



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931**

October 24, 2002

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

**SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION - NRC INTEGRATED INSPECTION  
REPORT NO. 50-395/02-03**

Dear Mr. Byrne:

On September 28, 2002, the NRC completed an inspection at your Virgil C. Summer Nuclear Station. The enclosed report documents the inspection findings which were discussed on October 2, 2002, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified two issues of very low safety significance (Green). One issue was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because the issue has been entered into your corrective action program, the NRC is treating the issue as a non-cited violation (NCV), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. In addition, licensee identified violations are listed in Section 4OA7 of this report. If you contest any NCV in this report, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Virgil C. Summer Nuclear Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system

(ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Kerry D. Landis, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure: Integrated Inspection Report No. 50-395/02-03  
w/Attachment: Supplementary Information

cc w/encl:  
R. J. White  
Nuclear Coordinator Mail Code 802  
S.C. Public Service Authority  
Virgil C. Summer Nuclear Station  
Electronic Mail Distribution

Gregory H. Halnon, General Manager  
Nuclear Plant Operations (Mail Code 303)  
South Carolina Electric & Gas Company  
Virgil C. Summer Nuclear Station  
Electronic Mail Distribution

Kathryn M. Sutton, Esq.  
Winston and Strawn  
Electronic Mail Distribution

Melvin N. Browne, Manager  
Nuclear Licensing & Operating  
Experience (Mail Code 830)  
South Carolina Electric & Gas Company  
Virgil C. Summer Nuclear Station  
Electronic Mail Distribution

Henry J. Porter, Director  
Div. of Radioactive Waste Mgmt.  
Dept. of Health and Environmental  
Control  
Electronic Mail Distribution

R. Mike Gandy  
Division of Radioactive Waste Mgmt.  
S. C. Department of Health and  
Environmental Control  
Electronic Mail Distribution

Distribution w/encl.:  
 K. Cotton, NRR  
 RIDSNRRDIPMIIPB  
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SIGNATURE	M. Widmann	M. King	L. Garner for	W. Rogers	W. Sartor		
NAME	MWidmann	MKing	KGreen-Bates	WRogers	WSartor		
DATE	10/23/2002	10/23/2002	10/23/2002	10/22/2002	10/22/2002		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

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

Report No.: 50-395/02-03

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

Facility: Virgil C. Summer Nuclear Station

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

Dates: June 30 through September 28, 2002

Inspectors: M. Widmann, Senior Resident Inspector  
M. King, Resident Inspector  
K. Green-Bates, Project Engineer, RII (Sections 1R06 and 4OA2.2)  
W. Rogers, Senior Reactor Analyst, RII (Sections 4OA3.3 and 4OA7.4)  
W. Sartor Jr., Senior Reactor Inspector, RII (Sections 1EP2, 1EP3, 1EP4,  
1EP5, 4OA1.3, 4OA1.4, and 4OA1.5)

Approved by: K. D. Landis, Chief, Reactor Projects Branch 5  
Division of Reactor Projects

Attachment: Supplementary Information

Enclosure

## SUMMARY OF FINDINGS

IR 05000395-02-03; South Carolina Electric & Gas Co., on 06/30 - 09/28/2002; Virgil C. Summer Nuclear Station. Post-Maintenance Testing, Identification and Resolution of Problems.

The inspection was conducted by resident inspectors, a regional senior reactor inspector, a senior reactor analyst, and a regional project engineer. The inspection identified two Green findings, one of which was a non-cited violation. The significance of the findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. Inspector Identified Findings

#### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a non-cited violation of Technical Specification 6.8.1.a for a failure to maintain proper control of a steam propagation barrier as required by procedures. During post-maintenance for the A train emergency diesel generator jacket water heater replacement, a steam propagation barrier was blocked open.

The safety significance of the finding was very low due to the low likelihood of a steam or feedwater line break accident and the short duration that the condition existed. (Section 1R19)

- Green. The inspectors identified a Green finding concerning the licensee's failure to develop an adequate Engineering Information Request which would have resulted in an inadequate post-maintenance test and a failure to meet American Society of Mechanical Engineers code requirements.

The safety significance of the finding was very low based upon the low likelihood of a major component water system break on the B train and the availability of the A train service water. (Section 4OA2.1)

### B. Licensee Identified Violations

- Four violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

## Report Details

### Summary of Plant Status

The unit began the inspection period at 100 percent power and remained at or near full power for the entire inspection period.

## **1. REACTOR SAFETY**

### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors evaluated implementation of adverse weather procedures, compensatory measures and licensee response for selected issues that occurred as a result of adverse weather. Specifically, the inspectors reviewed the licensee's compensatory measures for emergency diesel generators (EDGs) A and B elevated room temperatures and actions to reduce overheating in the main generated isophase bus duct (condition evaluation report (CER) 0-C-02-2218).

Inspectors also reviewed licensee response for heavy rainfall, building roof leaks, and the impact on auxiliary and intermediate building equipment (1DA switchgear room, A and C component cooling water pump breakers) and associated electric cabling (CERs 0-C-02-2801, 0-C-02-2990 and 0-C-02-2996).

##### b. Findings

No findings of significance were identified; however, various issues raised concerning external flooding as a result of excessive water intrusion are documented in Section 4OA2.2 of this report.

#### 1R04 Equipment Alignment

##### a. Inspection Scope

The inspectors verified through plant walkdowns that with a train of equipment removed from service that the opposite train of equipment was correctly aligned, available and operable. The following systems / components were verified:

- B EDG while the A EDG was out of service during scheduled surveillance testing;
- B reactor building (RB) spray system while the A RB spray pump was out of service for maintenance;
- A component cooling water (CCW) pump out of service (verify realignment with C CCW pump)

Correct alignment and operating conditions were determined from the applicable portions of drawings, system operating procedures (SOPs), final safety analysis report

(FSAR), and technical specifications (TSs). The documents reviewed during this inspection are listed in the Attachment to this report.

The inspection included review of outstanding maintenance work requests (MWRs) and related CERs to verify that the licensee had properly identified and resolved equipment alignment problems that could impact mitigating system availability.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors reviewed recent CERs, work orders (WO), and impairments associated with the fire suppression system. The inspectors reviewed surveillance activities to determine whether they supported the operability and availability of the fire protection system.

The inspectors assessed the material condition of the active and passive fire protection systems and features and observed the control of transient combustibles and ignition sources. The inspectors conducted routine inspections of the following areas:

- A and B train diesel generator rooms (fire zones DG 1.1/1.2 and DG 2.1/2.2)
- Battery charger room (fire zone IB-3)
- Auxiliary building switchgear room (fire zone AB-1.29)
- 1DB 4kV switchgear room and HVAC rooms for 1DA and 1DB (fire zones IB-16, 17 and IB-22.2)
- Service water (SW) pumphouse (fire zones SWPH 1-5)
- Relay room (fire zone CB-6)

These areas are important to safety based on the licensee's fire risk analysis (Individual Plant Examination for External Events Internal Fires Request for Additional Information, dated January 1999).

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed the licensee's external flooding mitigation plans and equipment to determine consistency with design requirements, FSAR and flood analysis documents. Walkdowns were conducted of the interior and/or exterior walls of the intermediate building, reactor building, turbine building, circulating water pump house and the diesel generator building to assess seasonal susceptibilities. During the course

of the inspection, the inspectors also reviewed a sample of potential external flood related CERs. A list of those documents reviewed are in the Attachment to this report.

b. Findings

No significant findings were identified. Areas of concern dealing with the licensee's corrective actions are discussed in Section 4OA2.2 of this report.

1R11 Licensed Operator Requalification Program

a. Inspection Scope

On July 9, 2002, the inspectors observed senior reactor operators' and reactor operators' performance on the plant simulator during licensed operator requalification training. The training scenario involved a stuck open steam generator A train power operated relief valve, pressurizer instrument leak, an anticipated transient without scram, and one stuck rod after reactor / turbine trip (LOR-SA-033R). The inspectors verified that training included risk-significant operator actions, implementation of emergency classification and the emergency plan. The inspectors assessed overall crew performance, communication, oversight of supervision and the evaluator's critique.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues described in the CERs and nonconformance notices (NCNs) listed below, the inspectors evaluated the licensee's effectiveness of the corresponding preventive and corrective maintenance associated with structures, systems or components (SSCs). Inspectors performed in-office reviews of procedures and evaluations and held discussions with system engineers as appropriate. Inspectors compared the licensee's actions with the requirements of the Maintenance Rule (MR), 10 CFR 50.65, using Engineering Services procedure ES-514, "Maintenance Rule Implementation," and the Virgil C. Summer "Important To Maintenance Rule System Function and Performance Criteria Analysis."

- CER 0-C-00-1876, review of emergency diesel generator governor issues and removal of the EDGs from Maintenance Rule (a)(1) to (a)(2) status;
- CER 0-C-01-2425, steam propagation barrier (SPB) door DRAB/514 auxiliary building to fuel handling building door latch failures, maintenance preventable function failure;
- NCN 02-464, technical work record (TWR) W015209, dated June 26, 2002, C train service water pump breaker (XSW1EA02) racking mechanism failure.



The inspectors' review also evaluated if maintenance preventable functional failures or other MR findings existed that the licensee did not capture in their program.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's assessments of the risk impacts of removing from service those components associated with planned and emergent work items. The inspectors evaluated the selected SSCs listed below for, (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that emergent work problems were adequately identified and resolved. The inspectors evaluated the licensee's work prioritization and risk determination to determine, as appropriate, whether necessary steps were properly planned, controlled, and executed for the planned and emergent work activities listed below:

- Train A service water pump 10-year maintenance with A EDG and A and B train chillers out of service;
- XVG9627B-CC, cross-connect from SW to CCW isolated causing B train CCW to be inoperable with A train service water pump and B chiller removed from service for maintenance;
- Testing turbine driven emergency feedwater (TDEFW) pump while A train service water pump, diesel fire pump, reactor building B train instrument air compressor and A train reactor makeup supply pump out of service;
- Testing TDEFW pump while reactor building instrument air compressor and the A train component cooling water pump was out of service;
- Train A charging pump and EDG out of service, with an elevated risk for loss of main feedwater.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions

a. Inspection Scope

This inspection evaluated operator response for non-routine plant evolutions to ensure they were appropriate and in accordance with the required procedures. The inspectors also evaluated performance problems to ensure that they were entered into the corrective action program. The following events or evolutions were reviewed:

- Planned non-routine evolution to implement operator contingency plans during work on CCW to SW cross-connect valve for a loss of B train CCW (CER 0-C-02-2306);
- Train A EDG field-failure relay actuated during surveillance testing activities (CER 0-C-02-2883) resulting in the engine unexpectedly unloading.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected operability evaluations affecting risk significant mitigating systems to assess, as appropriate, (1) the technical adequacy of the evaluations; (2) whether operability was properly justified and the subject component or system remained available, such that no unrecognized increase in risk occurred; (3) whether other existing degraded conditions were considered; (4) where compensatory measures were involved, whether the compensatory measures were in place, would work as intended, and were appropriately controlled; and (5) the impact on TS limiting conditions for operations (LCOs) and the risk significance in accordance with the significance determination process (SDP). The inspectors reviewed the following CERs, issues and evaluations:

- 0-C-02-1329, non-conservative flood level calculation in diesel generator building 400 foot elevation (rooms DG 00-01 and 00-02);
- 0-C-02-2254, residual heat removal flow switch IFS00602B calibrated to incorrect setpoints;
- 0-C-02-2306, service water to component cooling water cross-connect valve air regulator leaking;
- 0-C-02-2883, A EDG unable to be properly loaded due to output breaker failing open during engine testing.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the following item to determine whether the functional capability of the related system or human reliability in responding to an initiating event was affected by the listed operator workaround. The inspectors specifically considered whether the workaround affected the operators' ability to implement abnormal or emergency operating procedures for the modes of operation involved.

- Service water booster pump discharge piping becoming over pressurized causing check valve XVG03106A(B) to potentially bind.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed design change package engineering change request (ECR) 50473 and witnessed portions of its implementation performed while the unit was on-line. This modification implemented the security modifications to structures in response to the NRC Security Order, dated February 25, 2002. The inspectors reviewed the associated 10 CFR 50.59 documentation and assessed the ECR's impact on plant risk and verified the performance capability of risk significant SSCs would not be degraded through the modifications. The inspectors reviewed the modifications' implementation to confirm that in-plant emergency and abnormal operating procedure actions were not adversely affected and the security strategy was appropriately enhanced.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT)

a. Inspection Scope

For the post-maintenance tests listed below, the inspectors reviewed the test procedure and witnessed either the testing and/or reviewed test records to determine whether the scope of testing adequately verified that the work performed was correctly completed and demonstrated that the affected equipment was functional and operable:

- PMT for B reactor building spray pump, motor preventative maintenance retest per EMP-295.025;
- PMT for A EDG following motor operator controller (MOC) switch replacement / adjustment per STP-125.004A;
- WO 0200079, PMT to partially stroke XVG09627B-CC service water; cross-connect to component cooling water after maintenance (NCN-02-2306 replace air regulator);
- WO 0202277, retest of EDG A and B train room supply fans XPN0075A-AH and XPN0075B-AH after damper adjustments per EMP-295.004;
- WO 0202769, molded case circuit breaker test of XMC1DA22-01CD, EDG A fuel oil transfer pump XPP0004A-DG, per Electrical Maintenance Procedure (EMP)-280.004;

- WO 0210116, PMT per STP-105.003B on accumulator nitrogen supply valve, XVT08880-SI, due to excessive packing leak;
- WO 0211222, A EDG jacket water heater replacement XEG0001A-HC2 per EMP-300.002.

b. Findings

Introduction: The inspectors identified one non-cited violation (NCV) evaluated as having very low safety significance (Green). This violation resulted from a failure to follow procedural controls for steam propagation barrier (SPB) doors during the PMT process for the A train EDG jacket water heater replacement.

Description: The inspectors observed operator preparations to refill the A EDG expansion tank using SOP-306, "Emergency Diesel Generator," following work activities on the jacket water heater. As part of those preparations, the operators routed the water fill hose through an SPB door (DRIB/301). During discussions with the inspectors, the operators stated that they had the understanding that the SPB doors could remain open for up to one hour for minor maintenance. Fire Protection Procedure FPP-025, "Fire Containment," limits the opening of SPB doors in Modes 1 to 4 to normal ingress and egress and minor corrective maintenance of the door lock or hinge. The operators did not understand that the routing of a hose through the door did not constitute minor maintenance. Procedures require that SPB doors remain in a configuration such that they can be immediately closed to perform their hazard barrier function. The inspectors questioned the operators both prior to and during the filling activity if routing the hose through the SPB would be contrary to the SPB control procedures. An alternate means of routing the hose was available to the operators. After discussions with control room supervision the activity was suspended until the alternate method of supplying water was implemented.

Analysis: The failure to properly control SPB doors is considered more than minor, because if left uncorrected the finding would become a more significant safety concern. With this door blocked open by a hose, a high energy line break (i.e., steam or feedwater) in the intermediate building could render both EDGs inoperable due to the hazardous steam environment created. The issue was determined to be of very low safety significance (Green) based upon the low likelihood of a steam or feedwater line break accident and the short duration that the condition existed (less than one minute). This condition would have existed for approximately 20 to 60 minutes (maximum) if the inspectors had not questioned the activity.

Enforcement: Technical Specification 6.8.1.a, requires, in part, that written procedures shall be implemented covering activities recommended in Regulatory Guide 1.33, Appendix A, Item 3.s.2.a, which include procedures for emergency diesel generators. The operators used SOP-306 to return the EDG to service. Jacket water procedure, SOP-306, Section I, Note 2, states that SPBs are to be controlled in accordance with FPP-025. On August 23, the inspectors identified that a hose was routed through SPB door DRIB/301 contrary to FPP-025, Step 3.2.1, while the unit was in Mode 1. This NRC identified violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC enforcement Policy and is identified as NCV 50-395/02003-01. This condition has been entered in the licensee's corrective action program under CER 0-C-02-2704.

## 1R22 Surveillance Testing

### a. Inspection Scope

For the surveillance tests listed below, the inspectors examined the test procedure and either witnessed the testing and/or reviewed test records to determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable:

- STP-125.016, "Train A Charging Pump and Diesel Generator Slave Relay Test;"
- STP-125.020, "ESFLS Testing of Train B Chill Water Pumps and Chillers (Alternate Method);"
- STP-222.002, "Reactor Building Spray Pump Test;"
- STP-223.002A, "Service Water Pump Test C Train;"
- STP-225.001A, "Diesel Generator Support Systems Pump and Valve Test;"
- STP-345.037, "Solid State Protection System Actuating Logic and Master Relay Test - Train A."

### b. Findings

No findings of significance were identified.

## 1R23 Temporary Plant Modification

### a. Inspection Scope

The inspectors reviewed the following temporary modification to assess the impact on risk-significant SSC parameters, such as, availability, reliability and functional capability. The inspectors verified the temporary modification had not adversely affected safety functions of required systems:

- Bypass authorization request to jumper temperature input signals causing main control room board annunciator alarm XCP-615, "Reactor Coolant System Differential Temperature Deviation Hi/Lo."

### b. Findings

No findings of significance were identified.

### **Cornerstone: Emergency Preparedness**

## 1EP2 Alert Notification System Testing

### a. Inspection Scope

The inspectors reviewed the testing program for the alert and notification system (ANS), which comprised 106 pole mounted sirens within the ten-mile emergency planning zone. The testing program involved weekly silent tests, monthly growl tests, and an annual full

cycle test. The inspectors also reviewed maintenance records to ascertain the effectiveness and timeliness of repairs when siren problems were identified.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization Augmentation Testing

a. Inspection Scope

The inspectors reviewed the documentation supporting the maintenance and testing of the licensee's emergency response organization augmentation system.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

The inspectors reviewed changes to the Emergency Plan and the emergency action levels (EALs) to determine whether any of the changes decreased the effectiveness of the Emergency Plan. The current Virgil C. Summer Radiation Emergency Plan was Revision 45 with a March 28, 2002 effective date. The review was performed against 10 CFR 50.54.q.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

a. Inspection Scope

The inspectors evaluated the efficacy of licensee programs that addressed weaknesses and deficiencies in emergency preparedness. Items reviewed included exercise and drill critique reports, quality assurance audit reports and the licensee's CER Program. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

## 1EP6 Drill Evaluation

### a. Inspection Scope

On September 25, the inspectors reviewed and observed the performance of a simulator drill that involved a loss of service water and a security event which required an alert to be declared (LOR-ST-009A). The inspectors assessed emergency procedure usage, emergency plan classification, notifications and the licensee's identification and entrance of any problems into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and critique performance. Drill issues were captured by the licensee in CER 0-C-02-3110. Inspectors verified that the failures in the drill emergency plan opportunities were accurately documented and that the PI data was properly recalculated for the rolling eight quarters.

### b. Findings

No findings of significance were identified.

## 3. **SAFEGUARDS**

### **Cornerstone: Physical Protection**

## 3PP3 Response to Contingency Events

The Office of Homeland Security (OHS) developed a Homeland Security Advisory System (HSAS) to disseminate information regarding the risk of terrorist attacks. The HSAS implements five color-coded threat conditions with a description of corresponding actions at each level. NRC Regulatory Information Summary (RIS) 2002-12a, dated August 19, 2002, "NRC Threat Advisory and Protective Measures System," discusses the HSAS and provides additional information on protective measures to licensees.

### a. Inspection Scope

On September 10, 2002, the NRC issued a Safeguards Advisory to reactor licensees to implement the protective measures described in RIS 2002-12a in response to the Federal government declaration of threat level "orange." Subsequently, on September 24, 2002, the OHS downgraded the national security threat condition to "yellow" and a corresponding reduction in the risk of a terrorist threat.

The inspectors interviewed licensee personnel and security staff, observed the conduct of security operations, and assessed licensee implementation of the threat level "orange" protective measures. Inspection results were communicated to the region and headquarters security staff for further evaluation.

### b. Findings

No findings of significance were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator (PI) Verification

###### .1 Safety System Functional Failures

###### a. Inspection Scope

The inspectors verified the accuracy of the Safety System Functional Failures PI through the third quarter year 2002. The inspectors reviewed selective samples of station logs, LERs, and corrective action program database for the period of January through September 2002.

###### b. Findings

No findings of significance were identified.

###### .2 Residual Heat Removal System Unavailability

###### a. Inspection Scope

The inspectors verified the accuracy of the PI through the third quarter year 2002 for "Residual Heat Removal System Unavailability." The inspectors reviewed selective samples of station logs, removal and restoration logs and corrective action program database for the period of January through September 2002.

###### b. Findings

No findings of significance were identified.

###### .3 Emergency Response Organization Drill / Exercise Performance PI

On August 6-7, 2002, licensee records were reviewed to determine whether the submitted PI values (through the second quarter of 2002) were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, "Regulatory Assessment Performance Indicator Guideline."

###### a. Inspection Scope

The inspectors assessed the accuracy of the PI for emergency response organization (ERO) drill and exercise performance (DEP) through review of a sample of drill records. The latest reported DEP PI value (an aggregate of data from the past eight quarters) was 94.5 percent.

###### b. Findings

No findings of significance were identified.



.4 ERO Drill Participation PI

a. Inspection Scope

The inspectors assessed the accuracy of the PI for ERO drill participation through review of the training records for the 69 individuals assigned to key positions in the ERO as of the end of the second quarter of 2002. The latest reported ERO drill participation PI value was 92.9 percent.

b. Findings

No findings of significance were identified.

.5 Alert and Notification System Reliability PI

a. Inspection Scope

The inspectors assessed the accuracy of the PI for the ANS reliability through review of a sample of the licensee's records of siren tests conducted from during the previous four quarters. The latest reported ANS reliability PI value was 98.2 percent.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 American Society of Mechanical Engineers (ASME) Code Retest Requirements

a. Inspection Scope

For CER 0-C-02-2376, "EIR-80639 did not sufficiently address the ASME Code requirements for a post-maintenance retest of XVG09627B-CC (Service Water System outlet header component cooling loop B cross-connect valve)," the inspectors conducted an in-depth review of the licensee's problem identification and resolution activities to ensure they included:

- Complete and accurate identification of the problem in a timely manner commensurate with its significance;
- Evaluation and disposition of performance issues associated with maintenance effectiveness, including maintenance practices, work controls, and risk assessment;
- Evaluation and disposition of operability / reportability issues;
- Consideration of extent of condition, generic implications, common cause, and previous occurrences;
- Classification and prioritization of the resolution of the problem commensurate with its safety significance;
- Identification of root and contributing causes of the problem;

- Identification of corrective actions which are appropriately focused to correct the problem;
- Completion of corrective actions in a timely manner commensurate with the safety significance of the issue.

b. Findings

A finding (Green, no violation) was identified by the inspectors associated with an inadequate Engineering Information Request (EIR) which would have resulted in an inadequate PMT and failure to meet ASME code requirements. Specifically, the inspectors identified that the licensee failed to fully understand the requirements of the ASME code during development of the EIR. Questions by the inspectors prevented implementation of the inadequate PMT and subsequently no violation occurred of the ASME code .

During inspection of a risk assessment activity (reference Section 1R13) for work on XVG09627B-CC, (Service Water System outlet header component cooling loop B cross-connect valve), the inspectors questioned the adequacy of EIR-80639. The inspectors were concerned whether the EIR sufficiently addressed ASME Code requirements for a post-maintenance retest of XVG09627B-CC following air regulator replacement. The EIR did not require a full or partial stroke of the valve following maintenance. ASME / ANSI OMa-1988 Addenda to ASME / ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants Part 10, Inservice Testing of Valves in Light-Water Reactor Power Plants required at least a partial stroke of the subject valve. The partial stroke is to ensure there is not a negative impact on the valve performance following maintenance (a full stroke is later required when plant conditions allow, i.e., during shutdowns).

As a result of inspectors' questions, the licensee stopped the proposed maintenance activity and subsequent PMT until further review was completed. Corrective actions including revision of the proposed PMT to meet ASME code requirements adequately addressed the condition. The inspectors concluded the correction actions were completed in a timely manner and commensurate with the safety significance. The inspectors attended pre-job briefs, witnessed the maintenance, the PMT and no additional findings were identified with the work controls, the PMT or the corrective action program in response to this issue.

The inspectors determined that the finding was more than minor, in that, failure to fully understand the requirements of the code could have impacted operation of the plant. In addition, if the EIR had been left uncorrected the finding would become a more significant safety concern. Implementation of the improper PMT based on the original EIR would not have assured the service water backup supply would be available for the B train component cooling water system. The issue was determined to be of very low safety significance (Green) based on the low likelihood of a major component cooling water system break on the B train and the availability of the A train service water backup supply during this period of time. Questions by the inspectors prevented implementation of the inadequate PMT and therefore, no violation of regulatory requirements occurred. The licensee generated and addressed this finding under CER 0-C-02-2376.

## .2 Flooding Corrective Actions

### a. Inspection Scope

The inspectors reviewed the licensee's corrective action program for instances of potential external and internal flooding. A partial list of corrective action documents reviewed are listed in the Attachment to this report.

### b. Findings

In the past, the licensee has entered rain water and ground water intrusion events into their corrective action system and addressed them on an individual basis. However, the inspectors were concerned that these events have continued to occur over a substantial period of time and that a comprehensive review of issued CERs has not been performed to determine if an underlying root cause exists that should be addressed.

The inspectors also identified concerns with the licensee's corrective action to address the human performance elements associated with potential internal flooding issues. Specifically, the licensee's engineering department staff did not properly revise the design basis documents resulting from modifications MRF-21077 and 31738 that increased service water piping pressure. In addition, engineering personnel did not complete timely extent of conditions reviews of increased service water pressure for other rooms, systems and affected design calculations. The licensee generated CERs 0-C-02-3136, 0-C-02-2086 and 0-C-02-1329 for the NRC identified human performance issues. A review of the service water piping effect on EDG room flooding was determined by the licensee to have no safety impact. However, a review of the extent of condition for other compartments is ongoing and will be reviewed and dispositioned by the inspectors under URI 50-395/02002-02.

## 4OA3 Event Follow-up

- .1 (Closed) Licensee Event Report (LER) 50-395/2002-003-00: Automatic Reactor Trip Due to Spurious Noise on Nuclear Instrumentation Channel. This LER documents an automatic reactor trip that occurred on June 1, 2002, due to a spike on Nuclear Instrumentation (NI) Intermediate Channel NI-36. The reactor was in Mode 2 at approximately two percent power and no significant plant evolutions were in progress at the time of the reactor trip. The preliminary cause has been determined to be a failed or degraded circuit card. All systems (besides NI-36) functioned as designed following the reactor trip. This event was previously reviewed in Inspection Report (IR) 50-395/02-02 (Sections 1R14 and 1R20) with no findings of significance identified. This event did not constitute a violation of NRC requirements. The licensee documented corrective actions for this event in CER 0-C-02-1899.
- .2 (Closed) LER 50-395/2002-004-00: Automatic Reactor Trip Subsequent To Feedwater Pump Trip. This LER documents an automatic reactor trip that occurred on June 17, 2002. The initiating event for the transient and resulting trip was a fuse failure in the digital speed control system circuitry of the C main feedwater pump. The cause of the reactor trip was due to a design deficiency in the implementation of the digital speed control system for the main feedwater pumps which resulted in the reactor tripping on lo-

lo level in the A steam generator. All rods fully inserted and emergency feedwater pumps automatically started to restore steam generator levels. This event was previously reviewed in IR 50-395/02-02 (Section 1R14) and dispositioned as a non-cited violation 50-395/02002-01. This condition was entered into the licensee's corrective action program under CER 0-C-02-2061.

- .3 (Closed) LERs 50-395/1999-014-00 and 01: Kaowool Fire Barriers Outside 10 CFR 50 Appendix R Design Basis. This LER documents the unsatisfactory test results of 30 Kaowool triple wraps used to protect cables needed for safe shutdown in the advent of a fire in 18 different fire areas. The wraps did not maintain the protected cables free of fire damage for the prescribed time interval when tested consistent with their installation in the facility. The testing was conducted as a voluntary response to SECY-99-204 associated with fire wraps of this nature. The licensee initiated roving fire watches of the affected fire areas which placed them back in compliance with regulatory requirements. Initially, long term corrective actions were to make select modifications such as adding dummy cables for thermal mass and two more layers of Kaowool to the four air drop configurations and, to request the NRC approve some deviations to 10 CFR 50, Appendix R. Subsequently, the deviation requests were withdrawn. Consequently, the complete scope of the modifications (re-routing cables, adding Flamastic/more Kaowool wraps to the present configurations or installing sprinklers) will be documented in a forthcoming LER revision.

A Phase II Significance Determination Process evaluation was performed by a regional Senior Reactor Analyst to ascertain that the violation was of very low safety significance. The very low significance was due to: 1) a number of non-conforming barriers protected non-critical safe shutdown equipment; 2) all but four of the 30 barriers were only moderately degraded; 3) multiple other fire protection features were still intact in the 17 fire areas; and, 4) at least one accident mitigation train (unaffected by fire) was available in the relatively high ignition frequency fire areas. A licensee identified violation associated with these LERs is dispositioned in Section 4OA7.

#### 4OA6 Meetings

##### Exit Meeting Summary

The inspectors presented the inspection results to Mr. S. Byrne and other members of the licensee's staff on October 2, 2002. On October 23, 2002, the inspectors presented the closeout of LERs 50-395/1999-014-00 and 01 and observations discussed in 4OA2.2 to Mr. G. Halnon.

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

#### 4OA7 Licensee Identified Violations

The following violations of very low safety significance (green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as NCVs.

1. 10 CFR 50 Appendix B Criterion III requires, in part, that design specifications be correctly translated into procedures and instructions. The licensee failed to incorporate design changes into Emergency Operating Procedure, EOP-15, "Response to Loss of Secondary Heat Sink," for ECR 50091 which modified the main feedwater system (digital controls modification). This could have affected performance of EOP-15 should main feedwater have been needed to be re-established to provide a secondary heat sink. Because the probability of a loss of secondary heat sink is low and the main feedwater system is a contingency action for loss of secondary heat sink (emergency feedwater is the primary recovery means) this violation is not more than of very low significance, and is being treated as a non-cited violation. This issue was entered into the licensee corrective action program under CER 0-C-02-2312.
2. 10 CFR 50 Appendix B Criterion III requires, in part, that design specifications be correctly translated into work instructions and drawings. The licensee failed to incorporate correctly into design drawings the thermal overloads circuit for four safety-related valves. This resulted in a wiring error which disabled the thermal overload circuits for XVB03126A/B, and XVB03128A/C, service water inlet valves to the HVAC chillers. Because the probability of multiple redundant thermal overload conditions on separate trains is low, this violation is not more than of very low significance, and is being treated as a non-cited violation. This issue was entered into the licensee corrective action program under CERs 0-C-02-2512, 2577, 2590 and 2593.
3. Technical Specification 6.8.1, requires, in part, that procedures for tag outs and surveillance activities be implemented properly. TS 6.8.1.a references Regulatory Guide 1.33, Appendix A, which requires under Step 1.c, "Equipment Control (e.g., locking and tagging)," that procedures for tagging be provided and followed. Contrary to this requirement, the licensee operated a breaker (XPN-2009, breaker 7, heat trace circuit for sodium hydroxide) which was red tagged-out during performance of surveillance procedure ICP-240.078. The red tag was not securely hung and had fallen off contrary to SAP-201, "Danger Tagging," Step 6.1.7.G. This issue had the potential to cause a death or serious injury to personnel or equipment failure. Because the duration of the improper breaker closure was very short, no concurrent electrical work was in progress and no impact on safety-related equipment occurred, this violation is not more than of very low safety significance and is being treated as a non-cited violation. This issue was entered into the licensee corrective action program under CER 0-C-02-2947.
4. Operating License condition 2.c(18) requires all provisions of the Final Safety Analysis Report (FSAR) approved fire protection program be implemented and maintained. Section 9.5.1.1 of the FSAR states in part that the Fire Protection Evaluation Report (FPER) is considered a part of this FSAR. Section 1.2 of the FPER states that SCE&G commits to maintain the plant fire protection program in accordance with Appendix R to 10 CFR 50. 10 CFR 50, Appendix R, Section III.G.2 requires in part the separation of redundant trains of safe shutdown cables and equipment by a 3-hour rated fire barrier or the enclosure of one redundant train of safe shutdown cables and equipment in a 1-hour rated fire

barrier provided fire detectors and automatic fire suppression system are also installed in the fire area. Contrary to the above, 30 barriers in 17 fire areas using Kaowool did not meet the applicable 3-hour or 1-hour rating. This violation was entered into the licensee corrective action program under NCN 99-1520.

**Attachment**

**SUPPLEMENTARY INFORMATION**

**KEY POINTS OF CONTACT**

Licensee

J. Archie, General Manager, Engineering Services  
F. Bacon, Manager, Chemistry Services  
L. Blue, Manager, Health Physics Services  
M. Browne, Manager, Nuclear Licensing and Operating Experience  
D. Gatlin, Manager, Operations  
G. Halnon, General Manager, Nuclear Plant Operations  
R. Haselden, Acting Manager, Maintenance Services  
L. Hipp, Manager, Nuclear Protection Services  
D. Lavigne, General Manager, Organization Effectiveness  
G. Moffatt, Manager, Design Engineering  
K. Nettles, General Manager, Nuclear Support Services  
W. Stuart, Acting Manager, Plant Support Engineering  
A. Torres, Manager, Planning/Scheduling and Project Management  
R. White, Nuclear Coordinator, South Carolina Public Service Authority

**ITEMS OPENED AND CLOSED**

Opened and Closed

50-395/02002-03-01	NCV	improper control of steam propagation door DRIB/301 (Section 1R19)
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Closed

50-395/2002-003-00	LER	automatic reactor trip due to spurious noise on nuclear instrumentation channel (Section 4OA3.1)
50-395/2002-004-00	LER	automatic reactor trip subsequent to feedwater pump trip (Section 4OA3.2)
50-395/1999-014-00 and 01	LER	Kaowool fire barriers outside 10 CFR 50 Appendix R design basis (Section 4OA3.3)

## List of Documents Reviewed

### **Section 1R04 - Equipment Alignment**

#### Procedures

Component Cooling Design Basis Document;  
 SOP-116, "Reactor Building Spray System;"  
 SOP-118, "Component Cooling Water;"  
 SOP-306, "Emergency Diesel Generator;"  
 SOP-307, "Diesel Generator Fuel Oil System;"  
 FSAR Sections 8.3.1, 9.2.2, 9.5.4, and 10.4.9;  
 TS Sections 3.6.2, 3.7.3, and 3.8.1;  
 D-302-351, "Diesel Generator - Fuel Oil;"  
 D-302-351, "Diesel Generator - Miscellaneous Services;"  
 D-302-612, 613, and 614, "Component Cooling Water," and  
 D-302-661, "Reactor Building Spray System."

### **Section 1R06 - Flood Protection Measures**

#### Procedures

Emergency Operating Procedure EOP-17.1, "Response to Reactor Building Flooding;"  
 Operations Administrative Procedure OAP-109.1, Guidelines for Severe Weather;"  
 Emergency Plan Procedure EPP-015, "Natural Emergency (Earthquake, Tornado, Hurricane);"   
 Annunciator Response Procedure ARP-001-XCP-627.

#### CERs

CER 0-C-00-0533, "Design RB Flood Level Was Raised From 418.5' to 419.5', EOP setpoints for BR Flood Level Were Not Changed," dated April 26, 2000  
 CER 0-C-02-2464, "Floor Drains Below B DG room (427') are Clogged, Repeat Occurrence see CER 0-C-02-2418," dated July 30, 2002  
 CER 0-C-02-2990, "Rainwater leakage caused Equipment Concerns," dated September 15, 2002  
 CER 0-C02-2996, "New CER to Address Roof Leak over IDA Switchgear via NCN," dated September 16, 2002

#### Non-Conformance Notice

NCN 02-2996, "The Expansion Joint in the 1DA Switchgear Leaks," dated September 16, 2002

### **Section 1EP5 - Correction of Emergency Preparedness Weaknesses and Deficiencies**

#### Audits and Self-Assessments

Audit Report QA-AUD-2001-02-0 "Station Emergency Plan," dated August 01, 2001.  
 Draft Audit Report QA-AUD-022213-0 "Station Emergency Plan," dated 8/5/02.  
 Virgil C. Summer Nuclear Station Trend Report 2002-01  
 Virgil C. Summer Nuclear Station Trend Report 2002-02



CERs

- 0-C-02-2337 (07/18/2002) Deficiencies noted during the observation of the silent testing of sirens.
- 0-C-02-2330 (07/18/2002) Station Management has not consistently expressed clear expectations for supporting the Emergency Preparedness program.
- 0-C-02-2323 (07/18/2002) Emergency services to evaluate the areas that are in need of improvement for implementation of the corrective action program.

**Section 40A2.2 - Identification and Resolution of Problems**Documents

- CER 0-C-98-1009, "Roof of Inter Building Has Leaked into 1DA & 1DB, Deposits Caused Equipment Concerns," dated November 18, 1998
- CER 0-C-00-0988, "Concrete in the Tendon Gallery is Leaching at various Locations, discovered during Containment Concrete IWL," dated August 8, 2000
- CER 0-C-02-2990, "Rainwater leakage caused Equipment Concerns," dated September 15, 2002
- NCN 98-1009, "Roof of Inter Building Has Leaked into 1DA & 1DB," dated November 20, 1998
- Summer Station 620007, "Groundwater Intrusion Abatement Study Request for Proposal," dated April 30, 2001
- Gage Group Inc Letter "Groundwater Leakage into Diesel Generator Building Pit," dated May 8, 2002
- Parsons Power Group, Inc Letter No. CGGS-01-113, "Scope Document for Phase 1 of V. C. Summer's Groundwater Intrusion problem," dated August 2, 2001