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NUCLEAR REGULATORY COMMISSION
REGION II
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May 1, 2000

South Carolina Electric & Gas Company
ATTN: Mr. Stephen A. Byrne
Vice President, Nuclear Operations
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

SUBJECT: NRC INTEGRATED INSPECTION REPORT NO. 50-395/00-02

Dear Mr. Byrne:

On April 1, 2000, the NRC completed an inspection at your Virgil C. Summer Nuclear Station. The enclosed report presents the results of that inspection.

During the five weeks covered by this inspection period, your conduct of activities at the Virgil C. Summer Nuclear Station was generally characterized by safe plant operations and conservative management decisions.

Based on the results of this inspection, the NRC has determined that one violation of NRC requirements occurred. This Severity Level IV violation is being treated as a non-cited violation (NCV), consistent with Section VII.B.1.a of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region II, the Resident Inspector at your facility and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,
/RA/

Robert C. Haag, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket No.: 50-395
License No.: NPF-12

Enclosure: NRC Integrated Inspection Report

cc w/encl: See page 2
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-395
License No.:	NPF-12
Report No.:	50-395/00-02
Licensee:	South Carolina Electric & Gas (SCE&G)
Facility:	Virgil C. Summer Nuclear Station
Location:	P. O. Box 88 Jenkinsville, SC 29065
Dates:	February 27 - April 1, 2000
Inspectors:	M. Widmann, Senior Resident Inspector M. King, Resident Inspector G. Wiseman, Reactor Inspector, RII (Sections F1, F2, F3, F5, F7 and F8)
Approved by:	R. C. Haag, Chief, Reactor Projects Branch 5 Division of Reactor Projects

Enclosure

EXECUTIVE SUMMARY

Virgil C. Summer Nuclear Station
NRC Inspection Report No. 50-395/00-02

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

Operations

- A walkdown of the service water pump house ventilation system confirmed the system was properly aligned and available to meet Technical Specification requirements for area temperature control necessary to support equipment in the service water pump and switchgear rooms (Section 02.1).

- The licensee responded appropriately to the discovery of several Technical Specifications (TS) having non-conservative limiting condition for operation action statements. The licensee provided appropriate administrative controls consistent with NRC Administrative Letter 98-10 until amendments to the TS with appropriate justification can be submitted (Section 07.1).

Maintenance

- Observed maintenance and surveillance activities were satisfactorily performed in accordance with established procedures (Section M1.1).

- A Non-Cited Violation was identified for an inadequate surveillance procedure used to verify that the emergency core cooling discharge piping is full of water. The failure to establish an adequate procedure is a violation of Technical Specification 6.8.1.c. A 1993 procedure change had an inadequate basis to support the conclusion that high point vent valve XVT00071-SI was inaccessible due to radiation dose considerations (Section M3.1).

Plant Support

- Plant fire protection program requirements were met in accordance with Section 3.1 of fire protection procedure FPP-026, “Fire/Hazmat Response,” when fire related events occurred (Section F1.1).

- Fire brigade personal protective fire fighting equipment at the fire brigade staging area and lockers was accessible, maintained in good condition, and provided a sufficient level of personal safety needed to handle onsite fire emergencies (Section F2.1).

- Battery powered emergency lighting provided adequate illumination for access to safe shutdown equipment and was properly monitored by the maintenance rule program (Section F2.2).

- The specified post modification test requirements of the Simplex fire detection and

alarm system were adequate and met the appropriate testing requirements of the National Fire Protection Association and the Final Safety Analysis Report (Section F3.1).

- An observed fire drill in the A emergency diesel generator room demonstrated the fire brigade's ability to properly respond to a fire in a timely manner. The licensee's drill critique was self-critical and had several good observations (Section F5.1).

- A 1999 Quality Assurance fire protection program audit was effective in identifying fire protection program defense-in-depth (DID) element issues to management. The identified issues were similar to the types of fire protection program DID element items identified during the NRC Fire Protection Functional Inspection pilot program (Section F7.1).

Report Details

Summary of Plant Status

The unit began this inspection period at 100 percent power. On March 3, a power reduction commenced to allow turbine control valve testing and maintenance work on several secondary components (i.e., the C Main Feedwater Pump (MFP), and A feedwater booster pump). The downpower to 90 percent power and turbine valve testing was completed on March 4. Due to C MFP binding problems during cooldown, power was held at approximately 90 percent until March 11 when maintenance was completed. The unit was returned to 100 percent power later that same day and remained at 100 percent for the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

The inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious. Examples of safety-conscious operations continued during this inspection period and were evidenced by:

- Good preparation and the issuance of operations guidelines for the March 3 power reduction for control valve testing and secondary maintenance.
- Operations management conservatively delaying surveillance testing which would have tripped a channel for Overtemperature-delta-T until a spiking concern was addressed on another channel.
- Management delaying offsite power source maintenance work on the 115 kV Parr line due to pending inclement weather.
- The decision to test emergency diesel generators prior to removing an offsite power line for maintenance.

Specific events and other noteworthy observations are detailed in the sections below.

O2 Operational Status of Facilities and Equipment

O2.1 Engineered Safety Feature System Walkdown

a. Inspection Scope (37551, 71707)

The inspectors performed a walkdown of accessible portions of the Service Water Pump House (SWPH) ventilation system to verify proper alignment, and reviewed completed surveillance procedures and maintenance work requests, condition evaluation reports, and the integrated plant computer historical temperature data to access system operability.

b. Observations and Findings

The SWPH building temperature requirements are specified in Technical Specification (TS) 3.7.9, "Area Temperature Monitoring," and the SWPH ventilation system is described in the Final Safety Analysis Report (FSAR) Section 9.4.7.2.2, "Service Water Pumphouse Ventilation System." The inspectors confirmed the system was properly aligned and available to meet the requirements for area temperature control necessary to support equipment in the service water pump and switchgear rooms.

The inspectors and several system engineers discussed a previous root cause analysis (RCA 98-07-00) which investigated a June 10, 1998, event (reference NRC Inspection Report No. 50-395/98-05, Section E1.3) which resulted in the loss of both trains of SWPH ventilation due to SWPH fan 480 volt breaker failures. The breaker failures were caused by burnt leads and loose lugs that hold the conductors in place. The root cause of the failure was due to not sleeving the line leads from the breaker stab on the assembly to the breaker itself and using aluminum lugs on copper leads which due to thermal expansion and contraction of the dissimilar metals resulted in loose lugs. Actions to prevent recurrence were appropriately addressed in the root cause analysis. The corrective actions included: 1) Use of thermography in preventive maintenance tasks to identify degraded conditions in similar breakers; 2) Verifying there was no history of other safety-related breakers having loose lugs; and 3) Replacing the line leads with sleeved wire and replacing the aluminum lugs with copper lugs. The inspectors reviewed the status of the actions with the system engineer and confirmed all actions resulting from this root cause analysis were being tracked under the licensee's corrective action program. These actions are currently scheduled for completion by June 16, 2000.

The inspectors verified that control room alarms, instrumentation and control devices were as described in the licensing basis documents. During this review an inspector observation concerning a caution in Station Operating Procedure (SOP)-503, "Intermediate Building HVAC," Revision 10, noted a potential for damage due to excessive starting current exists if starting a SWPH fan with the opposite fan in operation. The inspectors questioned whether during safeguards testing this caution would be observed and if during engineered safeguards feature actuation would the potential exist to cause fan damage. The licensee was investigating this question at the close of the inspection period and was tracking this under Primary Identification Program (PIP) 0-C-00-0394. Preliminary discussions with plant support engineering indicated this concern is for long term effects of repeatedly starting a fan with another fan already in service. The licensee plans to address this concern prior to the next safeguards testing that is scheduled for November 2000.

c. Conclusions

A walkdown of the service water pump house ventilation system confirmed the system was properly aligned and available to meet technical specification requirements for area temperature control necessary to support equipment in the service water pump and switchgear rooms.

O7 Quality Assurance in Operations

O7.1 Review of Non-Conservative Limiting Conditions for Operation (LCO)

a. Inspection Scope (71707)

The inspectors reviewed the licensee's response to the discovery of several TSs having non-conservative Limiting Condition for Operation (LCO) action statements.

b. Observations and Findings

In response to an event at the McGuire Station (NRC 10 CFR 50.72 notification event No. 36659, dated February 4, 2000), the licensee evaluated the condition for applicability to the Summer Station. The licensee determined that the condition was applicable and notified the NRC on March 1, 2000, in accordance with 10 CFR 50.72 (b)(1)(ii)(B), "One Hour Reports." At the Summer Station the specific concern is that for certain engineered safety feature actuation functions, TS Table 3.3-3, "Engineered Safety Feature Actuation Systems Instrumentation," Note 16 allows the plant to operate indefinitely in a configuration such that a single failure could prevent the safety function from automatically occurring. Note 16 specifies that the required action for one inoperable instrumentation channel is to place the channel in bypass with no restrictions for how long the channel can be bypassed. A loss of power to one instrumentation train results in two channels becoming inoperable. Thus with one channel in bypass, an accident with a single failure involving a loss of power to the opposite train's instrumentation would result in three of the four instrumentation channels being inoperable. Since two channels are required for automatic actuation, none would occur. Manual operator action to perform these safety functions would be available and is required by the station emergency operating procedures. At the time of the event notification, all four channels of each of the affected functions were operable and the plant was not operating with a single failure vulnerability. The affected safety functions included the automatic switchover to the containment sump on low-low refueling water storage tank and reactor building spray on high-3 reactor building pressure. The licensee captured the concern in their corrective action program under PIP 0-C-00-0173.

On March 1, 2000, administrative controls were developed and implemented to limit the allowed outage time one channel can be bypassed for the affected actuation functions. The inspectors reviewed the licensee's actions and determined that the guidance provided in NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," was followed. The administrative controls put in place are considered an acceptable short-term corrective action until an amendment to the TS with appropriate justification can be submitted.

c. Conclusions

The licensee responded appropriately to the discovery of several technical specifications (TS) having non-conservative limiting condition for operation action statements. The licensee provided appropriate administrative controls consistent with NRC Administrative Letter 98-10 until amendments to the TS with appropriate justification can be submitted.

O8 Miscellaneous Operations Issues (92700)

O8.1 (Closed) Licensee Event Report (LER) 50-395/00-004-00: potentially outside design

basis due to a deficiency in facility technical specifications. The LER concerns the condition described in Section O7.1 of this report. The inspectors verified that the LER's immediate corrective actions have been implement and that the proposed additional corrective action were acceptable.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Observation of Work Activities

a. Inspection Scope (61726, 62707)

The inspectors observed or reviewed all or portions of maintenance and surveillance testing activities and associated documentation listed below.

- EMP-300.012 "Agastat Relay Calibration/Replacement," Rev. 10 (for XSW1EB02, C SW pump)
- EMP-405.001 "7.2 kV Breaker Maintenance," Rev. 15 (for C SW pump)
- ICP-100.003 "Control Room Outside Air Intake Flow IFT 09405," Rev. 5
- ICP-180.002 "Emergency Diesel Generator A," (calibration of IPI05443 A EDG fuel oil unloading pump suction strainer differential pressure indication)
- ICP-345.048 "ATWS Mitigation System Actuation Circuitry (AMSAC) Maintenance Check," Rev. 4
- MMP-320.035 "Feedwater Pump Maintenance," Rev. 3 (for C MFP)
- MWR 9916859 RHR/ Spray B Room #2 Hi Temperature Alarm Change Setpoint per ECR 50125 for ITS09721B per ICP-240.129, Rev. 3
- MWR 9917671 Remove coupling down stream of EDG lube oil strainer per MMP-300.001, Rev. 9, inspect for blockage, strainer has high differential pressure, suspect partial blockage
- MWR 9917834 Replace control transformer, XMC1EA1X 01FH, per ETBT-312 for SWPH supply fan XFN0080A-AH
- MWR 0002910 Disassemble and inspect XPP0040B reactor makeup pump B due to high vibration per MMP-320.002, Rev. 10
- MWR 0003339 B RCS subcooling margin loop indicator (ITM0499B) correct erratic indication, fluctuating as much as 20 degrees with no input change
- PMTS 9907626 ITS07048, RHR Heat Exchanger B outlet CCW temperature switch calibration
- PMTS 9919007 Regulator rebuild for XDP0176-PR1, damper for B EDG supply fan
- PMTS 9919648 B EDG injection pump drive locking flange stud inspection/ replacement per MMP-180.006, Rev. 7
- PMTS 9919659 Power pack for C Chiller Maintenance per MMP-451.002, Rev. 12B
- PMTS 9919986 A EDG Weekly Lube Check
- PMTS 0000252 Inspect and Clean / Lubricate SWPH Damper XDP0071A
- STP-125.002A "A Diesel Generator Operability Test," Rev. 0

- STP-128.319 "Smoke Detector Functional Check," Rev. 4 (for Fire Zone UU/TT, Fuel Handling Building
- STP-225.001A "Diesel Generator Support Systems Pump and Valve Test," Rev. 5
- STP-360.034 "Reactor Building Sample Line Atmospheric Radiation Monitor RMA0002 Calibration," Rev. 7B
- STP-391.005 "Seismic Monitoring System Triaxial Response-Spectrum Recorders Calibration," Rev. 4A (for IYM01786)

b. Observations and Findings

The inspectors verified that work was performed with the work package present and actively referenced. All activities observed were conducted in accordance with written procedure instructions. Procedures provided sufficient detail and guidance for the intended activities. Technicians demonstrated that they were experienced and knowledgeable of their assigned tasks. Quality control personnel were present whenever required by procedure and when applicable. The inspectors noted that appropriate radiation control measures were in place. An observation by inspectors related to foreign material exclusion controls during C main feedwater pump maintenance were promptly addressed.

c. Conclusions

Observed maintenance and surveillance activities were satisfactorily performed in accordance with established procedures.

M3 Maintenance Procedures and Documentation

M3.1 Emergency Core Cooling System (ECCS) Venting Procedure Review

a. Inspection Scope (37551, 61726, 71707)

The inspectors reviewed and observed the performance of the venting procedure used to verify that the ECCS discharge piping is full of water.

b. Observations and Findings

TS surveillance requirement 4.5.2, "Emergency Core Cooling," requires that each ECCS subsystem shall be demonstrated operable. Specifically, TS 4.5.2.c requires at least once per 31 days that ECCS piping is verified to be full of water by venting the ECCS pump casings and accessible discharge piping high points. The licensee accomplishes this in accordance with surveillance test procedure STP-105.006, "Safety Injection/Residual Heat Removal Monthly Flowpath Verification Test," Revision 9F. Based on observations made during performance of the venting activity, the inspectors questioned the adequacy of the procedure.

There are six high points vents in the ECCS discharge piping (excluding the two RHR pump casing vents). Issues with pump casing vents were previously reviewed and dispositioned as a non-cited violation (NCV) in NRC Inspection Report No. 50-395/99-03, Section M8.1 and therefore, will not be discussed further in this writeup. At the time

of the inspectors' observations, three of the available six high point vents were being utilized. The inspectors questioned whether the use of three high points was sufficient to ensure that the piping was full of water. The three high points vents used are: XVT00033-SI, Refuel Water Storage Tank Outlet Header Vent Valve; XVT00007A-RH, RHR Heat Exchanger A Tube Side Vent Valve; and XVT00007B-RH, RHR Heat Exchanger B Tube Side Vent Valve. After discussions with the licensee, the inspectors learned that originally six high point vents were used in performance of STP-105.006. However, a procedure change was initiated in July 1993, (Revision 8B) which eliminated three of the high point vents. A contingency requirement remained in the STP to vent the three high points which were removed if gas is discovered during the monthly venting of the remaining high points. The three high point vents eliminated were: XVT00071-SI, Hot Leg Injection Header Vent Valve; XVT00006A-RH, RHR Header A Vent Valve; and XVT00006B-RH, RHR Header B Vent Valve. The licensee documented the reason for the permanent procedure change as physical inaccessibility of the valves and ALARA (As Low As Reasonably Achievable) concerns. The licensee had Westinghouse perform analyses in September and October 1993, which concluded the system integrity would be able maintained in the event of a water hammer caused by formation of a large gas bubble in the ECCS discharge piping. In the licensee's view, these analyses further justified elimination of the three vent points from performance of the monthly surveillance. Final approval and issuance of the procedure occurred in November 1993.

The inspectors reviewed the procedure change package and the specific radiological conditions that existed during the time the change was being processed. Based on observation the inspector determined that the valves located in the RHR heat exchanger rooms, XVT00006A-RH and XVT00006B-RH, were physically inaccessibility, however, there was no physical limitation in accessing XVT00071-SI. The inspectors reviewed monthly radiation surveys taken around the July 1993 time frame for high point vent valve, XVT00071-SI. The inspectors also reviewed a sample of surveys from several years preceding and subsequent to the procedure change. The inspector noted that radiological conditions have remained similar from 1993 through the present day. Specifically, dose rates measured on March 10, 2000, when STP-105.006 was performed and valve XVT00071-SI was vented, were approximately the same as those measured in 1993; 100 mrem contact and 50 mrem at one foot. Total dose for the operator and support personnel venting valve XVT00071-SI on March 10 was eight mrem. While the west penetration room (location of XVT00071-SI) at times in the past has been posted as a high radiation area, the inspector noted that neither access to nor the actual location of XVT00071-SI involved personnel being in a high radiation dose field.

Based on the radiological surveys at the time the procedure was changed and typical radiation worker dose received when performing the venting evolution, the inspectors concluded that the dose rate measurements did not support the licensee's determination that high point vent valve XVT00071-SI was inaccessible based on ALARA considerations. As a result of the change in November 1993, the STP used to accomplish TS surveillance requirement 4.5.2 was inadequate, in that, all accessible high point vent valves were not used to verify that ECCS piping is full of water. TS 6.8.1.c, requires that written procedures shall be established, implemented, and maintained for surveillance and test activities of safety-related equipment. The failure to establish an adequate procedure is a violation of TS 6.8.1.c. This Severity Level IV violation is being treated as an NCV, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation is identified as NCV 50-395/00002-01 and has been placed in the licensee's corrective action program as PIP 0-C-00-0267.

Since STP-105.006 contained instructions to vent the high points in question if gas was discovered during the monthly venting of the remaining high points, there was reasonable assurance that the ECCS subsystem was not adversely affected and therefore, the safety significance is low. This is based, in part, on the physical locations of the high point vent valves (elevation differences and distances between the valves) and when gas has been discovered during the monthly vent of the three valves, no additional gas was noted when venting the three remaining valves.

c. Conclusions

A Non-Cited Violation was identified for an inadequate surveillance procedure used to verify that the emergency core cooling discharge piping is full of water. The failure to establish an adequate procedure is a violation of Technical Specification 6.8.1.c. A 1993 procedure change had an inadequate basis to support the conclusion that high point vent valve XVT00071-SI was inaccessible due to radiation dose considerations.

M8 Miscellaneous Maintenance Issues (92700)

M8.1 (Closed) LER 50-395/00-001-01: missed surveillance on control room evacuation panel B steam generator wide range level indicator. The inspectors determined that this LER corrected the date of discovery in LER 50-395/00-001-00. This revision revealed no new issues. LER 50-395/00-001-00 was closed in NRC Integrated Inspection Report No. 50-395/00-01.

IV. Plant Support

F1 Control of Fire Protection Activities

F1.1 Frequency of Fire Related Incidents and Fire Reports

a. Inspection Scope (64704)

The inspector reviewed plant fire related PIP reports resulting from fire, smoke, sparks, arcing, and equipment overheating incidents for the time period of 1998-2000, to assess

the effectiveness of the fire prevention program and any maintenance-related or material condition problems that may initiate fire events.

b. Observations and Findings

The licensee's PIPs associated with observed fire, smoke, sparks, arcing, or equipment overheating incidents indicated that during the period 1998-2000 there were nine incidents of fire, smoke or equipment overheating observed within safety-related plant areas. In all cases, these fire initiating faulted conditions were identified and mitigating actions were taken in a timely manner so as to limit damage to the original source and prevent serious exposure to other safety-related equipment or cables. No fire brigade response was required for any of these events. Plant fire protection program requirements were met in accordance with Section 3.1 of fire protection procedure FPP-026, "Fire/Hazmat Response," Revision 6, when fire related events occurred.

c. Conclusions

Plant fire protection program requirements were met in accordance with Section 3.1 of fire protection procedure FPP-026, "Fire/Hazmat Response," when fire related events occurred.

F2 Status of Fire Protection Facilities and Equipment

F2.1 Inspection of Fire Brigade Staging Area and Equipment (64704)

The inspector toured the fire brigade staging area in the turbine building and observed the condition of fire brigade equipment. The purpose of the inspection was also to verify that the fire brigade equipment specified in the NRC-approved fire protection program was accessible and available in the staging area and fire brigade lockers. The inspector observed that personal protective fire fighting equipment provided for fire brigade use at the fire brigade staging area and lockers were accessible, maintained in good condition, and provided a sufficient level of personal safety needed to handle onsite fire emergencies.

The inspector also observed that there was no battery-powered backup lighting in the area of the fire brigade staging dress out locker. There is no regulatory requirement to have battery-powered backup lighting in this area, however, the lack of backup lighting was a fire brigade vulnerability in that a power failure due to any cause could possibly delay the dress out and response of the fire brigade during a fire emergency. The licensee initiated PIP 0-L-00-0046 to address the inspector's observation.

F2.2 Emergency Lighting for Performance of Alternative Shutdown Capability

a. Inspection Scope (64704)

The inspector reviewed the design and operation of the eight-hour battery powered emergency lighting to verify that the requirements of 10 CFR 50 Appendix R, Section III.J were met. The inspector reviewed the last engineering maintenance rule (MR) quarterly summary report associated with the Appendix R emergency lights; Fire Protection Evaluation Report Section 3.6, "Emergency Lighting"; and, Enclosure 6.3,

"Eight-hour Emergency Lighting Unit List," of fire protection procedure FPP-027, "Safe Shutdown."

b. Observations and Findings

The emergency lighting system engineering quarterly summary report identified the system as category (a)(2) under the MR. The inspector determined that the system performance goals established by the licensee were adequate and that the functional failures of individual emergency lights were appropriately identified in the licensee's corrective action program.

The inspector also inspected 12 battery powered emergency lighting units installed in switchgear rooms 1DA (Fire Zone IB-20) and 1DB (Fire Zone IB-22), the A emergency diesel generator room (Fire Zone DG-1.1), and the control building (Fire Zone CB-1.1). The inspector observed that the emergency lighting unit lamps were operational and the lighting heads were aimed to provide adequate illumination for operation and access to safe shutdown equipment.

c. Conclusions

Battery powered emergency lighting provided adequate illumination for access to safe shutdown equipment and was properly monitored by the maintenance rule program.

F3 Fire Protection Procedures and Documentation

F3.1 Fire Detection System Post Modification and Periodic Testing

a. Inspection Scope (64704)

The inspector reviewed selected samples of post modification and periodic testing associated with the installation of the Simplex fire detection and alarm system in order to verify compliance with National Fire Protection Association (NFPA) standards 72-1990, "Standard for the Installation, Maintenance, and Use of Protective Signaling Systems," and NFPA 72H-1988, "Testing Procedures for Signaling Systems," and regulatory requirements contained in FSAR, Section 9.5, "Fire Protection."

b. Observations and Findings

The inspector found that the specified post-modification tests completed for the power block and the nuclear safety related plant areas were adequate to verify that the fire detection computer generated logic functioned properly and the system circuitry was operable. The post modification testing documentation included written statements of limiting conditions and special fire watch requirements. There were also instrument test sign-off sheet signatures for verification and validation of the completed functional tests of the system's primary fire detection circuits and the supervisory circuit alarm and trouble signal circuit verification. Periodic surveillance tests are performed to demonstrate that the system is operable. The inspector verified that the tests demonstrated that each detector is operable and would transmit an alarm signal to the primary alarm station in the control room and actuate the correct fire suppression system. The inspector concluded that the specified post modification test requirements

of the Simplex fire detection and alarm system were adequate and met the appropriate testing requirements of the NFPA and FSAR.

The inspector also reviewed an independent fire protection consultant's technical evaluation of the Simplex fire protection system post modification and periodic test program, dated July 23, 1999. This evaluation was initiated by the licensee to address potential design and testing issues identified for the Simplex fire protection system. The conclusions of the evaluation were that the completed installation and post modification testing for the power block and the nuclear safety related areas met the regulatory requirements. The licensee's evaluation recommended a number of test program procedural revisions and enhancements desirable from a fire safety position but these were not considered regulatory issues. The inspector agreed with the evaluation's conclusions.

c. Conclusions

The specified post modification test requirements of the Simplex fire detection and alarm system were adequate and met the appropriate testing requirements of the National Fire Protection Association and the Final Safety Analysis Report.

F5 Fire Protection Staff Training and Qualification

F5.1 Fire Brigade Drill Program

a. Inspection Scope (64704)

The inspector reviewed the fire brigade drill program and observed control room activities and fire brigade response associated with an unannounced fire brigade drill.

b. Observations and Findings

On March 23, 2000, the inspector witnessed an unannounced fire brigade drill (File No. FPD-00-06) for an operations shift. The fire scenario involved a simulated fire at the fuel oil day tank located in the A diesel generator room (Fire Area DG-1). The brigade demonstrated effective fire fighting tactics, proper search of the area for fire spreading, effective communications with control room personnel, the proper use of fire fighting equipment, and adequate recovery operations. The fire brigade leader's direction and performance was also effective. Control room activities in response to the drill were timely and in accordance with procedures. The nominal fire brigade performance response time during the drill to place an effective fire suppression agent on the simulated fire was about 12 minutes. The fire brigade response and drill performance met the established drill objectives.

The critique of this drill was effective in identifying several performance improvement observations involving the use of self contained breathing apparatus in drill scenarios; the fire fighting pre-plan instructions for securing the fuel oil transfer pumps and operation of smoke removal ventilation systems; the location of the fire incident command post; and, the use of fire drill props such as enhanced digital images of the fire scene to improve communication of the fire drill scenario to fire brigade personnel. The licensee initiated PIP 0-C-00-0363 to address performance improvement

observations.

To evaluate other operating shifts' drill performance, the inspector reviewed the drill critique data for selected shift drills conducted during 1998-2000. The fire brigade drill program and fire drill participation met the requirements of the site fire protection program. The overall fire brigade response and participation for these drills was satisfactory. The inspector noted that several drills had been performed in risk significant plant areas. The nominal fire brigade performance response time to place an effective fire suppression agent on simulated fires in the risk significant plant areas was about 15 minutes which met drill objectives.

c. Conclusions

An observed fire drill in the A emergency diesel generator room demonstrated the fire brigade's ability to properly respond to a fire in a timely manner. The licensee's drill critique was self-critical and had several good observations.

F7 Quality Assurance in Fire Protection Activities

F7.1 Fire Protection Audits (64704)

The inspector reviewed Quality Assurance Fire Protection Audit Report, "Station Fire Protection-Annual," dated August 4, 1999, and the corrective action program responses to audit issues.

The annual audit was performed in accordance with TS Section 6.5.2.8.i. The audit encompassed a review of five fire protection program inspection areas. The licensee audit team determined that the fire protection program was adequately developed and effectively implemented for the areas reviewed. The audit report identified one finding, one enhancement, and one quality assurance issue. The most significant audit issues involved NFPA fire pump discharge gauge code deviations; clarification of fire fighting pre-plan instructions for fire suppression water drainage and smoke removal operations; and, development of fire brigade drill scenarios in risk significant plant areas. The licensee's evaluation of these issues did not identify any adverse impact of the fire protection program or reportable events.

The inspector verified that the audit issues were documented through the corrective action program process. The inspectors observed that the licensee's audit was effective in identifying fire protection program defense-in-depth (DID) element issues to management. The identified issues were similar to the types of fire protection program DID element items identified during the NRC Fire Protection Functional Inspection pilot program.

F8 Miscellaneous Fire Protection Issues (92904)

F8.1 (Closed) Inspection Followup Item (IFI) 50-395/98001-05: review of licensee's completed fire barrier penetration seal revalidation project.

This issue was related to the lack of available documentation to verify that fire barrier penetration seals were installed in accordance with design specifications and bounded by configurations that had satisfactorily passed 3-hour fire resistance testing.

The inspector reviewed the licensee's "Penetration Seal Project Plan," dated January 28, 1999. The project plan described the licensee's plan and schedule to update penetration seal design-basis documentation and configuration information. The plan included the performance of inspections to document as-built penetration seals configurations and the development of design-basis documents to describe bounding tested configurations and engineering analysis.

The inspector reviewed the scope and completion status of the penetration seal plan implementation. The inspector verified that the plan implementation was on schedule. The licensee's Phase III (Tasks 5.1- 5.3) configuration design database development, penetration seal walk downs and inspection data gathering were completed for approximately 5440 penetrations. The inspector verified that the licensee's penetration seal design and installation parameter inspection criteria (verified during licensee walk downs) satisfied the guidance described in Sections 3.1 and 3.2 of NRC Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements."

The licensee's ongoing Phase III (Task 5.4) engineering activities included the evaluation of the design database of configuration records, bounding test report reviews, and performing design-basis engineering evaluations. These activities are scheduled to be completed in early 2001. The inspector determined that the scope of the fire barrier penetration seal plan was reasonable and complied with the guidance provided by GL 86-10. The inspector concluded that the scope of the fire barrier penetration seal plan was sufficiently documented in the licensee's corrective action program to assure that the corrective actions identified in the IFI would be completed.

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 March 30, 2000. The licensee acknowledged the findings presented and during subsequent discussions with the inspectors stated that they are continuing to review the ECCS venting non-cited violation . The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

The fire protection inspection observations and conclusions were discussed in a telephone conversation with licensee management on March 28, 2000. The licensee made no dissenting comments. Proprietary information was not handled during the fire protection inspection, and is not contained in this report.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Archie, Manager, Planning & Scheduling
F. Bacon, Manager, Chemistry Services
L. Blue, Manager, Health Physics and Radwaste
M. Browne, Manager, Plant Support Engineering
R. Clary, Manager, Plant Life Extension
C. Fields, Manager, Quality Systems
M. Fowlkes, Manager, Operations
T. Franchuk, Supervisor, Quality Assurance
L. Hipp, Manager, Nuclear Protection Services
T. Keckeisen, Supervisor, Fire Protection
G. Moffatt, Manager, Design Engineering
K. Nettles, General Manager, Nuclear Support Services
A. Rice, Manager, Nuclear Licensing and Operating Experience
B. Waselus, General Manager, Engineering Services (Interim)
R. White, Nuclear Coordinator, South Carolina Public Service Authority
B. Williams, General Manager, Nuclear Plant Operations
G. Williams, Manager, Maintenance Services

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62707: Maintenance Observations
IP 64704: Fire Protection Program
IP 71707: Plant Operations
IP 92700: Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92904: Followup - Plant Support

ITEMS OPENED AND CLOSED

Opened

50-395/00002-01	NCV	inadequate surveillance procedure for verification that the ECCS discharge piping is full of water (Section M3.1)

Closed

50-395/00-004-00	LER	potentially outside design basis due to a deficiency in facility technical specifications (Section O8.1)
50-395/00002-01	NCV	inadequate surveillance procedure for verification that the ECCS discharge piping is full of water (Section M3.1)

50-395/00-001-01	LER	missed surveillance on control room evacuation panel B steam generator wide range level indicator (Section M8.1)
50-395/98001-05	IFI	review of licensee's completed fire barrier penetration seal revalidation project (Section F8.1)