



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

October 27, 2003

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. 05000395/2003004**

Dear Mr. Byrne:

On September 27, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station. The enclosed integrated inspection report documents the inspection findings, which were discussed on October 1, 2003, with you, Mr. Jeff Archie, and other members of your staff.

The inspections 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.

The report documents one self-revealing finding of very low safety significance (Green). This finding was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A of the NRC Enforcement Policy. Additionally, four licensee-identified violations which were determined to be of very low safety significance are listed in this report. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, 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, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of

SCE&G

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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,

**//RAI//**

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

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

Enclosure: Inspection Report No. 05000395/2003004  
w/Attachment

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-395

License No.: NPF-12

Report No.: 05000395/2003004

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

Facility: Virgil C. Summer Nuclear Station

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

Dates: June 29 - September 27, 2003

Inspectors: M. Widmann, Senior Resident Inspector  
M. King, Resident Inspector  
S. Sanchez, Resident Inspector, St. Lucie  
K. Van Doorn, Senior Reactor Inspector, RII (Sections 4OA5.2, 4OA7.1)  
L. Mellen, Senior Emergency Preparedness Inspector, RII (Sections 1EP1, 1EP4 and 4OA1.2)  
W. Sartor, Senior Emergency Preparedness Inspector, RII (Sections 1EP1, 1EP4 and 4OA1.2)  
L. Miller, Senior Operations Engineer, RII (Sections 1R11.2 and 1R11.3)  
S. Rose, Operations Engineer, RII (Sections 1R11.2 and 1R11.3)

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

Enclosure

## SUMMARY OF FINDINGS

IR 05000395/2003-004; 06/29/2003 - 09/27/2003; Virgil C. Summer Nuclear Station; Event Followup.

The report covered a three month period of inspection by resident inspectors and announced inspections by one regional senior reactor inspector in the area of heat sink performance followup, two senior emergency preparedness inspectors for participation in a biennial emergency response exercise, two operations engineers for licensed operator requalification and support of the baseline inspection by one resident inspector from the St. Lucie Nuclear Plant. One Green non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. 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. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Initiating Events

Green. A self-revealing non-cited violation was identified for inadequate preventative maintenance (PM) resulting in a reactor trip. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," requires, in part, that procedures shall include appropriate qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." The licensee failed to establish an adequate Electrical Maintenance Procedure (EMP)-245.005, "Main Generator and Alterrex Refueling Preventative Maintenance," to preclude a condition that resulted in a reactor trip.

The finding is more than minor because it resulted in a reactor trip. The self-revealing finding is of very low safety significance since the event did not contribute to the likelihood of a primary or a secondary system loss of coolant accident (LOCA) initiator, did not contribute to a loss of mitigation equipment functions, and did not increase the likelihood of a fire or internal / external flood. (Section 4OA3.1)

### B. Licensee-Identified Violation

- 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 full power and remained there throughout the entire period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors performed two seasonal and one site specific weather related condition inspection for adverse weather protection to evaluate implementation of adverse weather procedure Operations Administrative Procedure OAP-109.1, "Guidelines for Severe Weather." The inspectors reviewed the licensee's plant preparation in response to the approach of Hurricane Isabel (and potential for tornados) during September as one seasonal review. This review was performed to assess the risk of weather related initiating events, and whether measures taken adequately protected accident mitigation systems for adverse weather effects. In addition, the inspectors reviewed a seasonal adverse weather sample due to high winds, lightning, and heavy rainfall to evaluate the impact on the station. Heavy rains negatively impacted simplex fire protection panel in the turbine building and reactor building spray sodium hydroxide storage tank area sump pump due to a grounded pump motor. The inspectors also reviewed recent weather related Condition Evaluation Reports (CERs) 0-C-03-2600, 0-C-03-2656, and 0-C-03-2781 where lightning strikes caused several main control board alarms and relay flags to drop on safety-related electrical equipment.

A hot weather site specific adverse weather inspection was performed on August 27. The inspectors reviewed the licensee's compensatory measures for the effect of the hot weather and restrictions placed on service water temperatures due to degraded component cooling water heat exchangers test results. Licensee activities are being administratively controlled by Station Order 03-12, "Restricting Service Water Pond Temperatures due to Fouling of the CCW Heat Exchangers," (this issue is discussed further in Sections 4OA5.2 and 4OA7.1).

##### b. Findings

No findings of significance were identified.

#### 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:

- Spent fuel pool ventilation train A (while B and C train charcoal filters were removed for performance testing);
- B motor driven emergency feedwater (MDEFW) pump and turbine driven emergency feedwater pump (while the A MDEFW pump was out of service);
- A and B emergency diesel generator (EDG) following B EDG test delay due to B charging pump relay contact concern (CER 0-C-03-2630).

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 (TS). 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. Specific procedures and documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Routine Inspection

a. Inspection Scope

The inspectors reviewed recent CERs, MWRs, 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 twelve areas:

- Auxiliary building switchgear room 1DB1/1DB2X (fire zone AB-1.29);
- Control room (fire zone CB-17.1);
- Relay room solid state protection system instrumentation and inverter (fire zones CB-6, CB-10, CB-12);
- Diesel generator rooms A and B (fire zones DG-1.1/1.2, DG-2.1/2.2);
- Intermediate building 1DA switchgear room (fire zone IB-20);
- Component cooling water heat exchangers service water booster pumps (fire zones IB-25.1.1, 1.2, 1.3, 1.5);
- Motor generator set / rod control cabinet room 63-02 (fire zone IB-21.1);
- Service water pumphouse (fire zones SWPH 1, 3, 5.1/5.2);
- Turbine driven EFW pump room (fire zone IB-25.2);
- Battery charger rooms and battery charger (fire zones IB-2, 3, 4, 5, 6 and IB-412);
- Turbine building (fire zone TB-1);
- Battery charger XBC1X-2X due to CER 0-C-03-2730, water overflowed and wetted internals (fire zone IB-25.1.2).

b. Findings

Negative corrective action observations regarding CER 0-C-03-2730 are documented in Section 4OA2 of this report. No other findings of significance were identified.

.2 Annual Fire Drill Inspection

a. Inspection Scope

The inspectors observed performance of the licensee's annual fire drill that used offsite assistance on September 13, 2003, to evaluate the coordination efforts between onsite and offsite personnel. The fire drill scenario involved a simulated fire due to small plane crashing into the Auxiliary Transformer and turbine building. This drill met the requirements of Emergency Plan Procedure (EP)-100, "Radiation Emergency Plan," Section 8.1.2.b, Fire Emergency Drill.

The inspectors evaluated the readiness of the licensee's personnel to prevent and fight fires including the following aspects:

- Observe whether protective clothing and self-contained breathing apparatus (SCBA) equipment were properly worn;
- Determine whether fire hose lines were properly laid out and nozzle pattern simulated being tested prior to entering the fire area of concern;
- Verify that the fire area was entered in a controlled manner;
- Review if sufficient firefighting equipment was brought to the scene by the fire brigade to properly perform their firefighting duties;
- Verify that the fire brigade leader's fire fighting directions were thorough, clear and effective, and coordinated with offsite fire team assistance;
- Verify that radio communications with plant operators and between fire brigade members were efficient and effective;
- Confirm that fire brigade members checked for fire victims and fire propagation into other plant areas;
- Observe if effective smoke removal operations were simulated;
- Verify that the fire fighting pre-plans were properly utilized and were effective;
- Verify that the licensee pre-planned drill scenario was followed and the drill objectives met the acceptance criteria, and deficiencies were captured in post drill critiques.

The inspectors attended the drill critique to ensure that the licensee addressed all observed areas for improvement. Items noted following the drill were captured in CER 0-C-03-2996 in accordance with Fire Protection Procedure (FPP)-026, "Fire / Hazmat Response."

Documents used to conduct this inspection included:

- Virgil C. Summer FPP-026, Attachment 1, "Drill Planning Guide," Drill Scenario Number 31;
- Fire Protection Pre-Plan for Transformer Area (fire zone TA, 436' elevation);



- FPP-026, "Fire / Hazmat Response;"
- Virgil C. Summer Nuclear Station Critique for Annual Offsite Drill conducted on September 13, 2003 and CER 0-C-03-2996, Recommendations from Annual Fire Drill with Offsite Assistance;
- CER 0-C-03-2866, two SCE&G fire brigade members exhibited symptoms of heat exhaustion during fire drill conducted 9/13/03;
- NRC Inspection Procedure 71111.05, "Fire Protection."

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed and walked down two areas regarding internal flood protection features and equipment to determine consistency with design requirements, FSAR and flood analysis documents. Walkdowns were conducted of residual heat removal (RHR), reactor building spray rooms, and all three charging pumps (CCP) rooms to evaluate flooding vulnerabilities. The inspectors also reviewed room sump pump calculations, penetrations, internal flooding water barrier requirements and CCP room sump pump capacities to verify compliance with calculated flood platform heights. Specific procedures and documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

Closeout of URI 50-395/03-03-03, "Failure to Confirm Heat Transfer Capabilities of Component Cooling Heat Exchangers (CCHXs)," is documented in Sections 4OA5.2 and 4OA7.1 of this report.

1R11 Licensed Operator Requalification Program

.1 Quarterly Review

a. Inspection Scope

On September 17, 2003, the inspectors observed senior reactor operators' and reactor operators' performance on the plant simulator during licensed operator requalification training. The training scenario involved a loss of RHR including an emergency classification of an alert (LOR-ST-055, Half Pipe RHR Break / Loss of RHR). The inspectors reviewed the scenario to verify that training included risk-significant operator actions and implementation of emergency classification and the emergency plan. The inspectors observed the simulator training to assess overall crew performance, communications, oversight of supervision and the evaluator's critique. The inspectors

also reviewed CER 0-C-03-2973, (potential error in emergency action level detection methods for Alert and Site Area Emergency detection methods) to evaluate how the licensee has incorporated lessons learned into training scenarios.

b. Findings

No findings of significance were identified.

.2 Biennial Inspection

a. Inspection Scope

During the week of August 18, 2003, the inspectors reviewed documentation, interviewed licensee personnel, and observed the administration of simulator operating tests associated with the licensee's operator requalification program. Each of the activities performed by the inspectors was done to assess the effectiveness of the licensee in implementing requalification requirements identified in 10 CFR 55, "Operators' Licenses." The evaluations were performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The inspectors reviewed and evaluated the licensee's simulation facility for adequacy for use in operator licensing examinations. The inspectors observed two operator crews and two staff crews during the performance of the operating tests. Documentation reviewed included written examinations, Job Performance Measures (JPMs), simulator scenarios, licensee procedures, on-shift records, licensed operator qualification records, selected watchstanding and medical records, the feedback process, and remediation plans. The inspectors also reviewed a sample of simulator performance test records (transient tests, malfunction tests, steady state test, and procedure tests), simulator modification request records, and the process for ensuring continued assurance of simulator fidelity to ensure compliance with 10 CFR 55.46 Simulation Facilities. Licensee documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

.3 Annual Operating Test Results

a. Inspection Scope

On August 29, 2003, the licensee completed the comprehensive requalification written examinations and annual operating tests, required to be given to all licensed operators by 10 CFR 55.59(a)(2). The inspectors reviewed the overall pass/fail results of the written examinations, individual operating tests, and the crew simulator operating tests. These results were compared to the thresholds established in Manual Chapter 609 Appendix I, Operator Requalification Human Performance Significance Determination Process.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the equipment issues described in the CERs listed below, the inspectors evaluated the licensee's effectiveness of the corresponding preventive or corrective maintenance associated with structures, systems or components (SSCs). The inspectors reviewed maintenance rule (MR) implementation to verify that component and equipment failures were identified, entered, and scoped within the Rule. Selected SSCs were reviewed to verify proper categorization and classification as (a)(1) or (a)(2) in accordance with 10 CFR 50.65. The inspectors examined (a)(1) corrective action plans to determine if the licensee was identifying issues related to the MR at an appropriate threshold and that corrective actions were established and effective. The inspectors' review also evaluated if maintenance preventable functional failures (MPFF) or other MR findings existed that the licensee had not identified. Inspectors reviewed the licensee's controlling procedures engineering services procedure (ES)-514, "Maintenance Rule Implementation," and the Virgil C. Summer "Important To Maintenance Rule System Function and Performance Criteria Analysis" to verify consistency with the MR requirements.

- 0-C-02-2883 and 0-C-02-3688, goal setting review for the EDG system (loss of excitation on A EDG causing the output breaker to open and lube oil strainer high differential pressure that required the diesel to be shutdown);
- 0-C-03-2561, Maintenance Rule monthly report for July 2002 found in error for both EDG unavailability hours - review indicated this would have resulted in maintenance rule unavailability limit being exceeded in October 2002;
- 0-C-03-0625 and 0-C-03-1432, C train chiller tripped on low oil pressure and exceeded hours of unavailability.

b. Findings

A self-revealing NCV concerning an inadequate maintenance procedure is documented in Section 4OA3.1 of this report. No other 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 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:

- Review of equipment out of service (EOOS) log to verify instrument calibration surveillance procedures were evaluated for impact on risk profile while MDEFW pump and valve testing were in progress (CER 0-C-03-2121 initiated);
- Review of EOOS model with EDG A train out of service to examine high differential lube oil pressure condition with B service water pump removed for maintenance and XTF-5 7.2 kV offsite tie-breaker being tested;
- Review of EOOS model for inclusion of inoperable charging pump B train suction isolation valve, LCV-115D, and impact on risk during performance of surveillance test STP-205.003, "Charging / SI pump "B" and Valve Test;"
- Review of EOOS surveillance test STP-222.002, Component Cooling Pump Test and basis for EOOS risk profile changing to "Yellow;"
- On-line troubleshooting and temporary modification of main generator field breaker indication and protective relay actuation concerns (CER 0-C-03-2618).

Under the problem identification and resolution portion for this Section, the inspectors reviewed CER 0-C-03-2196, engine starter cables lifted in error on the diesel driven fire service pump, XPP0134B, to understand the event and licensee actions taken.

b. Findings

A licensee identified violation concerning CER 0-C-03-2196 is documented in Section 4OA7.2. No other findings of significance were identified.

1R14 Personnel Performance During Non-Routine Plant Evolutions

a. Inspection Scope

This inspection evaluated operator preparations and response for the two listed non-routine plant evolutions to ensure they were appropriate and in accordance with the required procedures. The inspectors also evaluated performance and equipment problems to ensure that they were entered into the corrective action program.

- XFL5020A filter housing rupture resulting in low instrument air pressure, entry into Abnormal Operating Procedure AOP-220.1, "Loss of Instrument Air," CER 0-C-03-2276.
- Lightning strike causes 20 main control board alarms, 31 alarms / trouble alarms on fire protection simplex panel and loss of several security components, reference CERs 0-C-03-2603, 2604, and 2605.

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 and the risk significance in accordance with the SDP. The inspectors reviewed the following CERs, issues and evaluations:

- 0-C-03-2222, XVC03162A-SW diesel generator A air start after cooler service water return check valve failed STP-123.003A, service water to EDG operability issues;
- 0-C-03-2348, failure of suction isolation valve LCV-115D to stroke close following surveillance testing;
- 0-C-03-2588, design calculations contain incomplete and inconsistent information for evaluation of diesel generator loading and fuel oil consumption;
- 0-C-03-2690, CCW B train heat exchanger does not meet design function at worse case heat loads requiring operability limit to be lowered based on service water pond temperatures;
- 0-C-03-2819, Replacing charcoal in XAA0029-AH (control room emergency filter plenum A) resulted in breaching the control room pressure boundary and EIR80077 evaluating the capability of a clamp/gag device to hold dampers shut during charcoal replacement activities.

### b. Findings

Two licensee identified violations concerning CER 0-C-03-2588 and 0-C-03-2819 are documented in Sections 4OA7.3 and 4OA7.4, respectively. No other findings of significance were identified.

## 1R16 Operator Workarounds

### a. Inspection Scope

During this inspection period the inspectors performed one risk significant operator workaround review and one cumulative review. A risk significant operator workaround review was completed on July 24 regarding service water booster pump operation increased risk of water hammer, Station Order 03-11 and CER 0-C-03-2402. Additionally on July 24, the inspectors reviewed the licensee's list of identified operator workarounds and challenges to assess the effect on the functional capability, reliability or availability of any related mitigating system. The inspectors also reviewed the human reliability aspect of the operator workarounds and challenges. This review was performed to determine the impact on the operator's ability to respond in a correct and

timely manner to an initiating event and implement abnormal or emergency operating procedures.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspection Scope

The inspectors evaluated design change packages for one modification engineering change request (ECR), to evaluate the modification for adverse affects on system availability, reliability, and functional capability. The modification and the associated attributes reviewed are as follows:

Engineering Change Request, ECR 50141A, deleting the volume control tank (VCT) purge flow transmitter IFT-01094:

- Materials/components compatibility, functionality and consistency with design bases;
- Field installation;
- Post modification performance;
- Plant procedure, critical drawing, design basis information, FSAR updating.

For the selected modification package, the inspectors observed the as-built configuration. Documents reviewed included procedures, engineering calculations, modifications design and implementation packages, work orders, site drawings, corrective action documents, applicable sections of the living FSAR, supporting analyses, TSs, and design basis information.

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:

- MWR 217071, PMT per STP-223.002A / STP-223.003 after rebuild of B service water (SW) pump;
- MWR 306892, PMT per STP-205.003, "Charging / SI Pump B and Valve Test," due to failed thermal overload;

- MWR 306965, RHR mini-flow recirculation valve rework and setpoint change tested per STP-205.004, "Pump Valve and Operability Test;"
- MWR 308070, PMT per STP-212.002, "Reactor Building Spray Pump Operability Test," following planned mechanical maintenance;
- MWR 309414, PMT per STP-222.002, "Component Cooling Pump Test," following planned maintenance on the B component cooling water (CCW) pump;
- MWR 311224, CCW to A RHR heat exchanger (Hx) flow indication failed low, PMT per Instrumentation Control Procedure (ICP) 160.14, "CCW to RHR Hx A Flow IFT07034 Calibration," following IFQY07034 card replacement.

b. Findings

No findings of significance were identified.

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:

- ICP-100.004, "Control Room Outside Air Intake Flow Instrument Calibration with Ventilation in Emergency Recirculation Mode;"
- PTP-176.002, "Underground Storage Tank Leak Detect and Inventory Status Reports," CER 0-C-00-1840 reviewed for diesel generator fuel oil storage tanks;
- STP-120.004B, "Emergency Feedwater Valve Operability Test," (B Train);
- STP-121.002, "Main Steam Valve Operability Test;"
- STP-220.002, "Turbine Driven Emergency Feedwater Pump and Valve Test;"
- STP-222.002, "Component Cooling Pump Test," (for A CCW pump) Section 6.1, XPP0001A, A CCW pump inservice test and Section 6.9 - new reference values third ten-year interval being established.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

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

- Proposed temporary service water pond cooling towers, ECR 50261;

- Bypass Authorization Request, BAR 03-01, jumper for main generator field-breaker position indication circuit (reference CER 0-C-03-2618).

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP1 Exercise Evaluation

a. Inspection Scope

The inspectors reviewed the scope, objectives, and scenario for the Summer Nuclear Plant biennial, full-participation 2003 emergency response exercise to determine whether they were designed to suitably test major elements of the licensee's emergency plan per 10 CFR 50, Appendix E, Section IV.F.2.f. During the period July 21-29, 2003, the inspectors observed and evaluated the licensee's performance in the exercise, as well as selected activities related to the licensee's conduct and self-assessment of the exercise. On July 23, 2003, the inspectors observed the conduct of the exercise to ensure that employees of the licensee were familiar with their specific emergency response duties per 10 CFR 50, Appendix E, Section IV.F.1.(a). Licensee activities observed during the exercise included those occurring in the Control Room Simulator (CRS), Technical Support Center (TSC), Operational Support Center (OSC), and Emergency Operations Facility (EOF). The NRC's evaluation focused on the risk-significant activities of event classification, notification of governmental authorities, onsite protective actions, offsite protective action recommendations, and accident mitigation. The inspectors also evaluated command and control, the transfer of emergency responsibilities between facilities, communications, adherence to procedures, and the overall implementation of the emergency plan. On July 23-24, 2003, the inspectors attended selected portions of the post-exercise critique to evaluate the licensee's critique of Emergency Response Organization performance against the requirements of 10 CFR 50, Appendix E, Section IV.F.2.g. On July 29, 2003, prior to attending the presentation of the exercise critique results to plant management, the inspector reviewed six CERs initiated by the licensee to address problem areas identified during the exercise. CER 0-C-03-2363 was reviewed in detail to verify that issues regarding the incorrect protective action recommendation (PAR) were documented.

b. Findings

No findings of significance were identified.



#### 1EP4 Emergency Action Level and Emergency Plan Changes

##### a. Inspection Scope

The inspector reviewed changes to the Radiological Emergency Plan (REP) as contained in Revision 46, against the requirements of 10 CFR 50.54(q) to determine whether any of the changes decreased REP effectiveness.

##### b. Findings

No findings of significance were identified.

#### 4. OTHER ACTIVITIES

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

##### .1 Reactor Safety Cornerstone

##### a. Inspection Scope

To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 2, were used to verify the basis in reporting for each data element. The inspectors reviewed a selection of licensee event reports (LERs), portions of station operator log entries, corrective action program database, the monthly operating reports, and PI data sheets to verify data reported. In addition, the inspectors also interviewed licensee personnel associated with the PI data collection, evaluation and distribution. The inspectors sampled data for the following PIs:

- Emergency Feedwater System Unavailability - data reviewed for the period of April 2002 through July 2003;
- Safety System Functional Failure System Unavailability - data reviewed for the period of April 2002 through July 2003.

##### b. Findings

No findings of significance were identified.

##### .2 Emergency Preparedness Cornerstone

##### a. Inspection Scope

On July 21-24, 2003, licensee's records were reviewed to determine whether the submitted PI values through the second quarter of 2003 were calculated in accordance with the guidance contained in Section 2.4 (Emergency Preparedness Cornerstone) of NEI 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline."

- Emergency Response Organization (ERO) Drill/Exercise Performance;

- ERO Drill Participation;
- Alert and Notification System Reliability.

The inspectors assessed the accuracy of the PI for ERO drill and exercise performance (DEP) over the past eight quarters through review of a sample of drill and event records. The inspectors reviewed training records to assess the accuracy of the PI for ERO drill participation during the previous eight quarters for personnel assigned to key positions in the ERO. The inspectors assessed the accuracy of the PI for the alert and notification system reliability through review of a sample of the licensee's records of the weekly silent tests, monthly growl tests, and annual full-cycle tests.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

a. Inspection Scope

For CER 0-C-03-2730, (condensate drain from air handling unit, XAH0026, clogged which overflowed and wetted internals of battery charger XBC1X-2X), the inspectors reviewed the issue to ensure:

- 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;
- Consideration of extent of condition, common cause and previous occurrences;
- 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.

In addition to the current CER 0-C-03-2730, inspectors also reviewed previous CERs 0-C-01-1384, 0-C-01-1332, and 0-C-98-0743 documenting similar conditions. The inspectors evaluated whether the conditions adverse to quality were promptly identified, the cause determined, and corrective actions were taken to prevent recurrence.

b. Findings

The inspectors reviewed the licensee's continuing efforts to address concerns with an air handling unit (XAH0026) clogged condensate drain. This drain line has resulted in the unit overflowing and wetting of the internals of battery charger XBC1X-2X. This condition has periodically occurred since 1998. The inspectors noted the licensee had taken corrective actions including preventative maintenance (i.e., periodic cleaning of the drain line and extension of the drain line 10 inches to prevent fan vacuum capacity

from exceeding the trap height). However, these completed corrective actions have not completely addressed the battery charger water intrusion condition.

The inspectors were concerned that corrective actions have been limited in scope and that future actions have relied upon ineffective previous actions implemented per already closed CERs. Because of the licensee's prompt compensatory actions following the discoveries (placing protective plastic sheeting to limit water intrusion potential and performing equipment inspections) this condition did not represent a credible fire initiator or plant transient initiator. The inspectors concluded that given the components' safety significance and the low probability of becoming a fire initiator, no violations or findings of significance were identified.

#### 4OA3 Event Followup

- .1 (Closed) Licensee Event Report (LER) 50-395/2003-002-00: Reactor trip due to main generator breaker opening unexpectedly.

a. Inspection Scope

The inspectors reviewed the subject LER and CER 0-C-03-1614 to assess the cause and licensee actions taken for the automatic reactor trip that occurred on May 12, 2003. The inspectors reviewed the event to confirm plant equipment performed as required and reviewed the corrective actions to verify they were reasonable to address this event.

b. Findings

Introduction: A self-revealing Green NCV for inadequate preventative maintenance (PM) that resulted in a reactor trip was identified.

Description: On May 12, 2003, during 100 percent power operation, a reactor trip occurred on Over-Temperature-Delta-Temperature (OTDT) due to main generator breaker opening. This event was attributed to vibration induced wear of the generator field breaker cell switch mechanism that resulted in intermittent high resistance connections and a false generator field breaker open signal to the voltage regulator. Licensee investigation determined the cause of the event was vibration induced wear and fretting of the contacts in the generator field breaker position circuitry, which includes moveable and stationary disconnect contacts and the breaker position switch contacts.

CER 0-C-03-1614 attributed the primary root cause to insufficient preventative maintenance (PM) on the generator field breaker position circuit. The PM inspection is conducted by Electrical Maintenance Procedure (EMP)-245.005, "Main Generator and Alterrex Refueling Preventative Maintenance." The procedure stated that contacts are to be changed on an as-needed basis. During the past two outages, the stationary contacts were not changed out. The inspectors concluded that the PM contained inadequate guidance for the inspection of the contacts or replacement of the contacts on a periodic basis based on the amount of wear/fretting identified subsequent to the reactor trip.

Analysis: The inspectors determined the finding of inadequate PM was more than minor because it resulted in an actual plant transient / reactor trip that affected the initiating event cornerstone. The failure to have adequate preventative maintenance was of very low safety significance (Green) since the event did not contribute to the likelihood of a primary or secondary system LOCA initiator, did not contribute to a loss of mitigation equipment functions, and did not increase the likelihood of a fire or internal/ external flood.

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," requires, in part, that procedures shall include appropriate qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." Contrary, to this, the licensee failed to establish an adequate procedure, EMP-245.005, to preclude a condition that resulted in a reactor trip. Because the finding is of a very low safety significance and the licensee has entered this finding into their corrective action program under CER 0-C-03-1614, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-395/2003004-01, Inadequate Preventative Maintenance results in a Reactor Trip.

- .2 (Closed) LER 50-395/1999-0014-02: Kaowool Fire Barriers Outside 10 CFR 50, Appendix R Design Basis. This revision to the subject LER updates the compensatory actions taken and planned in response to the testing results for Kaowool triple wrap fire barriers. LER 50-395/1999-0014-00 and Supplement 1 were previously reviewed and closed in NRC Inspection Report 05000395/2002003, Sections 4OA3.3 and 4OA7.4 respectively, and were dispositioned as a licensee identified violation. This condition is in the licensee corrective action program under Nonconformance Notice, NCN 99-1520. No new issues or additional findings of significance were identified.

#### 4OA5 Other Activities

- .1 On July 29, 2003, the Senior Resident Inspector reviewed the Institute of Nuclear Power Operations/ World Association of Nuclear Operators (INPO / WANO) Peer Review of Virgil C. Summer Nuclear Station report, dated July 3, 2003.
- .2 (Closed) Unresolved Item (URI) 50-395/2003003-02: Failure to Confirm Heat Transfer Capabilities of Component Cooling Heat Exchangers (CCHXs). The inspectors questioned whether the licensee had demonstrated operability of the CCHXs. The inability to establish consistent test parameters had resulted in invalid as-found (pre-outage) performance tests. As a result, the testing program had not demonstrated the operability of the CCHXs under worse case conditions. In response to Generic Letter 89-13, the licensee had committed to establishing an effective testing program to verify heat transfer capability of all safety related HXs cooled by SW. The licensee had previously identified the need to improve testing protocol in order to obtain reliable data regarding the verification of heat transfer capability of the CCHXs. The licensee had initiated CER 0-C-02-2581 to track corrective actions for this problem. As a result, the licensee had contracted an outside vendor (Power Generation Technologies) to create a testing protocol which will establish a scientific methodology for testing HXs and ensuring a valid quantifiable test. Retesting for both trains was performed using the new test protocol under fouled conditions.

The inspectors observed testing of CCHX A train and reviewed test data for CCHX B train. The inspectors also reviewed associated support documentation which included: Engineering Information Request 80713, Define the Limiting Conditions for the CCHXs; Technical Work Record JG15995, 2B-CCW Heat Exchanger Trend Analysis, Revision 1; Work Order 0307879, Troubleshooting Plan and Testing of CCHX A Train, Revision 0; Station Order (SO) 03-12, Restricting Service Water Pond Temperatures due to Fouling of the CCW Heat Exchangers; and CER 03-2367, Evaluation of Thermal Performance of CCHX A Train based on Testing Conducted July 22, 2003.

Testing data for A train showed that the CCHX was acceptable but with very little margin. The B train test showed the CCHX to be under acceptance criteria (approximately 97 MBTU versus 110 MBTU). This was based on worse case assumptions for SW temperature. Therefore, the licensee evaluated current and past operability based on actual SW temperatures experienced and initiated administrative restrictions on SW temperatures per SO 03-12. Evaluations showed that the CCHXs had remained operable.

The inspectors determined that the lack of test control constituted a violation of 10 CFR 50, Appendix B, Criterion XI, Test Control. This licensee identified violation was greater than minor because it affected the Mitigating System Cornerstone of equipment reliability, in that, the failure to perform adequate testing would allow a degraded or inoperable heat exchanger to go undetected. For enforcement disposition of this issue see Section 4AO7.1.

#### 4OA6 Meetings

##### Exit Meeting Summary

The inspectors presented the inspection results to you, Mr. J. Archie, and other members of the licensee's staff on October 1, 2003. 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 Violation

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 an NCVs.

- .1 10 CFR 50, Appendix B, Criterion XI, Test Control, requires, in part, that a test program be established to demonstrate that systems and components will perform satisfactorily in service in accordance with established acceptance limits. Contrary to this requirement, the licensee failed to demonstrate adequate performance of CCHXs in service due to an inadequate test program. This finding was of very low significance (see Section 4OA5.2) because the CCHXs remained operable in service when actual conditions were used for evaluation. This issue was entered into the licensee corrective action program as CER 0-C-03-1831.

- .2 10 CFR 50, Appendix B, Criterion V, Instructions, Procedures and Drawings, states, in part, activities affecting quality shall be prescribed by procedures and shall be accomplished in accordance with these procedures. Contrary to this requirement the licensee failed to perform quality related work activities in accordance with SAP-300, "Conduct of Maintenance." On July 11, 2003, work was performed on the Diesel Driven Fire Service Pump (XPP0134B), instead of the intended component, Alternate Diesel Driven Fire Pump (XPP0172). The maintenance personnel failed to adhere to programmatic and procedural requirements when performing work contrary to requirements of SAP-300, Step 5.5. Because of the short duration that this condition existed (10 to 15 minutes) and that the electric driven fire pump remained operable 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-03-2196.
- .3 10 CFR 50, Appendix B, Criterion III, Design Control, states, in part, that design changes, including field changes shall be subject to design control measures commensurate with those applied to the original design and approved by the organization that performed the original design. Contrary to this requirement on August 14, 2003, the licensee identified that certain field changes affecting emergency diesel generator (EDG) loadings and non-conservative loading assumptions were not accounted for in the diesel generator loading and fuel oil consumption calculations (DC08360-006 for A EDG and DC06630-001 for B EDG). Fuel consumption and loading margins existed, therefore, the EDGs remained operable and 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-03-2588.
- .4 Technical Specification 3.7.6, "Control Room Normal and Emergency Air Handling System," surveillance requirement (4.7.6.e.3) requires the control room be maintained at a positive pressure. The system is designed that upon a safety injection signal or a high radiation condition that the air handling systems would pressurize the control room to a positive pressure of greater than or equal to 1/8 inch water gauge positive pressure with a maximum of 1000 SCFM of outside air during system operation. Contrary to this requirement on September 9, 2003, the licensee identified that maintenance activities and a system tagout performed the day before, in support of charcoal replacement, had resulted in an improper configuration such that the control room pressure boundary was unable to maintain the required positive pressure. The licensee made an eight hour non-emergency report to the NRC on September 9, 2003. Because the violation existed for a short duration (16 hours) and only represented a degradation of the radiological barrier function provided for the control room 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-03-2819.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee**

J. Archie, General Manager, Nuclear Plant Operations  
F. Bacon, Manager, Chemistry Services  
L. Blue, Manager, Health Physics Services  
R. Clary, Manager, Nuclear Licensing and Operating Experience  
M. Findlay, Manager, Nuclear Protection Services  
M. Fowlkes, General Manager, Engineering Services  
S. Furstenberg, Manager, Nuclear Operations Training  
D. Gatlin, Manager, Operations  
D. Goldston, Operations Superintendent  
A. Koon, Supervisor, Nuclear Operations Training  
D. Lavigne, General Manager, Organization Effectiveness  
K. Nettles, General Manager, Nuclear Support Services  
W. Stuart, Manager, Plant Support Engineering  
A. Torres, Manager, Planning / Scheduling and Project Management  
R. White, Nuclear Coordinator, South Carolina Public Service Authority  
R. Williamson, Emergency Preparedness Supervisor  
S. Zarandi, Manager, Maintenance Services

#### **NRC**

R. Bernhard, Region II, Senior Reactor Analyst

**LIST OF ITEMS OPENED AND CLOSED**Opened and Closed

50-395/2003004-01	NCV	Inadequate Preventative Maintenance Results in a Reactor Trip (Section 4OA3.1)
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Closed

50-395/2003-002-00	LER	Reactor Trip due to Main Generator Breaker Opening Unexpectedly (Section 4OA3.1)
50-395/1999-014-02	LER	Kaowool Fire Barriers Outside 10 CFR 50 Appendix R Design Basis (Section 4OA3.2)
50-395/2003003-02	URI	Failure to Confirm Heat Transfer Capabilities of Component Cooling Heat Exchangers (Section 4OA5.2)



## LIST OF DOCUMENTS REVIEWED

### Section 1R04 - Equipment Alignment

SOP-211, "Emergency Feedwater System"  
SOP-306, "Emergency Diesel Generator"  
SOP-307, "Diesel Generator Fuel Oil System"  
SOP-502, "Auxiliary and Fuel Handling Building Ventilation System"  
FSAR Sections 8.3.1, 9.4.2, 9.4.3, 9.5.4, and 10.4.9  
TS Sections 3.7.1.2, 3.7.11, and 3.8.1  
D-302-085, "Emergency Feedwater (Nuclear)"  
D-302-351, "Diesel Generator - Fuel Oil"  
D-302-353, "Diesel Generator - Miscellaneous Services"  
D-912-131, "Fuel Handling Building Charcoal Exhaust System Air Supply Distribution"

### Section 1R06 - Flood Protection Measures

FSAR Sections 9.3.3. and 9.3.4  
D-302-738, "Waste Processing"  
D-302-821, "Reactor and Auxiliary Building Sump Pumps"  
CMP-700.12, Embedded Pull Box Inspection, Rev. 0  
CMP-700.13, Inspection of Electrical Manholes, Rev. 0  
Engineering letter, dated August 7, 2003, from C. Rice to M. Fowlkes; re: design verification of sump pump  
2003 Chemistry data charts and Supervisor Report on floor drain tank in-leakage

### Section 1R11 - Licensed Operator Requalification

2002 LOR Annual Requalification Examination Report, Memorandum to B. L. Thompson from T. R. Howell, 9/17/2002  
LOR Annual Exam Results, Memorandum to Dan Gatlin from Steve Furstenberg, 8/15/2003  
Examination Profile Reports  
OAP-101.4, Operations Administrative Procedure, Operator Watchstanding Certification and Tracking, Rev. 4  
NTM-7-2, Nuclear Training Manual, Training Documentation, Rev. 11  
NTM-5-1, Nuclear Training Manual, Implementation of Nuclear Training, Rev. 7  
Integrated Systems Tests Table of Contents, Rev. 37  
IST-1.1, Simulator Administrative Section, Conduct of Operations, Rev. 4  
IST-1.2, Simulator Administrative Section, Simulator Discrepancy Report, Rev. 4  
IST-1.3, Simulator Administrative Section, Simulator Configuration Control, Rev. 3  
IST-1.4, Simulator Administrative Section, Simulator Physical Fidelity Report, Rev. 1  
IST-1.6, Simulator Administrative Section, Integrated Systems Testing, Rev. 2  
Listing of Active and Closed Simulator Discrepancy Reports as of 8/15/03  
Listing of Integrated Systems Test Status as of 8/15/03

### Section 1EP4 - Emergency Preparedness

Radiological Emergency Plan, Revision 46

Condition Evaluation Reports (CERs)

0-C-03-2360, Items from exercise

0-C-03-2361, REP 46 EAL changes

0-C-03-2362, Incorrect PAR

0-C-03-2363, Incorrectly calculating noble gasses in plume as Zero (0)

0-C-03-2394, Dose Assessment based on incorrect flow rate

0-C-03-2395, Follow up Notifications were inaccurate