licensee exhibited conservative decision making in deciding to test these relays.

E1.2 Maintenance Rule (a)(1) Systems

a. Inspection Scope (37551)

The inspectors observed the licensee's monthly meeting covering the Maintenance Rule (a)(1) systems.

b. Observations and Findings

System Engineering once a month at the daily morning management meeting discusses the Maintenance Rule (a)(1) systems and goes over in detail the status and goal setting for several of the (a)(1) systems. Nine of the 70 plant systems covered by the Maintenance Rule are in category (a)(1). On September 18, the inspectors observed a presentation to plant management on the Chemical and Volume Control system, building services, and balance of plant and process instrumentation and controls.

The inspectors concluded that the licensee, as required by the maintenance rule, is practicing goal setting which includes a cause and corrective action, and is monitoring the effectiveness of the corrective actions for a specific duration. The inspectors also concluded that the (a)(1) systems are receiving appropriate management attention.

c. Conclusions

The inspectors concluded that the licensee, as required by the maintenance rule, is practicing goal setting which includes a cause and corrective action, and is monitoring the effectiveness of the corrective actions for a specific duration. The inspectors also concluded that the (a)(1) systems are receiving appropriate management attention.

E1.3 Identification and Resolution of Equipment Problems

a. Inspection Scope (37550)

Several examples of the licensee's performance in the area of identification and resolution of problems were reviewed. Regulatory requirements associated with this review were provided by 10 CFR 50 Appendix B.

b. Observations and Findings

Engineering appropriately resolved a problem related to the Spent Fuel Pool that was addressed in NRC Inspection Report 95-18, related to an inconsistency between the Technical Specifications (TS) and SFP heat up analysis. The TS 3.9.3 prohibited the movement of fuel until the core had been subcritical for 100 hours, but the design basis calculations for refueling operations assumed that fuel had cooled for 144 hours after sub-criticality. The inspectors reviewed the licensee's corrective action for this discrepancy. The licensee re-calculated the spent fuel pool heat-up. This analysis was done in conjunction with power upgrade project. Results of this calculation were included in the power upgrade submittal made to the NRC, dated April 12, 1996. The calculation assumed initial conditions consistent with the TS.

A negative trend in core flux tilt was identified by the licensee and actions were initiated to resolve this concern. Over the years of operation, the licensee noted that the core flux tilt reading was trending away from a symmetrical flux distribution. The licensee assembled a team of engineers to evaluate this trend. The team included a representative from Westinghouse Electric Corporation and a consultant from a university. The team studied other reactors, and noticed a correlation between the flux tilt problem and the procedure for shuffling fuel bundles. Those cores showing a poor flux tilt had fuel bundles moved 180 degrees and those cores showing a good flux tilt had bundles moved 90 degrees or 270 degrees in the fuel shuffle. Engineering determined that the poor flux tilt was caused by the 180 degrees moving of bundles during fuel shuffle. The licensee changed their fuel shuffle procedures at their next refuel outage which resulted

in correcting the negative flux tilt trend. The inspector reviewed the flux tilt surveillance data sheets immediately before and after the procedure change which demonstrated the improvement.

Another issue identified and resolved by the licensee which demonstrated Engineering resolution of equipment problems was documented in Off-Normal Occurrence (ONO) reports 960205 and 960206, both opened on April 29, 1996, and closed on May 30, 1996. These problem reports dealt with solid state trip devices not operating properly. Engineering's cause analysis determined that the problem was a wiring error in the solid state trip device. They also determined that the error was such that it could not be detected by the normal single phase primary injection test method. To resolve this situation, Engineering developed a three phase test circuit and recommended performing an additional test using this circuit which would demonstrate whether the trip device is sensing the correct three phase wave form.

NRC Inspection Report 95-05, Paragraph 5.b, discussed a situation where the Resident Inspector noted a knocking noise at the Component Cooling Water (CCW) heat exchanger. The noise was determined to be cavitation at the service water outlet valve XVB03123B. The inspector followed-up on the licensee's actions to resolve this potential concern. The licensee had made an ultrasonic thickness determination on February 22, 1996, (refer to report Nos. VCSU-1448 and 1449) to determine whether any pipe wall thinning had taken place. The ultrasonic measurements showed that no wall thinning had taken place.

c. Conclusions

The resolution of the core flux tilt, static trip device issues, and CCW heat exchanger cavitation were examples of effective problem identification and resolution.

E2 Engineering Support of Facilities and Equipment

E2.1 Turbine Driven Emergency Feedwater (TDEFW) Pump Manual Speed Control Problems

a. Inspection Scope (37551)

During the performance of the monthly surveillance test of the TDEFW pump on October 1, a manual speed control problem was experienced. Specifically, the upper speed range of the manual speed control on the governor allowed the turbine speed to increase above the acceptable range stated in the test acceptance criteria. The inspectors reviewed the actions taken by plant engineering personnel to resolve this problem.

b. Observations and Findings

Surveillance Test Procedure (STP)-220.002, Turbine Driven Emergency Feedwater Pump Test, Revision 1, Section 6.4.9, specifies the actions

necessary to test the local speed control of the TDEFW pump. This portion of the STP is performed every three months and was performed on October 1. Steps F, G, and H in this section test the upper range of the manual speed control which is required to be within 4017 to 4200 Revolutions Per Minute (RPM). During the October 1 test, the speed increased to 4286 RPM which was outside the acceptance criteria. The licensee, with assistance from the governor vendor representative, made adjustments to the governor to correct the manual speed control. The STP was re-performed with satisfactory results and the TDEFW pump was placed back in service.

As described in NRC Inspection Report 50-395/96-09, the TDEFW pump had experienced low speed oscillation problems since July 1996. In August 1996, the licensee performed maintenance on the governor, governor valve, and the connecting linkage. Following this maintenance, the normally scheduled monthly STP was performed as a post maintenance test which yielded satisfactory results. This test did not include any speed control test since this section was not scheduled to be done in that month. The work done on the governor at that time appeared to be independent of the manual speed control circuit. After additional governor problems were experienced on October 1, the licensee assembled a root cause analysis team to investigate the circumstances of the TDEFW pump problems since July.

General Test Procedure (GTP)-214, Post Maintenance Testing, Revision 2, indicates that if pump turbine governor linkage adjustment or rework is done, a speed control test should be part of the post maintenance test. This would include the type of work done in August 1996. However, the post maintenance testing requirement specified on the Maintenance Work Request (MWR) for that work simply stated to perform STP-220.002. There are eight different tests covered in this STP but the MWR did not specify which test should be performed. The Test Unit assumed that a re-performance of the same test that originally failed would be adequate. The inspectors noted that if a speed control test had been specified to be performed following the August maintenance, the problems experienced on October 1 would likely have been avoided. At the end of this inspection period the licensee's root cause team was completing its investigation. A report of their findings was anticipated about October 29, 1996. Pending a review of this report, this will be considered an Unresolved Item (URI) 50-395/96011-03.

Following the overspeed event on October 1 and the subsequent governor adjustments and retest, the pump was declared operable and the action statement associated with TS 3.7.1.2 was exited. The precautions section of STP-220.002, paragraph 2.1, states "Do not exceed a turbine speed of 4200 RPM". On this date, the turbine speed was recorded as 4286 RPM. The inspectors observed that no documented justification was provided concerning possible damage to the pump resulting from the overspeed condition prior to exiting the action statement and placing the pump back in service. A justification was performed as part of the root cause analysis effort which concluded that the pump could continue to perform its design basis function. The inspectors reviewed this

document and agreed with its conclusions. However, the inspectors considered the lack of documented justification concerning possible pump damage prior to placing the pump back in service to be a weakness.

c. Conclusions

An URI was identified concerning the adequacy and methodology of post maintenance testing following TDEFW pump governor and linkage work. A weakness was identified due to a lack of adequate documented justification of TDEFW pump operability following an overspeed event prior to the equipment being declared operable.

E2.2 7300 Process System Card Replacement/Refurbishment Program

a. Inspection Scope (37551)

The inspectors reviewed the licensee's 7300 process system card replacement/refurbishment program.

b. Observations and Findings

The licensee identified that the plant has experienced a 7300 process system circuit card failure rate higher than industry average. As a result of this condition, a plan was developed to address card replacement/refurbishment.

There were 165 circuit cards identified whose failure could result in a significant plant transient and challenge to control room operators. Ninety-five of these cards were replaced during the recent refueling outage. The licensee plans to replace the remaining high priority cards before the end of 1996.

Other efforts by the licensee include identification of the root causes for the various card failures and implementation of improvements to increase reliability. The licensee is also participating in industry efforts in the use of new technologies to replace the 7300 process cards.

The inspectors concluded that this was a good initiative by the licensee to enhance the reliability of the 7300 process system.

c. Conclusions

The inspectors concluded that the licensee's recognition of a higher than normal 7300 process system card failure rate and efforts to replace high risk cards, identify the root causes, and participation in efforts to identify new technologies were good initiatives.

E2.3 Review of Time Delay Addition To Main Control Board Annunciator

a. Inspection Scope (37551)

The inspectors reviewed the engineering controls associated with the addition of a half-second time delay to the Main Control Board (MCB) steam dump line drain pot high-high level annunciator.

b. Observations and Findings

On October 23, the licensee installed a half-second time delay on the MCB steam dump line drain pot high-high level annunciator to reduce nuisance alarms. The modification to the annunciator circuitry involved the addition of a capacitor to a circuit card to create the time delay. The work was completed using a work order and an Engineering Technical Work Record that provided technical guidance.

During the review of this change the inspectors noted that similar changes, the addition of a half-second time delay, to MCB annunciator circuits had been made several times before. The previous changes included power range detector high flux deviation alarms and power range channel deviation alarms. The inspectors questioned the licensee's process for this apparent modification since it did not follow the licensee's established procedures for modifications. The inspectors concluded from their review of this change that the licensee was justified in using the work order process rather than preparing a plant modification. The annunciator system is not safety related and this change to the alarm circuitry would not affect plant design. The licensee had also performed a 10 CFR 50.59 screening that found that these time delay changes had no effect on plant descriptions in the FSAR. The licensee agreed that the process to make these changes to the annunciator system could be more formalized and has prepared a proposed Instrumentation and Control (I&C) procedure change.

c. Conclusions

A review of a change on a main control board annunciator alarm circuit that added a half-second time delay to prevent nuisance alarms concluded that the licensee was justified in using the work order process to make changes to this non-safety related system.

E2.4 Support to Operations

a. Inspection Scope (37550)

The inspectors reviewed Engineering's performance which demonstrated operations support. Examples included response to plant equipment problems and actions to improve equipment reliability. Regulatory requirements associated with this review activity were provided by 10 CFR 50 Appendix B.

b. Observations and Findings

The timeliness of Engineering's response to plant issues was demonstrated by the relatively short turn around time for Nonconformance Notices (NCNs), and Condition Evaluation Reports (CERs), which was routinely less than two weeks. No NCNs or CERs were older than 6 months. A sample review of NCNs and CERs demonstrated that the evaluations and resolutions were generally thorough. One exception regarding thoroughness was identified and is discussed in the following paragraph. This exception did not reflect typical licensee performance in this area.

The inspectors identified an example of inadequate corrective action for NCN 5344, dated March 14, 1996, related to a failed American Solenoid Company (ASCO) solenoid valve which resulted in an inoperable Train A Charging Pump. The NCN identified the root cause as a design control error which installed a valve that was underrated for system conditions. The valve was rated for a 45 pounds per square inch (psi) air system and was installed in a 100 - 115 psi station air system. Engineering approved a valve substitution recommended by the Architect/Engineer (A/E) in the design development phase of the associated modification which did not identify the valve pressure rating as a critical characteristic. The valve originally specified in the design change package Procurement Technical Report was appropriately rated. The NCN corrective action promptly corrected the adverse condition by lowering the valve supply pressure to 45 psi; however, the corrective action did not address the design control error which installed the under rated valve. This is identified as Violation 50-395/96011-04.

Several Engineering initiatives demonstrated support to operations. The program to reduce operator-work-arounds focussed management attention and engineering resources to resolve these items. The existing 13 operator-work-arounds were less than 1 year old and each was assigned an individual for monitoring and resolution. Management update was routinely provided in Plan-of-the-Day and Management meetings. The System Engineering Major Focus List included the top equipment reliability issues. The Design Engineering Major Focus List included programmatic and generic industry issues. Engineering was involved in the validation of Emergency Operating Procedures which was accomplished in May 1996.

There were examples of equipment performance improvement resulting from Engineering activities. Reactor Coolant pump seal leakage was a concern identified in January 1995. Engineering provided evaluations to support continued operation and analyzed and resolved the seal problems. Continued monitoring of seal leak-off indicated that the concern was resolved. A modification was implemented to provide cooling water to the Charging and Component Cooling Pumps from the Component Cooling System rather than the less reliable chill water system. Chill water system unreliability was a vulnerability identified in the licensee's Probabalistic Risk Assessment core damage frequency analysis.

Another example of Engineering's support to operations was related to the development of a cross reference for computer inputs and annunciator alarms to improve the Control Room Operators knowledge of which computer inputs during testing would cause annunciator alarms. During trouble shooting on computer inputs, several control room annunciators went to the alarm condition. The annunciators in question were driven by computer outputs generated by computer calculations, such as "RCS Leak Detection Greater than 1 gpm." The operators, while aware that trouble shooting was in progress, did not expect that the particular annunciators would go to the alarm condition. Operations expressed a concern that they should know in advance of work being performed and which computer inputs relate to which annunciators. To address this concern, Engineering generated Engineering Services Technical Report No. 09020-001 Computer Points that Alarm to Main Control Board. This report delineates the relationship of computer inputs, computer outputs and main control board annunciators. The inspector reviewed this report, and concluded that it adequately addressed the concern of Operations.

c. Conclusions

Engineering response to plant problems as documented in the station deficiency reporting system was appropriately thorough and timely. The exception noted in the violation for inadequate corrective action did not reflect typical licensee performance in this area. Several examples of Engineering initiatives and design changes demonstrated good engineering support of Operations.

E4 Engineering Staff Knowledge and Performance

E4.1 Backlogs

a. Inspection Scope (37550)

The inspectors reviewed the licensee's backlog of engineering work to determine if plant issues assigned to Engineering were appropriately prioritized, evaluated and resolved. The engineering products reviewed for backlog included plant modifications planned, modification closeouts, maintenance work orders on engineering hold, NCNs and CERs assigned to engineering, and drawing updates. Backlogs were reviewed for age, quantity, and significance. The requirements of 10 CFR 50 Appendix B were the basis for this review.

b. Observations and Performance

There were approximately 60 modifications awaiting implementation; no significant safety issues were apparent. There were 42 implemented modifications that had not completed the closure process. The critical drawings and procedures had been updated prior to operations turnover of the modified equipment. The non-essential drawings and documentation were being processed. There were 10 MWRs on engineering hold, the oldest were approximately one year old. No significant equipment issues were associated with these MWRs. The approximately 60 NCNs and CERs

assigned to Engineering were less than 6 months old. The turn around time by Engineering for NCNs and CERs was routinely about 2 weeks. There were 4400 drawings to be revised. A large portion of these were from the previous Steam Generator Replacement and Power Upgrade modifications. The licensee's recently developed computer aided design drawing control process was scheduled to revise 2200 of these drawings by December 1996. There was no backlog of essential (critical to operations) drawings.

c. Conclusions

The age, quantity, and significance of engineering backlogs indicated that plant issues assigned to engineering were appropriately prioritized, evaluated, and resolved.

E6 Engineering Organization and Administration

E6.1 Transition of Design Engineering's Roles and Responsibility

a. Inspection Scope (37550)

The inspectors reviewed the licensee's activities to reconfigure the role of the onsite Design Engineering (DE) organization. The regulatory guidance for this review was 10 CFR 50 Appendix B.

b. Observations and Findings

Previously, DE's primary role was the oversight of design activities. The A/E, Gilbert Associates/Parsons, provided the majority of engineering design services including design change development and maintenance of the design basis documentation. In 1994, the licensee initiated a Configuration Management Program Plan to reduce the reliance on vendor engineering services and establish DE as the custodian of the design basis documentation. The plan established a process and schedule for the transition of DE's role that was anticipated to last for five years. At this point the transfer of the first phase of the plan, assumption of the design basis documentation, was near completion and is expected to be completed in 1997. The final two phases include an assessment and integration of onsite design activities with the new DE's role. During the current phase of the plan, the A/E continues to provide engineering services and provides an independent review of licensee design activities.

c. Conclusions

The transition of DE's role from oversight to increased design development and custodian of the design basis documentation was well planned. Implementation of the plan was at an appropriate pace to preclude a degradation of design product quality. The assumption of the role of design basis document custodian provides a mechanism for the licensee to verify the completeness of their design basis documentation.

E7 Quality Assurance in Engineering Activities

E7.1 Review of Updated Final Safety Analysis Report (UFSAR) Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compared plant practices, procedures and/or parameters to the UFSAR description. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the FSAR that related to the areas inspected. Discrepancies were identified.

The inspectors' review of the FSAR identified that Section 6.2 of the FSAR incorrectly identifies containment penetrations 230A,B,C and 417A,B,C as reactor building pressure sensing lines. The FSAR describes all the instrument sensing lines that penetrate containment as provided with isolation valves in accordance with Regulatory Guide 1.11 except for four lines necessary for sensing reactor building wide range pressure. The method of isolation for the RVLIS is not discussed in the FSAR although the RVLIS contains no isolation valves. Additional information on this discrepancy is contained in Section M3.2.

E7.2 Conduct of Quality Assurance

a. Inspection Scope (40500)

The inspectors reviewed the licensee's QA program to determine the quality and number of assessments performed, the activities reviewed by the QA group, and the licensee's responsiveness to QA findings.

b. Observations and Findings

The inspectors found that the QA group was performing the internal audits and surveillances as specified in the licensee's Operational Quality Assurance Plan. Overall the inspectors found that many of the audit findings reviewed were substantive and provided an independent self-assessment in a broad range of areas. The inspectors found that the QA reports appeared to accurately reflect the findings of the auditors. The reports were independently prepared and line management was not involved in the preparation of the audit reports. The inspectors noted that audits in the engineering and fire protection areas provided significant independent feedback to the groups concerned. The audits in engineering and fire protection also reflected that independent assessments were being directed to areas of concern in the plant.

A review of audit findings and discussions with the manager of Quality Systems and supervisor of QA indicated there was a negative trend in line managements responsiveness to QA audit findings. The inspectors found that there was not an overly large backlog of audit findings. An indicator of this negative trend was an increase in the number of QA findings that required escalation to the next level of management for

resolution. Escalation is required when completion of corrective action is not timely or is considered unacceptable or not appropriately comprehensive. The inspectors' review of this issue with plant management indicated that they were aware of this negative trend and were taking action to correct it.

c. Conclusions

The Quality Assurance group was found to be performing the internal audits as required. Several of the audit findings were substantive and provided a good independent self-assessment in a broad range of areas. A negative trend in line managements responsiveness to QA findings was identified. Plant management was taking action to correct the negative trend.

E.8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) IFI 50-395/95005-01: susceptibility of containment sump isolation valve to pressure locking. This item addressed a potential condition of pressure locking on containment sump isolation valves XVG 8811A and B. Engineering evaluations dated July 11, 1994, and March 3, 1995, did not provide adequate justification to conclude that the pressure locking condition would not occur on these valves. The IFI was initiated to follow up the resolution of this issue.

The potential for pressure lock on these valves was eliminated by a modification to drill holes in the high pressure side disk of the valve. This resolution was consistent with the licensee's February 13, 1996, response to Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety Related Power Operated Gate Valves. Minor Modification, MCN 22765-B, completed on May 9, 1996, implemented the final resolution to the pressure locking concern on these two valves.

E8.2 (Closed) IFI 50-395/95007-01: main steam drain line vibration problem. This item addressed a vibration concern on the 12-inch main steam drain lines, particularly the Train B drain line which experienced apparently excessive visual vibratory movement. The licensee evaluated several resolution options and decided to replace the existing mechanical snubbers with hydraulic snubbers that have improved dampening capability. The inspectors reviewed the design change and MWR documentation and field verified the installation of the Train B hydraulic snubbers. These snubbers were replaced in March 1996. The Train A and C drain line snubbers, which experienced less movement, were scheduled for replacement in 1997.

E8.3 (Closed) VIO 50-395/95008-02: failure to control design of safety related (SR) ventilation system. This violation which was against 10 CFR 50, Appendix B, Criterion III, Design Control, involved a case where a fire damper, which had been purchased non-safety-related, non-seismic, was installed in an application that required a seismically designed damper. The error was noticed by the licensee within one day of the installation, and an NCN was written for that problem.

As part of the corrective action, a root cause analysis was performed for the event, and the cause was attributed to personnel error. Several individual errors had occurred in the purchasing and work control process. The inspectors reviewed this root cause analysis, and discussed it with the cognizant engineers. The inspectors agreed that the root cause was personnel error. The corrective action was installation of a correct damper and training of personnel. The inspectors confirmed that a safety-related, seismic damper was installed through review of Purchase Order No. Q666907 (Requisition No. 520469). The inspectors examined the damper installation in the plant, and did not identify any deficiencies. The inspectors confirmed that the committed training had taken place through review of training records.

E8.4 (Closed) VIO 50-395/95012-02: two examples of failure to follow procedure. This item addressed examples of procedural non-compliance by Engineering and Maintenance. The licensee's response to the violation, dated August 25, 1995, identified the root cause as human performance error and specified corrective actions to resolve associated plant applications and implement personnel discipline and staff briefings. The first example was related to engineering's failure to performance an adequate independent review of a nuclear instrumentation calibration; the second involved maintenance on the incorrect train of an emergency diesel generator room ventilation damper.

The inspectors verified the corrective actions specified in the violation response were completed. The licensee verified the Nuclear Instrumentation (NI) calibration error resulting from the inadequate independent review did not result in exceeding a TS limit and the wrong damper train work did not result in an Emergency Diesel Generator (EDG) operability concern. Disciplinary actions and staff briefings on personnel error were documented. The licensee performed a Technical Services Surveillance to review Reactor Engineering procedures for possible data and calibration errors due to independent verifications and subsequently revised procedures to enhance Reactor Engineering processes.

E8.5 (Open) IFI 50-395/95013-03: review of final resolution of CHG/HHSI cross-connect valve power lockout feature. This item was initiated to review the final resolution for the power lockout feature for the Charging/High Head Safety Injection (CHG/HHSI) pumps discharge cross connect valves. The lack of the power lockout feature resulted in a potential for loss of high head safety injection under certain system configurations. Temporary resolution was administrative controls to prevent the susceptible system configuration. The final resolution will be a modification to install the power lockout feature in the valve control circuit. The item remains open pending implementation of the modification which was scheduled for Refueling Outage 10 in October 1997.

E8.6 (Closed) Licensee Event Report (LER) 50-395/95001: potential loss of Engineered Safeguards Feature (ESF) activation due to high energy break in turbine building. This item addressed the potential loss of ESF

function from a Turbine building high energy line break due to ground short in the Solid State Protection System (SSPS) power circuits located in the turbine building. The corrective actions specified in the LER were completed on February 11, 1995, with the implementation of wiring changes in the Train A and B SSPS power supply circuits. The changes were documented in MWRs 95I3025 and 95I3024 dated February 14, 1995.

E.8.7 (Open) VIO 50-395/96005-02: draining of Spent Fuel Pool (SFP) due to inadequate corrective action. This item identified a failure to correct an identified valve leakage problem due to an inappropriately voided MWR which was initiated to fix the valve. The work order was voided on the basis that the valve was not routinely used as an isolation valve and therefore seat leakage was not a critical factor. A system tag-out for later maintenance used this valve as an isolation valve with the result of inadvertent water drainage from the SFP heat exchanger. This item remains open pending the completion of the MWR to fix the valve which is scheduled for November 18, 1996.

E8.8 (Closed) LER 50-395/96001: outside design basis for Appendix R analysis. This item involved a modification in which the Appendix R requirements were not appropriately addressed. The purpose of the modification was to increase the reliability of the Safety Injection System by providing a more reliable source of cooling water for the pumps. The licensee identified that the physical separation requirements of safe shutdown circuits as required by 10 CFR 50 Appendix R were not met.

The licensee performed root cause analysis 1076 for this event, and determined the cause to be inadequate design engineering knowledge of Appendix R requirements in conjunction with inadequate design guides. Long range corrective actions stated in the LER included:

- Implementing revisions to the modification package to rectify the design problem. A portion of these changes had been completed September 18, 1996, under MCN-22594P.

- As an interim corrective action, Appendix R Design Guide FP-01 was revised to include some cautionary statements. This was confirmed by the inspector through review of the new procedure.

The licensee's corrective actions were actually more extensive than stated in the LER. The licensee made a comprehensive review of the design process associated with Appendix R requirements. A flow chart of the ideal Appendix R design process was developed using techniques and software developed by an outside engineering company specializing in design process analysis. The inspectors reviewed this flow chart, and found it a very useful design tool. Using the concepts shown on the flow chart, the licensee was developing Engineering Guide EC-04, a comprehensive guide for any Appendix R related design activity. In addition, a new more sophisticated Appendix R screening questionnaire

for modification packages was developed. Also, the licensee developed a schedule of training sessions, which would be given on the new procedure. This schedule indicated that the training would be thorough for design personnel and would include an overview for other personnel.

The inspectors verified the corrective action completed to date. The inspectors noted that the overall corrective actions were extensive, and should prevent similar problems from recurring.

E8.9 (Closed) IFI 50-395/96002-02: isolation of non-safety-related load from safety bus. On February 29, 1996, during a routine Preventive Maintenance (PM) inspection of a safety-related Motor Control Center (MCC), a person noticed some damage in the compartment. The damage was to a section of special aluminum tape that was applied to certain cables to provide physical separation between safety-related and non-safety-related cables. The damage was small and easily repaired. However, system engineers were contacted to examine the condition. The system engineers then identified a section of cable they thought should have the tape applied, but did not. The actual configuration was reviewed by Design Engineering and found acceptable. The actual configuration was as follows: A non-safety-related motor was fed from the safety-related MCC. A safety-related circuit breaker and fuse (in series) electrically isolated the safety-related bus and non-safety-related circuit. The fuses were located in the same MCC but in a different compartment than the combination starter. Tape was applied to outgoing cable from the thermal overloads to the exit from the MCC. Tape was not applied to the wire running to/from the fuses. This was what the system engineer questioned. Design Engineering determined that all wiring was protected from thermal damage by the fuse and breaker. The inspectors reviewed the configuration in question, and concluded that it met the requirements for separation as stated in the FSAR.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 General Comments (71750)

The inspectors observed radiological controls during the conduct of tours and observation of maintenance activities and found them to be acceptable.

R2.2 Contaminated Material Found Outside The Radiation Control Area (RCA) (71750)

a. Inspection Scope

The inspectors reviewed an event that resulted in the loss of control of contaminated material outside the RCA.

b. Observations and Findings

During shift change on October 25, at approximately 7:30 a.m., a person exiting the plant through the security egress point alarmed the portal monitor. HP surveys found one small particle, approximately 2,000 net counts per minute (cpm), on his pants and approximately 200 cpm contamination under one fingernail. In addition, two wires, each approximately one foot long and similar to picture wire, were found in his cloth tote bag with approximately 5,000 net cpm fixed and approximately 1,000 disintegrations per minute (dpm) smearable contamination on each wire. Two additional items were subsequently found contaminated outside the RCA.

The individual's actions and locations were retraced. At approximately 8:30 p.m., on October 24, the individual had removed a clamp with two safety lanyard stubs (part of an underwater light fixture used during refueling activities) from a skid pan located just outside the RCA fence at the radwaste facility. The material was taken to the turbine building watch auxiliary operator station and then to the control room break room at approximately 1:00 p.m.. There the individual unscrewed (using his fingers) the two wires from the clamp.

The clamp that had been left in the control room break room had no smearable and approximately 10,000 net cpm fixed contamination. In the skid pan, the reflector for the underwater light was found with approximately 30,000 net cpm fixed and approximately 2,000 dpm/100 cm^2 contamination. Surveys in the turbine building, control room break room, and other areas, where these rad materials had been, revealed no smearable contamination. The individual's whole body count indicated no uptake of radioactive materials.

A root cause team has been formed to determine how the radioactive materials got outside the RCA and identify appropriate corrective actions. The skid pan in which the items were originally found is used to store recyclable metal that had been processed through the radwaste facility. This processing involves the manual monitoring of items to separate releasable materials from contaminated ones. Since these materials were probably processed through this radwaste facility process, the licensee has discontinued releasing items from this process until the root cause team has performed its evaluation.

This issue will be identified as URI 50-395/96011-05 pending the inspectors' review of the licensee's root cause analysis.

c. Conclusions

An URI was opened to review the causes of contaminated material found outside the RCA.

P5 Staff Training and Qualification in EP

P5.1 Emergency Preparedness Drill (71750)

On September 11, 1996, the licensee conducted an emergency preparedness drill with the inspectors observing activities in the Technical Support Center. No concerns were identified.

F1 Control of Fire Protection Activities

F1.1 Resolution of Thermo-Lag Fire Barrier Issue (64704)

a. Inspection Scope

The inspectors reviewed the action taken by the licensee to resolve the degraded Thermo-Lag fire barrier issue at Summer and to determine if this action was consistent with the NRC requirements.

b. Observations and Findings

In 1991, the NRC found that Thermo-Lag fire barrier material did not perform to the manufacturer's specifications. Specifically, the installed Thermo-Lag barriers would actually provide approximately one half of the specified rating, i.e., a 1-hour fire rated barrier would provide approximately 20 to 30 minutes of protection. The NRC issued NRC Bulletin 92-01 and requested licensees with Thermo-Lag fire barriers to take the appropriate compensatory measures for the areas where the Thermo-Lag materials were installed. The licensee responded to this bulletin by letter dated September 15, 1992.

Thermo-Lag fire barrier material was used in five locations at Summer. The inspectors reviewed each of these installation and the actions taken to resolve the Thermo-Lag issue. The status of this issue and the actions taken at each of the five locations at Summer were as follows:

Intermediate Building, 412 Elevation, Area 12-02W

The Thermo-lag fire barrier material was used in this area to provide one-hour fire rated protection for the structural supports to the radiant energy heat shield installed over the A SW booster pump. NCN 4498 had been issued on this item. An engineering evaluation was provided to justify not making any additional changes to this configuration. The inspector reviewed the evaluation and had no questions.

Intermediate Building, 423' Elevation

Two conduits in this area were provided with a one-hour Thermo-Lag fire barrier. This Thermo-Lag material is to be removed and these two

conduits are to be enclosed with another type fire barrier. The design for this modification was in process with construction scheduled to be completed by late 1997.

Intermediate Building, 412' and 436' Elevations

Cable tray No. 3088 in these areas was enclosed with a one hour Thermo-Lag fire barrier. This Thermo-Lag is to be removed and four Appendix R related cables installed in this cable tray are to be replaced with Rockbestos Firezone R type cables. This change will require review and approval by the NRC. The licensee submitted this request to the NRC by letters dated August 23 and October 17, 1996. The NRC is reviewing this request. The design for this change was complete and the installation was scheduled to be completed by late 1997.

Control Building, 412' Elevation, East Cable Chase

Conduit XX7177A installed in this area contained DC power cables for the main control board, and was enclosed with a one-hour Thermo-Lag fire barrier. This Thermo-Lag was scheduled to be removed and three Appendix R related cables are to be replaced with Rockbestos Firezone R type cables. This change will require review and approval by the NRC. The licensee submitted this request to the NRC by letters dated August 23 and October 17, 1996. The NRC is reviewing this request. The design for this change was complete and installation was scheduled to be completed by late 1997.

Control Building, 436' Elevation, North Cable Chase

This area contained nuclear irstrumentation cables enclosed within a one-hour Thermo-Lag fire barrier. This instrumentation was required in the event of an Appendix R fire. The Thermo-Lag for these cables was scheduled to be removed and these circuits were to be rerouted to meet the Appendix R separation requirements. This work was scheduled to be completed by late 1997.

c. Conclusions

The licensee had developed a satisfactory plan for the resolution of the Thermo-Lag issue at Summer.

F2 Status of Fire Protection Facilities and Equipment

F2.1 Operability of Fire Protection Facilities and Equipment (64704)

a. Inspection Scope

The inspectors reviewed the open maintenance work orders on the fire protection systems, the system engineer's monthly indicator report data, maintenance history, and inspected the fire protection systems to determine the performance trends and the material conditions of the plant's fire protection systems, equipment and features.

b. Observations and Findings

As of October 17, 1996, there were a total of 30 open maintenance work requests related to the fire protection systems and features. Most of these were minor corrective maintenance items. Eleven of the work requests were issued within the past month. None of these work requests affected the operability of the fire protection systems. In early 1995, there was a backlog of 20 work request over two years old. This backlog had been reduced to two work requests. These two work requests were related to modification work activities. The licensee had taken appropriate action to reduce the maintenance backlog on fire protection related components to a reasonable number of outstanding items.

The fire protection system engineer's monthly reports for the past year were reviewed by the inspectors. These reports indicated a rating of code "yellow" for each month except for February 1996 which was rated a code "red." A code "yellow" indicated that the system required increased attention and a code "red" indicated problems that required immediate attention. In February 1996 a number of fire protection related problems occurred. Both fire pumps experienced failures during testing and were out of service for several days for repairs, emergency lighting units and the fire alarm system experienced multiple failures, and a backlog existed in outstanding maintenance work requests. The licensee's management took action to reduce the maintenance backlog and correct the problems and discrepancies associated with the fire pumps, emergency lighting units, and to expedite the installation of the new replacement fire alarm system. Since February 1996, fire protection personnel changes were made. Also, the performance of the various systems improved, except for repetitive problems associated with emergency lighting and the fire alarm system.

The installation of a new fire alarm system was initiated in 1992 to replace the original fire alarm control panel which had become antiquated and unreliable. During this installation, a number of delays occurred. These delays were primarily due to installation and equipment not meeting the design specifications. The licensee stated that the equipment vendor initially was not very cooperative in the resolution of these problems. Recently, the relationship between the vendor and licensee has improved and the installation work for all areas within the protected area was scheduled to be completed by December 31, 1996.

The problems with the emergency lighting units involved the failure of a number of these units to pass the annual 8-hour illumination test. An evaluation was in process to determine the cause of this problem and to develop appropriate corrective action. Completion of this evaluation is scheduled for late 1996. This is identified as IFI 50-395/96011-06.

The fire protection system engineer was trending the results of the fire protection system tests. Computer software had recently been obtained to aid in the evaluation of the hydraulic performance of the fire protection pumps and water supply system.

The system engineer was developing performance indicators to aid in the evaluation of the performance of the fire protection systems and components. The use of these performance indications was scheduled to be implemented by the end of 1996. These performance indicators should make the evaluation of the fire protection systems more quantitative.

The inspector toured the plant and noted that all of the fire protection systems inspected were operational and appeared to be well maintained.

c. Conclusions

The maintenance records, equipment tending data and inspection of the fire protection components, indicated that the previous maintenance backlog on the fire protection systems had been reduced to a manageable number and the maintenance, operability and performance of these systems were good. Completion of the installation of the new fire alarm system, resolution of the emergency lighting problems, and the scheduled upgrades to the fire protection system engineer's evaluation data should enhance the overall fire protection program.

F2.2 Surveillance of Fire Protection Features and Equipment (64704)

a. Inspection Scope

The inspectors reviewed the following completed surveillances and tests for the indicated equipment:

- STP 0228.001, Diesel Driven Fire Service Pump, annual operability Test completed June 18, 1996.
- STP 0228.001, Electric Driven Fire Service Pump, annual operability test completed June 25, 1996.
- STP 0128.021, Fire Service System 3 Year Flow Tests Per SAP-131A, completed July 8, 1994.
- STP 0128.021, Fire Service System Annual Flow Tests for Power Block Buildings, completed August 4, 1995.
- STP 0128.024, CO_2 System Functional Test, completed March 28, 1996.
- STP 0128.306D, Fire Detection Supervisory Check Test Zone DDD, completed July 9, 1996.
- STP 0128.311, CO_2 System Detector Operability Test, completed August 8, 1996.
- STP 0128.3212B, Simplex Fire Detection Functional Test, completed May 30, 1996.

b. Observations and Findings

The completed surveillance tests of the fire protection systems reviewed by the inspectors were appropriately completed and met the acceptance criteria.

F3 Fire Protection Procedures and Documentation (64704)

F3.1 Procedure Review

a. Inspection Scope

The following Station Administration Procedure and Fire Protection Procedures were reviewed for compliance with the NRC requirements and guidelines:

- SAP-131, Revision 5, Fire Protection Program.
- FPP-020, Revision 1, Program Administration.
- FPP-022, Revision 1, Fire Prevention.
- FPP-026, Revision 1, Fire/HAZMAT Response.

Plant tours were performed to determine procedure compliance.

b. Observations and Findings

The above procedures established the administrative guidance used to implement the fire protection program at Summer and include the requirements for the control of combustibles, ignition sources and fire brigade organization and training. The procedures were satisfactory and met the NRC requirements and guidelines, except for fire brigade drills. Fire brigade drills were required by FPP-026 Section 3.4.11 to be conducted quarterly. Drills were performed quarterly for each operations shift. However, drills were not scheduled to assure that each brigade member participates in at least two drills per year. The licensee stated that this item would be reevaluated. This is identified as URI 50-395/96011-07.

The operability, surveillance and test requirements for the fire protection systems and features had been removed from the Technical Specifications and incorporated into the site fire protection administrative procedures. In general, these requirements met the requirements for the fire protection features which were formerly in the Technical Specifications. Where there were differences, the licensee had performed an appropriate evaluation to justify the change. For example, appropriate evaluations had been performed for changing the test of the smoke detectors from semi-annual to annual and changing the operation of the deluge sprinkler systems for the charcoal filters in the ventilation units from automatic to manual.

The inspectors performed plant tours and noted that the general housekeeping of the plant was good. Implementation of the fire prevention procedure requirements was satisfactory. The control of combustible and flammable materials was effective.

c. Conclusions

The fire protection program implementing procedures met the commitments to the NRC. The procedures did not require each fire brigade member to participate in at least two drills per year. This was identified as an URI. Implementation of the fire protection and prevention procedures was satisfactory. The general housekeeping and control of combustibles were good.

F5 Fire Protection Staff Training and Qualification (64704)

F5.1 Fire Brigade Organization and Training

a. Inspection Scope

The inspectors reviewed the fire brigade organization and training for compliance with the facility's fire protection program and the NRC guidelines and requirements.

b. Observations and Findings

The organization and training requirements for the Summer plant fire brigade were established by Procedure FPP-026, Revision 1, Fire/HAZMAT Response. The fire brigade for each shift was composed of a fire brigade leader and two brigade members from operations and two brigade members from mechanical maintenance. The fire brigade leader was either a licensed operator or an auxiliary (non-licensed) unit operator. The fire brigade members from operations were auxiliary unit operators. Each fire brigade member was required to receive initial, quarterly and annual fire fighting related training and satisfactorily complete an annual medical evaluation to certify that the fire brigade member could participate in the fire brigade. There were a total of 54 operations personnel and 31 maintenance personnel on the plant's fire brigade.

The inspectors reviewed the Training Department's summary training and medical records and verified that the training and medical certification for the fire brigade personnel were up to date.

On October 16, the inspectors witnessed a fire brigade drill in Auxiliary Building electrical equipment Room AB63-01. The fire brigade leader and five fire brigade members responded in full fire fighting turnout gear. Personnel from health physics, operations, security and maintenance also responded to the drill. The actions by the fire brigade and support personnel were satisfactory. A drill critique was conducted with the fire brigade members following the drill. The drill controllers addressed several weaknesses which had been identified during a recent QA audit of the fire protection program.

c. Conclusions

The fire brigade organization and training met the facility's procedure requirements and the performance by the fire brigade to a drill during this inspection was satisfactory.

F6 Fire Protection Organization and Administration (64704)

F6.1 Fire Protection Program Management and Administration

a. Inspection Scope

The licensee's management and administration of the facility's fire protection program were reviewed for compliance with the commitments to the NRC and to current NRC guidelines

b. Observations and Findings

The General Manager, Nuclear Operations, was designated as the onsite manager responsible for the administration and implementation of the fire protection program. The daily control of the fire protection program was designated to the Fire Protection Supervisor who reported to the Supervisor of the Test Unit. Most of the surveillance inspection and testing of the fire protection systems and features were performed by personnel assigned to the Test Unit. The Test Unit and the Fire Protection Supervisor reported to the Operations Manager.

The responsibility for the fire brigade training was assigned to a fire brigade training instructor who was assigned to the Test Unit.

A fire protection engineer was assigned to the System and Component Engineering group and was the designated fire protection expert for the fire protection systems and features. A fire protection engineer was also assigned to the Design Engineering group and provided design engineering input for plant modifications and Appendix R related issues. Both of these functions were under the management of the General Manager, Engineering Services.

Personnel assigned to perform fire protection related functions had frequent informal interface meetings and formal meetings as necessary, normally monthly, to coordinate the implementation of the fire protection program. Maintenance, licensing, QA and other staff personnel normally participated in these meeting. The personnel currently assigned principle fire protection functions were working together as a team. During recent months, the fire protection program was well implemented.

c. Conclusions

The coordination and oversight of the facility's fire protection program met the licensee's commitments to the NRC. The personnel assigned to implement the principle functions of the fire protection program were

working together as a team resulting in a program that had been effectively implemented during the past few months.

F7 Quality Assurance in Fire Protection Activities (64704)

F7.1 Audit Reports

a. Inspection Scope

The following audit reports were reviewed:

- QA Audit 93006 Station Fire Protection Annual/Biennial Audit
- QA Audit 94006 Station Fire Protection Annual Audit
- QA Audit 95007 Station Fire Protection Triennial Audit
- QA Audit 95022 Station Fire Protection Biennial Audit
- QA Audit 96008 Station Fire Protection Annual Audit

b. Observations and Findings

These audits were thorough and identified a number of findings, enhancements and observations for resolution to improve the facility's fire protection program. The inspector reviewed the audit finds and recommended enhancements from each QA report and determined that timely appropriate corrective action had been taken on all of the identified findings, except for two items from the 1996 audit related to flammable liquid lockers and fire brigade drills.

The inspector inspected two flammable liquid lockers under operations control and found these lockers satisfactory. However, the licensee considered this issue open pending completion of additional QA reviews, scheduled for January 1997, to verify that appropriate corrective action had been implemented. The inspector noted during the review of fire brigade drill performance that the QA enhancement items related to the performance of fire brigade drills were being addressed.

c. Conclusions

The audits and assessments of the facility's fire protection program were thorough and appropriate corrective actions were taken in a timely manner to resolve the identified issues.

F8 Miscellaneous Fire Protection Issues

F8.1 Fire Protection Related NRC Information Notices

a. Inspection Scope

The inspector reviewed the licensee's evaluation for the following NRC INs:

- IN 92-18, Potential Loss of Shutdown Capacity During a Control Room Fire
- IN 92-28, Inadequate Fire Suppression System Testing
- IN 94-28, Potential Problems with Fire Barrier Penetration Seals
- IN 94-31, Potential Failure of WILCO, LEXAN-Type HN-4-L, Fire Hose Nozzles
- IN 94-58, Reactor Coolant Pump Lube Oil Fire
- IN 95-36, Emergency Lighting

b. Observations and Findings

The evaluations for these INs were appropriate and the required corrective actions had been completed except for the following:

IN 92-18, Potential Loss of Shutdown Capacity During a Control Room Fire

In October 1996, the licensee initiated a reanalysis of this information notice due to recent industry problems related to "hot shorts" for Appendix R related motor control valves. At the conclusion of this inspection, this reanalysis had not been completed. However, the following valves appeared to be affected by an Appendix R fire and could result in a hot short preventing these valves from performing their safe shutdown function or maintaining system pressure integrity:

- XVG 08885 Alternate High Head Safety Injection Cold Leg Recirculation Isolation Valve
- XVG 08887A Low Head Recirculation Train Isolation
- XVG 08887B Low Head Recirculation Train Isolation
- XVG 08809B Refueling Water Storage Tank RHR Pump B Suction Valve

There were approximately 80 Appendix R related motor control valves at Summer. Initially, a number of these valves appeared to be susceptible to damage and would not be operable following an Appendix R fire. The inspectors did not review the licensee's evaluation since this

evaluation had not been completed. However, the preliminary results of this evaluation incicated that four valves did not meet the Appendix R requirements. Pending completion of the licensee's evaluation and follow-up NRC inspection, this issue is identified as URI 50-395/96011-08.

IN 95-36, Emergency Lighting

The licensee was reevaluating this information notice due to recent problems associated with the failure of the Appendix R 8-hour emergency lighting units. The licensee's reevaluation of this information notice will be reviewed during a subsequent NRC inspection.

c. Conclusions

The evaluations for the reviewed INs were appropriate and the required corrective actions had been completed except for IN 92-18 and 95-36. An URI was identified for IN 92-18 concerning a potential for a hot short to affect operation of some motor operated valves and the licensee was reevaluating IN 95-36 for applicability at Summer.

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 November 8, 18, and 21, 1996. The licensee acknowledged the findings presented.

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

PARTIAL LIST OF PERSONS CONTACTED

Licensee

F. Bacon, Manager, Chemistry Services
L. Blue, Manager, Health Physics
M. Browne, Manager, Design Engineering
S. Byrne, General Manager, Nuclear Plant Operations
R. Clary, Manager, Quality Systems
M. Fowlkes, Manager, Operations
S. Furstenberg, Manager, Maintenance Services
D. Lavigne, General Manager, Nuclear Support Services
G. Moffatt, Manager, Planning and Scheduling
K. Nettles, General Manager, Strategic Planning and Development
H. O'Quinn, Manager, Nuclear Protection Services
A. Rice, Manager, Nuclear Licensing and Operating Experience
G. Taylor, Vice President, Nuclear Operations
T. Taylor, Acting General Manager, Engineering Services
R. Waselus, Manager, Systems and Component Engineering
R. White, Nuclear Coordinator, South Carolina Public Service Authority
B. Williams, General Manager, Engineering Services

INSPECTION PROCEDURES USED

IP 37550: Engineering
IP 37551: Onsite Engineering
IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726: Surveillance Observations
IP 62707: Maintenance Observations
IP 64704: Fire Protection Program
IP 71001: Licensed Operator Requalification Program Evaluation
IP 71707: Plant Operations
IP 71715: Sustained Control Room and Plant Observation
IP 71750: Plant Support
IP 92901: Followup - Plant Operations
IP 92903: Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-395/96011-01	NCV	failure of FCV-113A to open on automatic makeup to Volume Control Tank (Section M3.1)
50-395/96011-02	NCV	failure to establish adequate containment penetration isolation verification surveillance procedure (Section M3.2)
50-395/96011-03	URI	Turbine Driven Emergency Feedwater Pump governor problems (Section E2.1)
50-395/96011-04	VIO	inadequate corrective action for design control error (Section E2.)
50-395/96011-05	URI	contaminated material found outside the radiation control Aaea (Section R2.2)
50-395/96011-06	IFI	resolution of battery failures on 8-hour Appendix R emergency lighting units (Section F2.1)
50-395/96011-07	URI	not performing two drills per year for each fire brigade member (Section F3.1)
50-395/96011-08	URI	evaluation of motor operated valves for meeting requirements of Appendix R Section III.L.7 (Section F8.1)

Closed

50-395/95005-01	IFI	susceptibility of containment sump isolation valve to pressure locking (Section E8.1)

50-395/95007-01	IFI	main steam drain line vibration problem (Section E8.2)
50-395/95008-02	VIO	failure to control design of SR Ventilation System (Section E8.3)
50-395/95010-01	URI	documentation of records of training deficiencies noted during annual requalification examinations as required by 10 CFR 55.59(c) (Section O8.2).
50-395/95010-02	IFI	use of WOG ERG based generic critical tasks for critical task development (Section O8.3).
50-395/95010-03	IFI	lack of Operations management participation in annual requalification examinations (Section O8.4).
50-395/95010-04	IFI	reactivation of licensed operators (Section O8.5).
50-395/95012-02	VIO	two examples of failure to follow procedure (Section E8.4)
50-395/95001	LER	potential loss of ESF activation due to high energy break in Turbine Building (Section E8.6)
50-395/96002-02	IFI	isolation of non-safety-related load from safety bus (Section E8.9)
50-395/96011-01	NCV	failure of FCV-113A to open on automatic makeup to Volume Control Tank (Section M3.1)
50-395/96011-02	NCV	failure to establish adequate containment penetration isolation verification surveillance procedure (Section M3.2)
50-395/96001	LER	outside design basis for Appendix R analysis (Section E8.8)

Discussed

50-395/95013-03	URI	review of final resolution of CHG/HHSI cross-connect valve power lockout feature (Section E8.5)
50-395/96005-02	VIO	draining Of SFP due to inadequate corrective action (Section E8.7)
50-395/96007-04	URI	failure to meet control room human factor engineering criteria for control board instrumentation (Section O8.1)