U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-395
License No.:	NPF-12
Report No.:	50-395/98-08
Licensee:	South Carolina Electric & Gas (SCE&G)
Facility:	V. C. Summer Nuclear Station
Location:	P. O. Box 88 Jenkinsville, SC 29065
Dates:	September 6 - October 10, 1998
Inspectors:	B. Bonser, Senior Resident Inspector (September 6 - 25, 1998) K. O'Donohue, Acting Senior Resident Inspector M. King, Resident Inspector (In-Training) K. Coyne, Project Engineer (In-Training) (Section M8.1)
Approved by:	R. C. Haag, Chief Reactor Projects Branch 5 Division of Reactor Projects

ENCLOSURE

EXECUTIVE SUMMARY

V. C. Summer Nuclear Station
NRC Inspection Report No. 50-395/98-08

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a five-week period of resident inspection and an in-office review of an unresolved item.

Operations

- Operations personnel took timely and appropriate actions as required by Technical Specification 3.4.4 "Relief Valves," in response to a leaking power operated relief valve (Section O1.2).

- The Nuclear Safety Review Committee (NSRC) meeting was in compliance with TS 6.5.2 requirements for meeting quorum, NSRC Chairman participation, and meeting agenda. The portions of the meeting observed by the inspectors were technically and performance oriented (Section O7.1).

Maintenance

- A troubleshooting plan that addressed the trip of the Group 2 pressurizer heater breaker was appropriate and timely. The TS 3.4.3 requirements for pressurizer operation were met (Section M1.2).

- A non-cited violation was identified for failure to establish preventative maintenance activities for the turbine driven emergency feedwater (TDEFW) pump current-to-pressure (I/P) converter which resulted in an unanalyzed failure mode of the turbine control system. The TDEFW pump failed to reach full speed during surveillance testing due to an I/P converter failure (Section M1.3).

- Observed engineered safeguards transformer differential relay testing was satisfactory and performed in accordance with testing requirements. The personnel involved were knowledgeable of their tasks (Section M1.4).

- Prior to February 10, 1996, the licensee failed to perform surveillance testing of engineered safety feature activated carbon in verbatim compliance with their TS requirements. This deficiency was licensee identified and promptly corrected. Accordingly, the NRC is exercising discretion in accordance with Section VII.B.6 of the Enforcement Policy and refraining from issuing a citation for this Severity Level IV violation (Section M8.1).

Engineering

- The use of the engineering technical work record (TWR) process to resolve a meter calibration deficiency was inappropriate in that the verification review process was circumvented. The licensee identified the failure to provide a verification review and initiated a nonconformance notice (NCN) which allowed for a second party verification of the meter calibration in the NCN disposition (Section E1.1).

Plant Support

- Health Physics (HP) work practices associated with high efficiency particulate air filter change out met the licensee's program requirements. HP management continues to address the proper use of electronic dosimetry (Section R1.2).

Report Details

Summary of Plant Status

The unit operated at approximately 100 percent power for the entire 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; specific events and noteworthy observations are detailed in the sections below.

O1.2 Leaking Pressurizer Power Operated Relief Valve (PORV)

a. Inspection Scope (71707)

The inspectors reviewed the licensee's response to a leaking pressurizer PORV.

b. Observations and Findings

On October 4, the operations monitoring computer alarmed due to high differential temperature at monitoring point U1074 "Pressurizer Safety/PORV Differential Tailpipe Temperature." The computer point monitors the differential temperature between the average downstream temperature for all three pressurizer PORVs and the temperature measured at the common pipe downstream from the PORVs. A high differential temperature indicates possible PORV seat leakage.

Operations personnel responded to the alarm per Station Operating Procedure (SOP)-101, "Reactor Coolant System," Revision 21, Section V-A, "A Pressurizer PORV Tailpipe High Temperature." Maintenance Work Request (MWR) 9814957 was performed by instrumentation and control personnel to verify that temperature indications were accurate. After determining that PORV PCV00445B had seat leakage, the licensee closed the associated PORV block valve. MWR 9814958 was written to perform corrective maintenance on PCV00445B during an upcoming outage.

The inspectors verified that Technical Specification (TS) 3.4.4, "Relief Valves," requirements were met in a timely manner. The inspectors also verified that Removal and Restoration documentation was accurate.

c. Conclusions

Operations personnel took timely and appropriate actions as required by TS 3.4.4, "Relief Valves," in response to a leaking pressurizer power operated relief valve.

O7 Quality Assurance in Operations

O7.1 Nuclear Safety Review Committee Meeting (NSRC)

a. Inspection Scope (40500)

The inspectors attended portions of a NSRC meeting to observe the NSRC functions. The inspectors reviewed implementation of TS 6.5.2, "Nuclear Safety Review Committee (NSRC)."

b. Observations and Findings

On September 16, the inspectors observed portions of a day-long NSRC meeting. All the meeting agenda items were addressed, and the observed portions of the meeting were technically and performance oriented. The agenda included reviews of plant status, a proposed TS change, the Primary Identification Program (PIP), Trend Reports, Quality Assurance Reports, Licensee Event Reports, Task Lists and NSRC members plant tour comments. The inspectors verified the NSRC Chairman and quorum requirements were in compliance with TS 6.5.2.

c. Conclusions

The NSRC meeting was in compliance with TS 6.5.2 requirements for meeting quorum, NSRC Chairman participation, and meeting agenda. The portions of the meeting observed by the inspectors were technically and performance oriented.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments (62707)

The inspectors observed various maintenance and surveillance testing activities. The inspectors generally found the work performed during the activities to be professional and thorough. All work was performed with work packages present and actively referenced. Technicians were experienced and knowledgeable of the their assigned tasks. The inspectors observed supervisors and system engineers monitoring job progress. The inspectors forwarded minor concerns to licensee management for resolution. Specific observations warranting additional discussion are described below.

M1.2 Observation of Pressurizer Heater Breaker Troubleshooting

a. Inspection Scope (62707)

The inspectors observed portions of the troubleshooting activities conducted following Group 2 Pressurizer Heater Breaker tripping open.

b. Observations and Findings

On September 8, at 9:35 p.m., Group 2 Pressurizer Heater Breaker XSW1DB-05 tripped open. The licensee entered TS 3.4.3.a, which states, "with one group of pressurizer heaters inoperable, restore at least two groups to operable status within 72 hours or be in at least hot standby within the next 6 hours." The inspectors reviewed and followed portions of the licensee's response which was conducted under work order number 9813710 and Electrical Maintenance Procedure (EMP)-300.007 "General Electrical Maintenance and Troubleshooting," Revision 6.

The troubleshooting plan was detailed and thorough, however, no specific cause was determined for breaker XSW1DB-05 tripping. The licensee decided to replace the breaker with a refurbished qualified spare breaker. The replacement of the breaker required the door to the 1DB switchgear room to be blocked open and the mullion to be removed. The administrative control for blocking open a steam propagation barrier door was previously identified by inspectors as an unresolved item (URI) 50-395/98006-01. The NRC staff is continuing to review the licensee's practice of blocking open or disabling steam propagation barrier doors.

The inspectors observed the breaker replacement activities and noted that the actions were conducted in an expeditious and professional manner. The licensee minimized the time that the 1DB door mullion was removed for the breaker replacement, and restored the door to service within 36 minutes. This amount of time was significantly less than previously recorded times in which the licensee made steam propagation barrier doors inoperable. The inspectors noted that several supervisors monitored job progress, and that quality control personnel were present when required by procedure. Following the breaker change out, the licensee electronically monitored the breaker for spurious trip signals. The licensee detected no spurious trip inputs and declared the breaker back in service on September 10, at 12:35 p.m.

c. Conclusions

The troubleshooting plan that addressed the trip of the Group 2 pressurizer heater breaker was appropriate and implemented in a timely manner. The TS 3.4.3 requirements for pressurizer operation were met.

M1.3 Failure of Turbine Driven Emergency Feedwater (TDEFW) Pump Speed Control (62707)

a. Inspection Scope (62707)

The inspectors reviewed the failure of the TDEFW pump speed control system.

b. Observations and Findings

On September 15, the licensee performed surveillance test STP 220.002 "Turbine Driven Emergency Feedwater Pump and Valve Tests," Revision 2. The TDEFW pump

failed to reach full speed. During troubleshooting, the licensee determined that the current-to-pressure (I/P) converter, which was part of the speed control system, was not functioning properly. The failed I/P converter was replaced under MWR 9813816. STP 220.002 was reperformed and completed satisfactorily.

While inspecting the failed I/P converter, instrumentation and control personnel found black dust particles clogging the air stream passage in the I/P converter. Once cleaned, the I/P converter operated properly. The preventative maintenance program did not address cleaning the I/P converter internals. The inspectors determined that the I/P converter failure was safety significant in that the failure mode prevented the TDEFW pump from achieving its design flow due to inadequate pump speed. Additionally, the licensee stated that there was the potential for the dust particle buildup to collect to the extent that the blockage would limit pump speed to the minimum speed setting. However, the inspectors also noted that the licensee's emergency procedures address loss of feedwater and that operations personnel are trained to respond to a loss of heat sink condition.

During the replacement of the I/P converter, it was noted that the converter was designated as non-safety related. The licensee's Quality Related (QR) Plan addresses non-safety related components that effect the performance of safety related systems and components. Technical requirements packages were developed as part of the QR plan to define maintenance requirements for ensuring the identified non-safety related components are maintained such that the associated safety related components remain capable of performing to their design and technical requirements. The inspectors noted that the TDEFW pump I/P converter was not included in the QR plan. Although the I/P converter was calibrated every eighteen months, neither the converter nor its regulator were included in any other preventative maintenance program.

On September 25, an engineering evaluation was initiated to determine if the non-safety related I/P converter could affect the performance of safety related components. The control air to the I/P converter was isolated based on a recommendation from engineering and their evaluation that the converter could be isolated. Isolation of the I/P converter allowed the TDEFW pump to operate at full speed thus ensuring that the failure of the non-safety related I/P converter would not prevent the TDEFW pump from achieving its design flow.

The engineering evaluation determined that the I/P converter design was analyzed for failures arising from complete loss of air and loss of electrical signal. However, the design analysis did not address partial air stream blockage. Nonconformance Notice (NCN) 98-0823 was written to address this failure mode. The inspectors reviewed the NCN and verified that the scope appropriately addressed the concern. The inspectors also reviewed vender information on the speed control circuit for the TDEFW pump and verified that isolation of the I/P converter corresponds with full turbine speed.

The licensee's corrective actions for this condition include isolation of the I/P converter from TDEFW speed control, initiation of a review and engineering evaluation to identify other susceptible I/P converters and associated maintenance, and initiation of procedure

development to address maintenance activities for the I/P converters.

TS 6.8.1, "Procedures and Programs" requires the establishment, implementation and maintenance of written procedures for activities referenced by Regulatory Guide (RG) 1.33, Revision 2, February 1978. RG 1.33 requires written procedures for maintenance that can affect the performance of safety related equipment. Contrary to the above, the technical requirements package developed for addressing the non-safety related instrument air components did not include the TDEFW speed control I/P converter.

This non-repetitive, licensee identified, non-willful and corrected violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the NRC Enforcement manual. It will be designated as NCV 50-395/98008-01, "Inadequate preventative maintenance of the turbine driven emergency feedwater pump current-to-pressure converter."

c. Conclusions

An NCV was identified for failure to establish preventative maintenance activities for the Turbine Driven Emergency Feedwater (TDEFW) pump current-to-pressure (I/P) converter which resulted in an unanalyzed failure mode of the turbine control system. The TDEFW pump failed to reach full speed during surveillance testing due to an I/P converter failure.

M1.4 Observation of Engineered Safeguard Transformer Differential Relay Surveillance Testing

a. Inspection Scope (61726)

Inspectors observed portions of the surveillance testing of Engineered Safeguard Transformer Differential Relays XTF0004-87T4.

b. Observations and Findings

On September 17, inspectors observed and reviewed surveillance testing conducted for Engineered Safeguard Transformer Differential Relays XTF0004-87T4 under Preventive Maintenance Tracking Sheet (PMTS) 9804734 and EMP-190.024 "Test Procedure for G.E.Types BDD15B and BDD16B Relays," Revision 4. The test equipment being used was verified by the inspectors to be within calibration requirements. The personnel performing the test followed the procedure and were knowledgeable of the task. No adjustment of the relays was required.

c. Conclusions

The relay testing observed by the inspectors was satisfactory and performed in accordance with testing requirements. The personnel involved were knowledgeable of their tasks.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) URI 50-395/96002-03: Charcoal adsorber tested in a manner different than specified in TS. On February 7, 1996, the licensee identified that the laboratory testing standard used to determine the efficiency of activated carbon adsorber in the Control Room Normal and Emergency Air Handling System and the Spent Fuel Pool (SFP) Ventilation System did not comply with technical specification requirements. Specifically, surveillance requirements 4.7.6.c.2, 4.7.6.d, 4.9.11.b.2, and 4.9.11.c required representative carbon samples to meet the laboratory testing criteria of Regulatory Position C.6.a of Regulatory Guide 1.52, Revision 2, March 1978. Regulatory Position C.6.a requires, in part, laboratory testing of activated carbon in accordance with American National Standard ANSI/ASME N509-1976, "Nuclear Power Plant Air Cleaning Units and Components." The purpose of this surveillance testing is to ensure that charcoal filters used in Engineered Safety Feature (ESF) ventilation systems can mitigate the consequences of a radiological accident. Contrary to the TS requirement, the licensee performed the charcoal laboratory testing in accordance with ANSI/ASME N509-1980, which refers to the test methodology of ASTM D 3803-1979, "Standard Test Methods for Radiation Testing of Nuclear-Grade Gas-Phase Adsorbents."

Following identification of this inconsistency, the licensee requested an emergency technical specification change to recognize the station's actual testing methodology. Differences between ANSI/ASME N509-1976 and the licensee's proposed TS change included; (1) a reduction in test gas temperature, (2) inclusion of a pre-test temperature equilibration and (3) elimination of the pre-test humidity equilibration. In general, lower test temperatures result in greater water retention by the carbon sample. Because water retention reduces the efficiency of the carbon, the decrease in test temperature results in more conservative test conditions. The ANSI/ASME N509-1976 standard requires thermal equilibration of the charcoal sample at 25°C, followed by an instantaneous introduction of 70% relative humidity test gas at 80°C. The licensee concluded they could not successfully perform the test in accordance with 1976 standard since water vapor would condense on the relatively cooler charcoal and invalidate the test. The licensee's testing methodology avoided condensation problems by including a pre-test temperature equilibration of the carbon sample to test gas temperature. The licensee believed elimination of the pre-test humidity equilibration simulated accident conditions better than the 1976 standard and prevented partial regeneration of the carbon. The NRC granted the licensee's proposed TS revision by issuing Amendment 131 on February 10, 1996. In the associated safety evaluation, the NRC staff concluded that the licensee promptly notified the NRC of the surveillance requirement deficiency and promptly proposed an emergency amendment to resolve the inconsistency. When issuing the emergent amendment, the NRC also noted that testing per ANSI/ASME N509-1980 provided more accurate assurance that the Control Room Normal and Emergency Air Handling System and SFP Ventilation System would perform their design function than testing done per the N509-1976 standard. The licensee currently performs activated carbon laboratory testing in accordance with the ANSI/ASME N509-1980 standard.

The NRC's position on the appropriate testing for nuclear-grade activated charcoal has evolved over time. It was initially assumed that high-temperature/high-humidity conditions, such as the conditions associated with ANSI/ASME N509-1976, presented the most severe challenge to the charcoal adsorber during testing. With increased testing experience, the NRC and the industry identified that low-temperature/high-humidity test conditions were more conservative. Although the licensee's current test methodology addresses concerns associated with high temperature test conditions, the NRC staff believes that the methodology of ASTM D 3803-1979 (the testing standard referenced by ANSI/ASME N509-1980) has unacceptable test parameter tolerances and instrument calibration requirements, and is non-conservative in not requiring pre-test humidity equilibration of used charcoal. As discussed in SECY 97-299, "Laboratory Testing of Nuclear-Grade Activated Charcoal," the NRC staff has now determined that testing nuclear-grade activated charcoal to standards other than ASTM D 3803-1989 does not provide assurance for compliance with the plant's licensing basis. In their February 1996 emergency TS change request, the licensee acknowledged they were aware of the NRC's belief that ASTM D 3803-1989 was the preferred charcoal testing methodology. Although the emergent TS change request adopted the ASTM D 3803-1979 standard, the licensee indicated they would submit an additional TS change request to incorporate the improved 1989 standard. On May 21, 1997, the licensee submitted a TS amendment request to change the methodology for surveillance testing of charcoal adsorbers (TS 4.7.6 and TS 4.9.11) from the ANSI/ASME N509-1980 standard to ASTM D 3803-1989. This TS change request is currently under review by the NRC.

Prior to February 10, 1996, the licensee failed to perform surveillance testing of activated carbon in verbatim compliance with their TS requirements. This deficiency was licensee identified and promptly corrected. At the time the deficiency was corrected, the NRC staff noted that the testing methodology of ANSI/ASME N509-1980 provided more accurate assurance that ESF air handling units would perform their design function. Therefore, this condition had minimal potential to impact plant safety. In SECY 97-299, the NRC staff noted that the presence of conflicting NRC guidance and complex and ambiguous standards may warrant mitigation of enforcement sanctions. Accordingly, the NRC is exercising discretion in accordance with Section VII.B.6 of the Enforcement Policy and refraining from issuing a citation for this Severity Level IV violation.

III. Engineering

E1 Conduct of Engineering

E1.1 Review of Engineering Response to a Calibration Deficiency

a. Inspection Scope (37551, 61726)

Inspectors observed the calibration of a control room watt meter XCP6117 W-ESF and reviewed the licensee's response to a calibration acceptance criteria deficiency.

b. Observations and Findings

On September 17, the inspectors observed electricians perform a calibration of watt meter XCP6117 W-ESF for Engineered Safeguard Transformer XTF0004. The watt meter is located on the main control board. The calibration was performed under work order 9804578001 and procedure EMP-0285.001 "Panel Mounted Meter Calibration Check," Revision 8. The calibration of the test equipment was verified by the inspectors. A concern was properly raised by the technicians regarding the danger tagging prior to commencing work. Control room supervision was informed of the concern and determined that although the tagout was technically correct, a labeling discrepancy existed. The licensee took appropriate action to address the labeling discrepancy.

The XCP6117 W-ESF meter calibration check was completed with all ranges meeting the acceptance criteria except for the 75 percent range. The data for the 75 percent range was slightly out of the required acceptance criteria. To be within the acceptance criteria the data needed to be rounded off. Engineering personnel were tasked with addressing the issue and an engineering technical work record (TWR) was used to allow for the rounding off of the data. The licensee returned the meter to service based on the completed TWR.

The licensee later determined that a NCN would have been the more appropriate method to resolve this concern. The licensee issued Primary Identification Program (PIP)/NCN 98-0835 to address this condition. The inspectors noted that the use of a TWR to resolve issues of this type circumvents the verification review process that is accomplished when using an NCN or procedure revision process. The resulting NCN 98-0835 included the proper verifications and accepted the meter as-is.

The safety significance of applying the TWR process to address the possible meter data error was minor in that it was later determined that rounding off the data was acceptable; however, the TWR process does not require a verification to be performed. The licensee is addressing these concerns under its Quality System Review (QSR) process.

c. Conclusions

The use of the engineering technical work record (TWR) process to resolve a meter calibration deficiency was inappropriate in that the verification review process was circumvented. The licensee identified the failure to provide a verification review and initiated a nonconformance notice (NCN) which allowed for a second party verification of the meter calibration in the NCN disposition.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.2 Observations of Health Physics (HP) Work Practices

a. Inspection Scope (71750)

The inspectors observed normal radiological practices and controls during the conduct of tours and observations of general maintenance activities. Inspectors observed HP work practices during performance of high efficiency particulate air (HEPA) filter change out. Inspectors also reviewed licensees' response to two condition evaluation reports (CERs) concerning entry into the radiation controlled area (RCA) without electronic dosimeters.

b. Observations and Findings

On September 29, the inspectors observed HP work practices conducted in support of work request WR 9813685 and Mechanical Maintenance Procedure (MMP)-460.025, "Inspection and Replacement of Filters in the Air Handling System," Revision 8A, for the Auxiliary Building Ventilation System. Proper HP practices were generally noted and minor concerns raised by the inspectors were immediately corrected.

The inspectors reviewed the licensee's response to CER 98-0825 and 98-0848, each documenting a person entering the RCA without electronic dosimeters (EDs). Although the subject personnel were wearing the required thermoluminescent dosimeters (TLDs), they failed to wear the required EDs as required by step 4.3 of Health Physics Procedure HPP-150, "Requirements for Issuance and use of Personnel Dosimetry," Revision 7. The licensee's review determined that neither person entered high radiation areas while in the RCA without the EDs. These failures constitute a violation of minor significance and is not subject to formal enforcement action. There were 5 instances in the last six months and 19 instances since the introduction of the ED program in which personnel did not have an ED with them while in the RCA. HP management was already sensitive to this issue and discussed with the inspectors their root cause analysis which was previously performed to help prevent personnel entering the RCA without their EDs. A root cause was personnel distraction at the RCA entry point where the EDs are obtained. As part of the corrective action effort, the licensee installed sound proofing around one electronic dosimetry processing machine to evaluate if this would minimize distractions. The licensee is also evaluating changes to the software used with the electronic dosimetry processing machine. The change would alert personnel or an HP that an ED was left in the machine to avoid personnel working in the RCA without a ED.

c. Conclusions

The inspectors concluded that health physics work practices are generally adequate. HP management continues efforts to prevent personnel from entering the RCA without their electronic dosimetry.

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 October 21, 1998. 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
S. Byrne, General Manager, Nuclear Plant Operations
R. Clary, Manager, Quality Systems
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G. Taylor, Vice President, Nuclear Operations
R. Waselus, Manager, Systems and Component Engineering
R. White, Nuclear Coordinator, South Carolina Public Service Authority
B. Williams, General Manager, Engineering Services
G. Williams, Associate Manager, Operations

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92902:	Followup - Maintenance

ITEMS OPENED AND CLOSED

Opened

50-395/98008-01	NCV	Inadequate preventative maintenance of the turbine driven emergency feedwater pump current-to-pressure converter (Section M1.3)

Closed

50-395/98008-01	NCV	Inadequate preventative maintenance of the turbine driven emergency feedwater pump current-to-pressure converter (Section M1.3)
50-395/96002-03	URI	Charcoal adsorber tested in a manner different than specified in TS (Section M8.1)