UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

October 20, 2000

SDP/EA-00-238

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

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION - NRC INTEGRATED INSPECTION REPORT NO. 50-395/00-05

Dear Mr. Byrne:

On September 23, 2000, the Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer reactor facility. The enclosed report presents the results of that inspection which were discussed on September 27, 2000, with Mr. G. Halnon and other members of your staff. On October 17, 2000, the inspection results and significance determination for the turbine driven emergency feedwater (TDEFW) pump discharge isolation valve being closed were discussed with you and other members of your staff.

The inspection was an examination of 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. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel.

This report discusses a finding that appears to have substantial safety significance. As described in Section 4OA3 of this report, the closed TDEFW pump discharge isolation valve was assessed using the significance determination process (SDP) and was preliminarily determined to be Yellow, i.e., an issue with substantial importance to safety that will result in additional NRC inspection and potentially other NRC action. The finding appears to have substantial safety significance due to the 48 days duration of the valve being closed and the importance of the TDEFW pump for mitigating accident scenarios involving the loss of offsite power and failures of the emergency diesel generators.

Related to this finding are two apparent violations involving (1) the failure to comply with Technical Specification (TS) 3.7.1.2 for TDEFW pump operability and (2) the failure to properly position and independently verify the TDEFW pump discharge isolation valve in accordance with procedures required by TS 6.8.1. The two apparent violations are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions - May 1, 2000" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's website at http://www.nrc.gov/OE.

Before the NRC makes a final decision on this matter, we are providing you an opportunity to request a Regulatory Conference where you would be able to provide your perspectives on the significance of the finding, the bases for your position, and whether you agree with the apparent violations. If you choose to request a Regulatory Conference, we encourage you to submit your evaluation and any differences with the NRC evaluation at least one week prior to the conference in an effort to make the conference more efficient and effective. If a conference is held, it will be open for public observation. The NRC will also issue a press release to announce the conference.

Please contact Mr. Robert Haag at (404) 562-4550 within seven days of the date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision and you will be advised by separate correspondence of the results of our deliberations on this matter.

Since the NRC has not made a final determination in this matter, no Notice of Violation is being issued for the inspection finding at this time. In addition, please be advised that the number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review.

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/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Victor M. McCree, Deputy Director
Division of Reactor Projects

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

Enclosure: NRC Integrated Inspection Report

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-395
License No.:	NPF-12
Report No.:	50-395/00-05
Licensee:	South Carolina Electric & Gas (SCE&G)
Facility:	Virgil C. Summer Nuclear Station
Location:	P. O. Box 88 Jenkinsville, SC 29065
Dates:	June 25 through September 23, 2000
Inspectors:	M. Widmann, Senior Resident Inspector M. King, Resident Inspector E. Christnot, Resident Inspector, Oconee (Sections 1R05 and 1R12.2) D. Forbes, Health Physicist, RII (Section 2OS2) L. Garner, Project Engineer, RII (Section 1R06) R. Gibbs, Senior Reactor Inspector, RII (Section 1R12.1) G. Kuzo, Senior Health Physicist, RII (Sections 2PS1, 2 and 3)
Accompanying Personnel:	C. Sochor, Health Physicist, RII (Sections 2PS1, 2 and 3)
Approved by:	R. C. Haag, Chief, Reactor Projects Branch 5 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000395-00-05, on 06/25-09/23/00; South Carolina Electric and Gas; Virgil C. Summer Nuclear Station. Event followup.

The inspection was conducted by resident inspectors, a regional reactor inspector, project engineer and two regional health physicists. The inspection identified an issue that was preliminarily determined to be yellow. The significance of the issue is indicated by its color (green, white, yellow, red) and was determined by the Significance Determination Process in Inspection Manual Chapter 0609 (see Attachment 1).

Cornerstone: Mitigating Systems

- To Be Determined. The turbine driven emergency feedwater (TDEFW) pump was determined to be inoperable due to its manually operated discharge isolation valve, XVG01036-EF, being in a locked closed position during the period of August 4 to September 21, 2000 (48 days). During a surveillance test on August 4 the isolation valve was not returned to the procedurally required locked open position and the independent verification failed to recognize this condition. In this configuration, no flow from the TDEFW pump would be available to feed the steam generators. Two apparent violations were associated with this issue. Technical Specification (TS) 6.8.1.a and c requirements for following procedures were not met, in that, the isolation valve was not returned to its correct procedural position and an independent verification was not properly performed as specified by procedures. TS 3.7.1.2 was not met, in that, the TDEFW pump was inoperable in excess of the allowed 72 hours without complying with the TS action statement.

  The finding appears to have substantial safety significance due to the 48 day duration of the valve being closed and the importance of the TDEFW pump for mitigating accident scenarios involving the loss of offsite power and failures of the emergency diesel generators. (Section 4OA3).

Report Details

The unit began the inspection period at 100 percent power and operated at or near 100 percent power until September 16 when a planned power coast down began. At the end of the inspection period the unit was at 94 percent power. The scheduled refueling outage start date was October 6.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

.1 Availability of Redundant Equipment

a. Inspection Scope

For the systems identified below, 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:

- Component Cooling Water (CCW) System (while the standby C CCW pump, normally aligned to the operating loop, was out of service)
- Reactor Building (RB) Spray train B (while train A RB spray pump was out of service)
- Service Water (SW) train B (following maintenance on A SW pump discharge check valve and during testing of train A SW).

The applicable portions of the following station operating procedures (SOPs), Final Safety Analysis Report (FSAR), Technical Specifications (TSs), drawings (Ds) and NRC guidance were utilized:

- SOP-116, “Reactor Building Spray System,” Revision 13B;
- SOP-117, “Service Water System,” Revision 18C;
- SOP-118, “Component Cooling Water System,” Revision 14E;
- D-302-222, “Service Water Cooling,” Revision 39;
- D-302-611, “Component Cooling,” Revision 31;
- D-302-661, “Reactor Building Spray System,” Revision 31;
- FSAR Sections 6.2.2, 9.2.1 and 9.2.2;
- TS 3.6.2.1, 3.6.2.2, 3.7.3, 3.74, 3.7.5 and 3.7.9; and
- NUREG/CR-5865, EGG-2674, “Generic Service Water System Risk-Based Inspection Guide,” published May 1992.

b. Findings

No findings of significance were identified.

.2 (Closed) Unresolved Item (URI) 50-395/00004-01: review licensee’s evaluation of discrepancies between the spent fuel pool ventilation design basis document, TS and surveillance test procedure. The inspectors questioned the operability of fuel handling

exhaust fan (XFN0023B) based on Primary Identification Program (PIP) 0-C-00-630. The licensee responded by performing troubleshooting and testing which measured system flow rate at 26,624 cubic feet per minute (cfm). This value was below TS 4.9.11.b.1 requirement of 30,000 cfm +/- 10 percent (i.e., 27,000 to 33,000 cfm). No fuel movement or loads over the spent fuel pool were in progress at the time low system flow was measured for the B fan, therefore, no violation of the TS occurred. The licensee declared the B fan inoperable and entered it into the removal and restoration tracking log. URI 50-395/00004-01 was issued pending NRC review of the licensee's evaluation of this issue.

During this report period the licensee performed additional troubleshooting, testing and damper adjustments, and were able to achieve the required TS flow rate for fan XFN0023B. The actual measured flow rate was 28,264 cfm. Based on these licensee actions and the inspectors review of troubleshooting, engineering evaluations, observation of the field test performed and review of the test data collected, the inspectors concluded that TS 4.9.11.b.1 was satisfied. The inspectors reviewed previous surveillance test results and recent system troubleshooting tests results and determined the system met established performance criteria and design parameters. The licensee is planning to submit a TS change to clarify flow rate measurement requirements [actual cubic feet per minute (acfm) or standard cubic feet per minute (scfm) issues in lieu of cfm as currently stated in TS].

1R05 Fire Protection

a. Inspection Scope

The inspectors reviewed current PIPs, Work Orders (WO), and impairments associated with the fire suppression system. The inspectors reviewed the status of ongoing surveillance activities to determine whether they were current to support the operability of the fire protection system. The inspectors assessed the material condition of the active and passive fire protection systems and features, and verified proper control of transient combustibles and ignition sources. Additionally, the inspectors assessed administrative controls (compensatory measures) in place due to Kaowool issues (reference NRC Inspection Report No. 50-395/99-09, Section F2.1). The inspectors observed Kaowool repair work in progress under WO 0009721 to modify the fire barrier per Engineering Change Request (ECR) 50205A. Additionally, the inspectors observed portions of Preventative Test Procedure, (PTP)-114.007, "Wet Pipe Sprinkler System Flow," Revision 8D, conducted in the auxiliary building and observed operators in the control room and Simplex fire panel alarm response during portions of this test.

The inspectors conducted routine inspection of the following areas:

- Relay Room (fire zone CB-6);
- A and B Diesel Generator Rooms (fire zones DG1.1, 1.2, 2.1 and 2.2);
- 1DA and 1DB Switchgear Rooms (fire zones IB-20 and 22.2);
- A and B Charging / Safety Injection Pump Rooms (fire zones AB1.5 and 1.7);
- Turbine Driven Emergency Feedwater Pump Room (fire zone IB-25.2);
- Control Room (fire zone CB-17.1); and

- Turbine Building (fire zone TB-1).

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

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed "V. C. Summer Nuclear Station; Individual Plant Examination," dated June 1993, to understand the risk significance of flooding initiators associated with potential internal flooding events. Applicability of supplements and revisions to the June 1993 report were discussed with cognizant personnel. A walkdown of three rooms was performed to verify that the qualitative results listed in Table 3.3.8-1, "V. C. Summer Internal Flooding Analysis Areas Analyzed Qualitatively," of the June 1993 report were reasonable to justify that no quantitative analyses were necessary. This walkdown was conducted in Auxiliary Building (AB) rooms 88-23, 24 and 25, subbasement charging pump rooms A, B and C respectively. FSAR Sections 7.6.5, "Leak Detection Systems," and 10.4.7.2.3, "Condensate and Feedwater System - Safety Evaluation," were reviewed to determine the plant equipment which were installed to detect and mitigate the effects of an internal flood. The inspectors observed the material condition of sump pumps in the lowest level of the AB and the Intermediate Building (IB). Dikes and wall penetrations were inspected around the residual heat removal (RHR) pump and the reactor building spray pump rooms. The inspection was to ensure that the dikes were intact and that no unsealed penetrations below the dike tops connected these rooms.

Potential Feedwater (FW) line breaks were analyzed in Calculation DC 03200-001, "Flooding Evaluation For All AB and IB Areas Affected by FW," Revision 5A. The inspectors reviewed the general methodology used in this calculation for reasonableness.

The inspectors reviewed FSAR Sections 2.4.2 through 2.4.10, which discussed external flooding and flooding protection requirements. The inspectors performed a walkdown of the site to verify features remained as described in these FSAR sections. In addition, within the protected area, the storm drain system was examined to verify that the drains were not blocked and that the ground was properly graded to channel water into the system. The inspectors discussed with the cognizant engineer the underground electrical cables to the service water pump house. The discussions focused on cable qualification for submergence and splicing in the underground pull vault.

The inspectors reviewed previous PIPs and the associated corrective actions for past flooding events. No flooding events were identified; however, where issues were documented (i.e. rain water intrusion) the appropriateness of the licensee's actions was

evaluated. Preventative maintenance activities for building roofs, fire protection system sprinklers, and other sources of internal flooding were also reviewed. The majority of equipment, systems, and facilities reviewed were considered in the licensee's internal flooding analysis. Material condition of the equipment and facilities was examined. The licensee does not take credit for any operator actions to cope with a flooding event and, therefore, has not written or established any operator coping guidance.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On September 21, the inspectors observed senior reactor operators and reactor operators on the plant's simulator during licensed operator requalification training. Observed training covered RHR operations in General Operating Procedure (GOP)-7, "Plant Shutdown and Cooldown from Hot Shutdown to Cold Shutdown (Mode 4 to 5)," Revision 7. The inspectors noted that instructors would freeze the simulator when necessary to discuss important training points with the crew. In addition, the inspectors observed classroom training on the Equipment Out of Service (EOS) computer program used to assess and manage risk that may result from proposed maintenance activities. This training was being conducted to support upcoming implementation of the 10 CFR 50.65, Maintenance Rule a(4) which becomes effective November 28, 2000. Through review of the training schedule and training materials, the inspectors verified that the training program included previous lessons learned items and plant experience issues. This material included review of site specific PIPs from previous refueling outages in preparation for the upcoming October refueling. The inspectors assessed overall crew performance and observed licensee training.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule (MR) Implementation

.1 MR Periodic Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's periodic assessment, "V.C. Summer Nuclear Station Maintenance Rule Second Periodic Assessment TR00010-003," Revision 0, dated January 24, 2000, which was issued in accordance with paragraph a(3) of the Maintenance Rule (10 CFR 50.65). The inspectors verified that the assessment was issued in accordance with the time restraints of the Rule, and also that the assessment included all required areas including balancing reliability and unavailability, review of a(1) activities, review of a(2) activities, and consideration of industry operating experience.

b. Findings

No findings of significance were identified.

.2 Effectiveness of MR Program

a. Inspection Scope

The inspectors reviewed portions of selected performance-based problems associated with Structures, Systems or Components (SSCs), to assess the effectiveness of maintenance efforts that apply to those SSCs. Reviews focused, as appropriate, on (1) maintenance rule scoping in accordance with 10 CFR 50.65; (2) characterization of failed SSCs; (3) safety significance classifications; (4) 10 CFR 50.65 (a)(1) or (a)(2) classifications; and (5) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). The selected SSCs were:

- Fire Services,
- Chiller Water System,
- Control Room and AB Heating Ventilating and Air Conditioning, and
- Building Services (i,e., includes plant structures for protection and radiation shielding: Intermediate, Fuel Handling, Diesel Generator, Auxiliary, Control Building, etc.).

For the equipment issues described in the PIPs listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) to determine if maintenance preventable functional failures may have existed that the licensee did not capture in their program and assessed the corrective actions taken:

PIP Number	Description
0-C-00-0875 0-C-00-1173	Refueling Water Storage Tank (RWST) Level Transmitters, ILT0993 and ILT0990, rain water intrusion issues
0-C-00-0922	Emergency Diesel Generator A Exciter Cabinet (XEX4201) rain water intrusion issue

The inspectors reviewed the disposition to nonconformance notice (NCN)-00-0875 and the corrective actions to verify that they were appropriate and have been implemented to prevent water intrusion for all the RWST level transmitters. The licensee plans to place Building Services in a(1) status to track corrective action effectiveness related to rain water intrusion for the emergency diesel generator building.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's assessments of the risk impacts of removing from service those components associated with preplanned 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 unforseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors evaluated the licensee's work prioritization and risk determination to determine whether necessary steps were properly planned, controlled, and executed for work activities listed below:

- ILT-0993, Refueling Water Storage Tank Level Transmitter, failed high, replaced;
- Pressurizer Back-up Heater Group 1 Breaker, XSW1DA-12, failed to close, troubleshooting and replacement;
- B Emergency Diesel Generator on-line preventative maintenance, calibrations and retests; and
- Guard pipe inspections at penetrations 327, 328, 329 and 425 (RHR and RB Spray Pump suction from RB recirculation sumps) and associated Justification for Continued Operation (JCO) should inspections indicate degradation exists, reference Technical Work Record, TWR CC89503.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection Scope

This inspection evaluated the licensee operator response for a non-routine plant evolution to ensure they were appropriate and in accordance with the required procedures and to ensure necessary conditions were captured in the licensee's corrective action program.

The inspectors reviewed the operating crew's performance following a standpipe level high/low alarm for C Reactor Coolant Pump (RCP) on the evening of July 6. The operator response was conducted in accordance with Annunciator Response Procedure, "ARP-001-XCP-619," Revision 6, for Annunciator Point 2-4, "RCP C Standpipe Level Hi/Lo" alarm. The operator response was hampered by valve alignment problems between the reactor makeup system and the C RCP standpipe. The operators referred to Abnormal Operating Procedure (AOP)-101.2, "Reactor Coolant Pump Seal Failure," Revision 0, and SOP-106, "Reactor Makeup Water System," Revision 8F, to diagnosis and correct the condition. PIP 0-C-00-0835 was issued to capture the valve alignment condition in the licensee's corrective action

program.

The inspectors also observed several operating crew's performance during end of life operation that included a power coast down which began September 16.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected operability evaluations affecting risk significant systems, listed below, 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 as compensating measures; (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 SDP.

PIP Number	Title/Description
0-C-99-1026 0-C-00-1101	RWST Swapover Timeline Not Consistent with FSAR
0-C-00-0644	Determine an RCS pressure below which the RCS shall be considered "not filled" and implement administrative controls to preclude an uncontrolled boron dilution event (reference Westinghouse NSAL-94-013).
0-C-00-0730	On A EDG both fuel oil transfer pumps were recorded in the alert range for discharge pressure
0-C-00-0800	Rod P8 indication problems at 220 steps
0-C-00-0813	Electric fire pump auto started during STP-123.003B but gave no alarm in the control room
0-C-00-0823	Feedwater oscillations on A feedline

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 either witnessed 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 Test Procedure		Activities Requiring PMT
Number	Title	
STP-123.003A, Revision 4A	"Train A Service Water System Valve Operability Test," (for XVC03115C-SW, C service water pump)	Replaced XVC03115C-SW, service water pump C discharge check valve, due to a damaged rubber seal - reference PIP 0-C-00-0890
STP-125.013, Revision 6	"Diesel Generator Semiannual Operability Test" (XEG0001B-E for the B Emergency Diesel Generator)	Motor lube PMs, inspect field lug terminal connections, fill manometers and calibration, fill and vent fuel oil suction strainer D/P pressure indicator
STP-222.002 Revision 3	"Component Cooling Pump Test" (XPP-1A-CC for the A CCW pump)	A CCW pump lubrication, speed switch preventative maintenance, suction pressure indicator calibration
STP-375.004, Revision 6A	"Refueling Water Storage Tank Level Instrument ILT00993 Calibration"	RWST level transmitter (ILT00993) failed high, moisture intrusion into the transmitter housing - replace and repair (add additional sealant to prevent recurrence)
STP-506.001 Revision 6	"Pressurizer Heater Capacity Test"	Pressurizer Back-up Heater Group I Breaker, XSW1DA-12 failed to close properly, replaced breaker with a spare breaker

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 procedures 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-123.003A “Train A Service Water System Valve Operability Test,” Revision 4C;
- STP-220.001A “Motor Driven Emergency Feedwater Pump and Valve Test,” Revision 5C (for A MDEFW pump);
- STP-220.002 “Turbine Driven Emergency Feedwater Pump and Valve Test,” Revision 3;
- STP-222.002 “Component Cooling Water Pump Test,” Revision 3 (for C CCW pump); and
- STP-345.037 “Solid State Protection System Actuation Logic and Master Relay Test, Train A,” Revision 15A; and
- Quality Systems Procedure (QSP)-506 “IWE and IWL Visual Examination,” Revision 0A (for the external Containment Dome and the Reactor Building concrete surfaces as defined in ASME Section XI, Subsections IWE and IWL).

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed temporary modifications to assess the impact on risk-significant SSC parameters and important safety significant maintenance rule systems. The inspectors verified the temporary modifications had not affected safety functions of the systems or the ability of the operators to respond to plant transients and accidents. Additionally, inspectors verified the work was performed in a manner that minimized the transient risk to the plant during installation and removal of the modification. The following temporary modifications were reviewed:

- Temporary RHR heat exchanger room wall modifications during relocation of RHR current to pressure (I/P) converters per Engineering Change Request (ECR) 50140 and
- Installation of temporary monitoring equipment for the main generator output megawatt troubleshooting per work order WO 0012130.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

On June 28, the inspectors observed an emergency drill conducted to train on the integrated capabilities of the emergency response organizations and a major portion of the Virgil C. Summer Nuclear Station Radiation Emergency Plan. This drill is also considered as one of the required health physics drills. Participation of the state and local governments was limited, per their request, to receiving emergency notification and the associated forms. The inspectors observed various aspects of the drill in the simulator control room and the Emergency Operating Facility. The inspectors assessed emergency procedure usage, including proper emergency plan classification, notifications and protective area recommendations to ensure the licensee was properly identifying and entering any problem areas during the drill into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and critique performance to determine whether the drill was of appropriate scope to be included in the performance indicator statistics. The inspectors verified that issues affecting the performance indicator data were appropriately captured.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS2 As Low As Reasonably Achievable (ALARA) Planning and Controls

a. Inspection Scope

The inspectors reviewed the plant collective exposure history, current exposure dose trends, and the year 2000 annual site dose goal to determine if the licensee was implementing ALARA practices as required by 10 CFR 20.1101(b) and licensee's Corporate ALARA Plan. Specific documents reviewed are listed in the "Documents Reviewed" section at the end of this report. During plant walkdowns the inspectors observed job site implementation of ALARA controls. The inspectors reviewed licensee ALARA Committee Meeting minutes, use of temporary shielding, radiation work permits, and discussed with health physics personnel internal exposure goals and practices for the upcoming Refueling Outage 12. ALARA planning and controls for five high dose jobs to be performed during the Refueling Outage 12 were reviewed in addition to planned source term reduction initiatives. Licensee monitoring program and subsequent implementation for declared pregnant workers since January 1, 2000, was reviewed and discussed. The inspectors also reviewed ALARA program problem identification and resolution for 2000 year-to-date.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS1 Radioactive Gaseous and Liquid Effluent Monitoring Systems

a. Inspection Scope

The licensee's offsite pre-release dose calculations for a June 29, 2000, waste gas decay tank release were evaluated based on established site-specific dispersion characteristics, maximum release rate, and radionuclide concentrations. Licensee doses were compared to NRC results calculated using the PC-Dose computer code.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation

.1 Radioactive Waste Processing

a. Inspection Scope

Radiation protection program activities associated with radioactive waste characterization, temporary storage, and subsequent burial at licensed facilities were reviewed. Sample representativeness for radioactive waste streams were verified. The inspectors reviewed and discussed 1999 waste stream radiochemical sample analysis results used to determine scaling factors and calculations to account for difficult-to-measure radionuclides for primary, mixed bed, and blowdown resins, and for dry active waste. During the week of July 31, 2000, the inspectors toured solid radioactive waste processing equipment and on-site storage facilities and conducted dose rate surveys for selected radioactive waste containers and temporary storage areas.

The solid radioactive waste processing equipment and storage areas were reviewed and verified against FSAR and Process Control Program (PCP) details. Measured dose rates were verified against licensee label or posting information. Program guidance and implementation were evaluated against 10 CFR Parts 20 and 61, and Technical Specifications. Implementation of Health Physics Procedure (HPP)-717, "Sample Collection, Preparation, and Analysis Techniques for Assuring Compliance with 10 CFR 61," Revision 6 was verified.

b. Findings

No findings of significance were identified.

.2 Transportation Activities

a. Inspection Scope

Radiation protection program activities associated with packaging and transportation of radioactive material/waste were reviewed. Quality control records and shipping paper and supporting documentation were reviewed and evaluated for accuracy and completeness. Records of the following radioactive waste or radioactive material shipments were reviewed and discussed:

- 99-042, Radioactive Material, Surface Contaminated Object, 7, UN2913, 5/1/99;

- 99-089, Radioactive Material LSA n.o.s., 7, UN2912, 11/29/99; and
- 99-093, Radioactive Material LSA n.o.s., 7, UN2912, 12/1/99.

Transportation activities were reviewed against 10 CFR Parts 20 and 71, and 49 CFR Parts 170 -189.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program

.1 Radiological Environmental Monitoring

a. Inspection Scope

Offsite environmental monitoring air sampling stations 6 and 7 were inspected during the week of August 31, 2000. Station locations and equipment were verified against details in the licensee's 1999 Annual Environmental Monitoring Report and Off-Site Dose Calculation Manual (Revision 23). Equipment operability, pump flow rate quality control checks, sample collection, and change-out of the particulate and iodine filters were observed.

The inspectors reviewed implementation of the environmental laboratory quality control (QC) activities to meet Regulatory Guide 4.15, Revision 1, February 1979, as specified by TS 6.8.1(i). Reviewed activities included laboratory methods for liquid and airborne sample preparation and processing, verification of lower limit of detection capabilities for environmental monitoring analyses, and implementation and results for selected counting room analytical radionuclide measurement system QC performance activities.

b. Findings

No findings of significance were identified.

.2 Meteorological Monitoring

a. Inspection Scope

Meteorological monitoring program guidance and operations were evaluated. The meteorological tower siting and functionality were evaluated. Operability of control room data readouts and recording instruments was verified. Control room operators knowledge and emergency procedures details regarding backup methods to obtain meteorological data in the event of a radiological emergency were evaluated. Current meteorological system calibration records and performance checks, and data verification, correction, reduction, and compilation were reviewed. Meteorological data were reviewed and staff interviews conducted to verify conformance with TS requirements, FSAR details, Safety Guide 23 guidelines, and procedures. The following procedures were reviewed and discussed:

- STP-393.004 "Meteorological Tower Calibration," Revision 6,
- HPP-1060 "Meteorological Data Verification and Correction," Revision 3, and
- HPP-1061 "Meteorological Checks," Revision 2.

The Equal To/Better Than (ETBT) and Limited Scope Design Change Package Transmittal, ETBT 452, 50.59 screening, and safety evaluation packages were reviewed and discussed with responsible staff regarding replacement of the wind speed and wind direction instruments on the 10 and 61 meter elevations of the meteorological tower.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

PIP reports were reviewed for the meteorological tower operability, maintenance, and calibration. The licensee's prioritization, documentation, and resolution of problems of identified issues were evaluated. Staff were interviewed regarding repetitive problems with the meteorological instrumentation and corrective actions in place to resolve these issues. The inspectors reviewed and discussed with appropriate licensee staff members eight PIP reports associated with the environmental assurance and administrative equipment issues generated since 1998.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Unplanned Scrams per 7,000 Critical Hours PI

a. Inspection Scope

The inspectors verified the accuracy of the "Unplanned scrams per 7,000 Critical Hours" PI through the second quarter of 2000. The inspectors reviewed selective samples of station logs, NRC Inspection Reports, Licensee Event Reports, Monthly Operating Reports, and corrective action program database for the period of January 1999 through June 2000.

b. Findings

No findings of significance were identified.

.2 Scrams with Loss of Normal Heat Removal PI

a. Inspection Scope

The inspectors verified the accuracy of the "Scrams with a Loss of Normal Heat Removal" PI through the second quarter of 2000. The inspectors reviewed selective samples of station logs, NRC Inspection Reports, Licensee Event Reports, Monthly

Operating Reports, and corrective action program database for the period of January 1999 through June 2000.

b. Findings

No findings of significance were identified.

.3 Unplanned Power Changes per 7,000 Critical Hours PI

a. Inspection Scope

The inspectors verified the accuracy of the "Unplanned Power Changes per 7,000 Critical Hours" PI through the second quarter year 2000. The inspectors reviewed selective samples of station logs, NRC Inspection Reports, Licensee Event Reports, Monthly Operating Reports, and corrective action program database for the period of January 1999 through June 2000.

b. Findings

No findings of significance were identified.

4OA3 Event Followup - Turbine Driven Emergency Feedwater (TDEFW) Pump Discharge Valve Found Out of Position

a. Inspection Scope

The inspectors reviewed circumstances related to the licensee's discovery of manually operated TDEFW pump discharge isolation valve, XVG01036-EF, being found out of position. The inspectors reviewed the associated procedures used to control normal emergency feedwater alignment, surveillance test activities, and the independent verification process and reviewed the licensee's investigation and root cause report. The inspectors also attended the Management Review Board (MRB) meeting on September 26 which reviewed this event. The inspectors interviewed the operators involved and performed a field walkdown with them present.

b. Findings

Two apparent violations were identified. The first apparent violation involved the failure to properly perform an equipment alignment and the associated independent verification which resulted in the flow path for the TDEFW pump being isolated while the plant was in Mode 1. The misalignment was determined to have existed for approximately 48 days which resulted in the second apparent violation for exceeding TS 3.7.1.2, "Emergency Feedwater System," Limiting Condition for Operation Action Statement (a), for an inoperable emergency feedwater pump greater than 72 hours.

On September 21, 2000, with the unit in Mode 1 the licensee discovered the TDEFW pump discharge isolation valve in a locked closed position as opposed to the locked open position as required by the normal system alignment per SOP-211, "Emergency Feedwater System," Revision 11G. With the system in this condition no flow from the TDEFW pump would be available to any of the steam generators. Upon discovery the

valve was immediately returned to the required locked open position. The licensee reported this condition in accordance with 10 CFR 50.72(b)(1)(ii)(A) one-hour non-emergency event notification at 6:51 a.m., on September 21, for the plant being in an unanalyzed condition that significantly compromises plant safety.

During their review, the inspectors learned that the discharge valve was misaligned on August 4, 2000, while performing STP-120.004, "Emergency Feedwater Valve Operability Test," Revision 13C. The valve alignment error was discovered on September 21 during performance of STP-220.002, "Turbine Driven Emergency Feedwater Pump and Valve Test," Revision 3B, when an operator observed the valve stem position and questioned whether the valve was in the correct position. The discharge valve was not required to be manipulated by the surveillance performed on September 21.

Based on interviews with the operators involved in the August 4 misalignment, the inspectors learned that the initial positioner, who had earlier in the evening closed the subject valve during STP-120.004, had failed to correctly position the subject valve open. The required position, as shown on lineup sheet Attachment IIC of STP-120.004, was locked open. The initial positioner locked the valve after the "re-positioning" occurred and prior to the valve being independently verified. This action was contrary to Step 6.4.2 of Station Administrative Procedure (SAP)-153, "Independent Verification," Revision 1. Step 6.4.2. states: "The initial positioner manipulates the component to the required position." The step also states: "The independent verifier physically checks the position of the component . . .," then, "The initial positioner installs the locking device." The second operator responsible for the independent verification attempted to perform the verification after the valve had already been locked. Based on a statement made by this operator an adequate verification (which requires actual movement of the handwheel) could not be performed properly due to lack of slack in the locking chain. The inspectors noted that Step 6.4.2 of SAP-153 which requires both the positioner and verifier be present prior to locking the component was not complied with. Based on discussions with the operators, the inspectors determined that both operators failed to recognize that the manually operated valve was a rising stem valve and visual position indication was easily recognizable. Both operators involved initialed the lineup sheet indicating the subject valve was locked open when, in fact, it was locked closed.

The inspectors and a Region II Senior Reactor Analyst (SRA) evaluated the safety significance of the closed TDEFW pump discharge isolation valve per the SDP. The current baseline Core Damage Frequency (CDF) from the licensee's Probabilistic Safety Analysis (PSA) model for internal events is 5.59E-5/year. To initially assess the risk significance of this configuration the SRA performed a scoping calculation. By using the baseline CDF and a TDEFW pump Risk Achievement Worth value of 4.08 in the scoping calculation, the Change in Core Damage Frequency (CCDF) for the TDEFW pump being inoperable for 48 days was calculated to be 2.26E-5. For this simplified review no credit was given for operator recovery; however, this was reviewed as discussed below.

An integral aspect in determining the safety significance of this condition was evaluating the ability of the operators to recover from the closed discharge valve during events requiring the TDEFW pump. Since the dominant accident sequences associates with an inoperable TDEFW pump involve a loss of offsite power and failures of the

emergency diesel generators (Station Blackout (SBO) event), the SRA focused on these sequences and associated considerations when evaluating operator recovery. The SRA determined that the operators would be successful in opening the closed TDEFW pump isolation discharge valve in five of ten situations which resulted in a recovery value of 0.50. The major contributor to the operators being able to recover from this condition and open the discharge isolation valve is the ability to diagnose the condition, i.e., identify the valve is locked in the closed position. The following Performance Shaping Factors (PSF) were key elements in the SRA's evaluation of the diagnostic consideration:

Available time: Core damage was estimated to occur in about one hour for the scenario in question. The time to recognize a loss of secondary side heat sink and reopen the valve each take approximately 5 minutes. This resulted in a time period to diagnose and correct the condition of between one hour and 30 minutes. Based on the amount of available time, a PSF between nominal and extra time was selected.

Stress on the operators: Since this would be an infrequent and emergency situation (SBO) with multiple equipment failures, i.e., both emergency diesel generators, a high stress level and PSF was selected.

Complexity of the task: The operators would need to look at both the TDEFW pump flow and discharge pressure indications and the position of EFW flow control valves to recognize this condition. The complexity PSF was viewed as moderate.

Experience/Training: While this would be considered a rare occurrence, operators are trained to function in emergency situations and occasionally respond to malfunctioning systems, therefore, a nominal PSF was assigned.

Procedures: The only guidance in Emergency Operating Procedure (EOP)-6.0, "Loss of All EFS AC Power," regarding EFW flow is to check the TDEFW pump and the discharge flow control valves. The EOP does not direct walking down the discharge lines for flow obstruction, therefore, this action would fall under "skill of the craft." It should also be noted that EOP-6.0 is a continuous use procedure which means that the operators are not to go outside the EOP until AC power is restored. A procedural PSF of poor was selected.

Ergonomics: The diagnostic would have to be done outside the control room with an SBO in progress. Flashlights would be required for lighting in the area of the discharge valve due the emergency lighting being located on the opposite side of the mezzanine level. The discharge isolation valve is not located adjacent to the TDEFW pump but in an overhead mezzanine. The valve is properly labeled, however, the valve is in a congested area with other valves and components in a somewhat remote corner on the mezzanine level. The valve was locked with a colored chain reserved for locked open valves which would give some confidence to the operators that the valve was in the correct position. In addition, there is industry experience that the valve cages of the downstream flow control valves can plug prohibiting EFW flow to the steam generators. A PSF between nominal and poor was selected for this area.

For work processes and fitness for duty PSFs, no indications of problems or strengths were noted, therefore, nominal PSFs were assigned. To determine the recovery factor for this specific event, a baseline failure probability of 10E-2 was adjusted by the PSFs. Nominal PSFs (value of 1.0) have no net effect on the recovery factor, where as poor or moderate PSFs increase the failure probability. The available time PSF that was between nominal and extra time was given a 0.5 value which decreased the failure probability.

Using a recovery value of 0.50, and a PSA model with Summer plant specific data included, the SRA calculated a CCDF of 1.16E-5 for the TDEFW pump being inoperable for 48 days. This CCDF is consistent with the scoping calculation results when an operator recovery value of 0.50 is applied. This change in CCDF is preliminarily characterized as a YELLOW finding per the SDP.

TS 6.8.1.c requires that written procedures shall be established, implemented, and maintained for surveillance and test activities of safety-related equipment. TS 6.8.1.a, requires that written procedures shall be established, implemented, and maintained for activities recommended by Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Equipment control (e.g., locking and tagging) is an activity contained in Appendix A. The failure to re-open the TDEFW discharge isolation valve as required by surveillance procedure STP-120.004 and the failure to independently verify the valve open per the requirements of SAP-153 are examples of an apparent violation for failure to follow procedural requirements. This apparent violation (AV) is identified as AV 50-395/00005-01.

TS 3.7.1.2, “Emergency Feedwater System,” requires at least three independent steam generator feedwater pumps and flow paths shall be operable. The associated action statement requires inoperable emergency feedwater pumps to be restored within 72 hours. Contrary to TS 3.7.1.2 requirements the TDEFW pump, with its discharge isolation valve remaining closed at the conclusion of STP-120.004, was inoperable for approximately 48 days and, therefore, the 72 hour action statement was exceeded. This is an apparent violation for having the TDEFW pump inoperable in excess of TS Limiting Condition For Operation Action Statement. This apparent violation is identified as AV 50-395/00005-02.

4OA6 Management Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Gregory Halnon and other members of licensee management at the conclusion of the inspection on September 27, 2000. A re-exit was held on October 17, 2000, to discuss the two apparent violations and the TDEFW pump safety significance determination. The licensee acknowledged the findings presented.

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

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Archie, Manager, Planning & Scheduling
F. Bacon, Manager, Chemistry Services
L. Blue, Manager, Health Physics and Radwaste
M. Browne, Manager, Nuclear Licensing and Operating Experience
R. Clary, Manager, Plant Life Extension
C. Fields, Manager, Quality Systems
M. Fowlkes, Manager, Operations
G. Halnon, General Manager, Engineering Services
L. Hipp, Manager, Nuclear Protection Services
G. Moffatt, Manager, Design Engineering
K. Nettles, General Manager, Nuclear Support Services
F. O'Neal, Maintenance Rule Coordinator
R. Osborne, Plant Support Engineering Supervisor
A. Rice, Manager, Plant Support Engineering
R. White, Nuclear Coordinator, South Carolina Public Service Authority
B. Williams, General Manager, Nuclear Plant Operations
G. Williams, Manager, Maintenance Services

NRC

Walt Rogers, Senior Reactor Analyst (SRA)

ITEMS OPENED AND CLOSED

Opened

50-395/00005-01	AV	Apparent violation TS 6.8.1.a and c for failure to follow procedures to return the TDEFW manual discharge isolation valve to the open position and improperly performing independent verification (4OA3).
50-395/00005-02	AV	Apparent violation for not complying with TS 3.7.1.2 action statement to restore the TDEFW to operable status in 72 hours (4OA3).

Closed

50-395/00004-01	URI	Review licensee's evaluation of discrepancies between the spent fuel pool ventilation design basis document, technical specifications and surveillance test procedure (1R04.2).

DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection discussed in Section 2OS2:

V.C. Summer Technical Specifications,

V.C. Summer Final Safety Analysis Report,

Corporate ALARA Plan, Revision 9,

HPP-151, “Use Of The Radiation Work Permit And Standing Radiation Work Permit,” Revision 8,

HPP-153, “Administrative Exposure Limits,” Revision 13,

HPP-401, “Issuance, Termination And Use Of RAPS And SWAPS,” Revision 13,

HPP-819, “Temporary Shielding Evaluation, Installation, And Removal,” Revision 10,

Engineering Services (ES)-321, “Procurement Of Material And Services,” Revision 7,

ALARA Committee Meeting Minutes,

Refueling 11 Outage Report, and

Refueling 12 Outage ALARA Plan.

Attachment 1

NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
● Initiating Events	● Occupational	● Physical Protection
● Mitigating Systems	● Public	
● Barrier Integrity		
● Emergency Preparedness		

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: http://www.nrc.gov/NRR/OVERSIGHT/index.html.