



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0198

Report No.: 50-395/96-01

Licensee: South Carolina Electric & Gas Company
Columbia, SC 29218

Docket No.: 50-395

License No.: NPF-12

Facility Name: Virgil C. Summer Nuclear Station

Inspection Conducted: January 1 through 27, 1996

Inspectors: L. W. Garner For 2-23-96
B. R. Bonser, Senior Resident Inspector Date Signed

J. L. Starefos, Resident Inspector
R. D. Gibbs, Reactor Inspector (Paragraphs 3.2 & 3.3)

Approved by: George A. Belisle 2/23/96
George A. Belisle, Chief Date Signed
Reactor Projects Branch 5
Division of Reactor Projects

SUMMARY

Scope:

This routine resident inspection was conducted on site in the plant operations area including partially submerged containment tendon in tendon pump area, painting in required ventilation zones, and Technical Specification 3.0.3 entry for chiller realignment; in the maintenance area including maintenance observations, surveillance observations, and previous inspection item follow up; in the engineering area including component cooling water modification deficiencies, calorimetric review follow up; and in the plant support area including a fire drill observation.

Results:

Plant Operations

The inspectors conducted plant tours and reviewed plant events. No problems were identified (paragraph 2.2).

ENCLOSURE

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A tendon end cover in the containment tendon sump area was identified partially submerged under water. The tendon end covers contain a seal to prevent water inleakage. An inspection followup item was identified to review the tendon inspection to be conducted during the Spring refueling outage (paragraph 2.3).

There is no method to track the total cumulative square feet painted in order to determine when 1000 ft² is exceeded and an engineering evaluation is needed. This lack of a method to control the total square feet painted in the areas where ventilation is required is considered to be a weakness in the painting program (paragraph 2.4).

The entry into Technical Specification 3.0.3 to realign chillers on the A train of the chilled water system was considered to be a conservative decision and an overall benefit to plant safety (paragraph 2.5).

Maintenance

Several maintenance activities were observed. No concerns were identified during the observation of these activities (paragraph 3.1).

Surveillance activities were observed. No concerns were identified during the observation of these activities (paragraph 3.2).

The corrective actions for a previously identified violation involving cleanliness controls were successfully completed and the violation was closed (paragraph 3.3).

Engineering

System and design engineering were routinely interfaced with to follow up on issues. These issues included a partially submerged containment tendon, painting in ventilation zones, motor bearing lubricants, fire protection, plant thermal performance, and main steam system safety valves (paragraph 4.1).

A chilled water/component cooling water (CCW) system post modification review identified two fire protection concerns involving postulated fires that require control room evacuation and fall under the alternative and dedicated shutdown capability required by Appendix R. One concern involved the use of repairs to transfer the control of the B train CCW pump from the control room to an alternate remote location. The second concern involved a hot short that could spuriously close the CCW supply to the oil cooler on the C charging pump when aligned to the B train (paragraph 4.2).

A non-cited violation was identified due to problems identified with the maintenance of procedures associated with plant calorimetric calculations and with overall programmatic controls for the calorimetric program (paragraph 4.3).

Plant Support

Aspects of plant support in the areas of radiological controls, physical security, and fire protection were routinely observed. No problems were identified (paragraph 5.1).

A fire drill and critique were observed. The inspectors' observations were conveyed to the evaluator (paragraph 5.2).

REPORT DETAILS

Acronyms used throughout this report are defined in paragraph 8.

1.0 Persons Contacted

Licensee Employees

- *Bacon, F., Manager, Chemistry Services
- Blue, L., Manager, Health Physics
- *Browne, M., Manager, Design Engineering
- Byrne, S., General Manager, Nuclear Plant Operations
- *Fields, C., Manager, Materials and Procurement
- *Fowlkes, M., Manager, Operations
- *Furstenberg, S., Manager, Maintenance Services
- Haselden, R., Supervisor, Instrumentation and Control
- *Hipp, T., Supervisor, Electrical Maintenance
- *Hunt, S., Manager, Quality Systems
- *Kelley, V., Coordinator, Emergency Services
- LaCoe, P., Supervisor, Test Unit
- *Lavigne, D., General Manager, Nuclear Safety
- *Lippard, G., Manager, Nuclear Licensing and Operating Experience
- *Loignon Jr., G., Operations
- Long, G., Supervisor, Mechanical Maintenance
- Moffat, G., Manager, Planning and Scheduling
- *Nesbitt, J., Manager, Technical Services
- O'Quinn, H., Manager, Nuclear Protection Services
- *Poole, J., Outage Planning
- *Proper, J., Manager, Nuclear Licensing and Operating Experience
- *Schafer, J., Health Physics
- Taylor, G., Vice President, Nuclear Operations
- *Taylor, T., Manager, Engineering Services
- *Waselus, R., Manager, Systems and Component Engineering
- White, R., Nuclear Coordinator, South Carolina Public Service Authority
- *Williams, G., Associate Manager, Operations

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation, and corporate personnel.

2.0 Plant Operations (71707, 40500)

2.1 Plant Status

The plant operated at or about full power during the entire inspection period.

2.2 General

The inspectors conducted frequent CR tours to verify proper staffing, operator attentiveness, and adherence to procedures. The inspectors attended daily plant status meetings and shift turnovers to maintain awareness of overall facility operations, and reviewed operator logs to verify operational safety and compliance with TS. Instrumentation and

safety system lineups were periodically reviewed from CR indications to assess operability. Frequent plant tours were conducted to observe equipment status and housekeeping. During the inspection period, the inspectors toured the Auxiliary Building and the Intermediate Building with the auxiliary operators during their rounds. The operators were knowledgeable of their duties.

ONOs were reviewed to assure that potential safety concerns were properly reported and resolved. The inspectors routinely attended plan of the day meetings where management discussed the details of the ONOs and proposed actions to resolve the issues.

2.3 Partially Submerged Containment Tendon in Tendon Sump Area

During a tour of the Auxiliary Building, the inspectors identified water in the containment tendon sump area (AB08-02). The level of the water was high enough to partially submerge the lowest containment tendon end cover. The licensee was notified and subsequently pumped the water from the sump area. The inspectors discussed this issue with engineering. Engineering explained that the tendon end cover included a seal to prevent water inleakage. To verify the integrity of the tendon end cover seal, the licensee plans to remove the end cover during the upcoming Spring refueling outage, check for water intrusion and sample the tendon grease. This inspection will be in addition to the tendon TS surveillance planned for the outage. Until the inspectors review the licensee's verification of the tendon integrity during the Spring 1996 refueling outage, this is identified as IFI 50-395/95-01-01, Partially Submerged Tendon Inspection.

The inspectors considered that the water in the tendon sump area was a housekeeping issue that could have been identified by operators during their rounds. This was discussed with licensee personnel.

2.4 Painting in Required Ventilation Zones

During the inspection period, the licensee modified the CR kitchen area. This modification included painting within the CR ventilation zone. The inspectors questioned the effects of the painting on the CR ventilation system. TS surveillance requirement 4.7.6.c includes a requirement that each CR normal and emergency air handling system be demonstrated operable following painting, fire or chemical release in any ventilation zone communicating with the system. This is to assure that charcoal in the filter can perform its intended safety function. Procedure OAP-111.1, Guidelines for Operations Department Special Instructions, revision 0, states, "Touchup painting in these areas is allowed up to 200 ft²/day or 1000 ft² total. Any painting in excess of these limits requires engineering evaluation."

The inspector reviewed the CR ventilation system and determined that this painting was acceptable because the normal CR ventilation system lineup has the filters isolated by maintaining the associated dampers

closed. However, the licensee does not have a method to track the total cumulative square feet painted in order to determine when 1000 ft² is exceeded and an engineering evaluation is needed. The inspectors consider this lack of a method to control the total square feet painted in areas where ventilation is required a weakness in the painting control program.

2.5 Technical Specification 3.0.3 Entry for Chiller Realignment

On January 26, at 4:38 pm, the licensee entered TS 3.0.3 for 20 minutes while transferring chillers on the B train of chilled water. Prior to entry into TS 3.0.3 the C chiller, the swing chiller, was operating on B train. The B chiller was in standby on B train and the inoperable A chiller was running on A train to purge air out of the chiller following maintenance. In order to ensure an operable chiller would be available on the A train before the expiration of the 72-hour LCOs for the applicable CCP, RHR pump, and spray pump the licensee decided to enter TS 3.0.3 and shift the C chiller to standby on the A train. When the B chiller was racked into the B train electrical bus while the C chiller was operating on the B train bus, the licensee considered the B train chillers inoperable. The inoperable B train chillers, in conjunction with the inoperable A chiller, put the plant in a condition not covered by TS and therefore caused the licensee to enter TS 3.0.3. The licensee subsequently realigned the chillers so that the B chiller was running on the B train bus (B train was the operable train), the C chiller was in standby on the A train bus, and the A chiller was inoperable and running.

Prior to the chiller realignment the licensee's TS guidance did not allow entry into TS 3.0.3 for any reason. The licensee reviewed their plan to enter TS 3.0.3 with the inspectors and NRC management, and revised their TS guidance before realigning the chillers. The revision to the TS guidance allows voluntary entry into TS 3.0.3 only in circumstances where entry will result in an overall improvement in plant safety. The inspectors concluded, after reviewing this issue, that the licensee's decision to realign the chillers and enter TS 3.0.3 was conservative and a safety benefit.

Within this area, one IFI and a weakness were identified.

3.0 Maintenance (62703, 61726, 92702)

3.1 Maintenance Observations

Station maintenance activities for the safety-related systems and components listed below were observed to ascertain that they were conducted in accordance with approved procedures, regulatory guides, and industry codes or standards and in conformance with TS.

The following items were considered during this review: limiting conditions for operation were met while components or systems were

removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; activities were accomplished by qualified personnel; parts and materials used were properly certified; and radiological and fire prevention controls were implemented. The following maintenance activities were observed:

- PMTSs: P0195188/P0195189, Visual Inspection Meg/Bridge and Lubricate RWST Sump Pump A/B Motor
- PMTS: P0193586, Visual Inspection Meg/Bridge and Lubricate Turbine Room Sump Pump A Motor
- PMTS: P0192969, Adjust Packing on MS Header C Power Relief Valve Isolation Valve
- WR: 95E3168, Replace Motor Bearings on Charging/SI Pump C Aux Oil Pump Motor

The inspectors observed portions of the oil pump motor bearing replacement. During the review of this replacement work, the inspectors determined that the electrical technician exhibited a good questioning attitude when engineering was contacted to determine the appropriate grease to be used in the bearing replacement.

While reviewing the calibration data for M&TE number FS4019, a Fluke meter, the inspectors identified a discrepancy between the calibration due date on the calibration document (3/7/96), and the calibration due date which had been recorded on the completed procedure data sheets (3/8/96). The licensee was notified and determined that the calibration sticker on the equipment was incorrect. The calibration sticker currently reflects the correct calibration due date.

- Electrical Equipment Inspection and Cleaning - B Train Service Pump Speed Switches, EMP-300.005, revision 6, section 7.

The inspectors observed electrical technicians perform an inspection of the B train SW speed switch cabinets. Several patches of peeling paint and paint chips were identified inside the cabinet. As a result, a NCN was prepared documenting the potential for the paint chips to affect relays and other devices in the cabinets. The NCN was resolved by cleaning and repainting the affected areas inside the cabinets.

3.2 Surveillance Observations

- Analog Channel Operational Test of Main Steam Line Radiation Monitor RMG0019A

The inspectors observed the performance of the Analog Channel Operational Test of Main Steam Line Radiation Monitor RMG0019A. This test was performed to surveillance test procedure STP-360.010, Main Steamline Area Radiation Monitors, RM-G19A, 19B, and 19C, Operational Test, revision 5. The inspectors observed procedure adherence and data collection by the I&C technicians. In addition, during performance of the test, the inspectors questioned the technicians concerning the data being collected and the installation of the test equipment. After the test was completed, the inspectors requested a copy of the data for this test, as well as, the previous test done on this monitor. The inspectors reviewed this data and the TS to verify that the test had been accomplished at the required frequency, and also, to verify that the test procedure met the intent of the testing required by the TS. The inspectors concluded that the test met the requirements of the TS and was performed in accordance with the procedure by personnel knowledgeable of the area. No deficiencies were observed regarding the performance of this test.

- RHR Pump and Valve Operability Test

The test was conducted by operations and the test group in accordance with STP-205.004, RHR Pump and Valve Operability Test, revision 2. The inspectors identified no concerns during the observation of this surveillance.

3.3 Previous Inspection Item Followup

(Closed) Violation 50-395/94-24-02, Failure To Have Adequate Work Instructions To Ensure Cleanliness Controls Were Properly Implemented.

This item was issued due to the licensee's failure to adequately maintain temporary secondary side manway cleanliness covers on SG A during the SG replacement work on October 25, 1994. The inspectors' review of the procedures associated with this work initially concluded that the procedures in effect were not sufficient to maintain system cleanliness. The licensee responded to this violation on December 16, 1994, and concluded that the root cause of the deficiency was not inadequate procedures but was personnel error. This conclusion was based on a review of the procedures in effect and interviews with personnel performing the work. In addition, the licensee determined that the covers had been installed but had fallen off due to tape failure. The licensee's immediate corrective action for this deficiency included performance of a secondary side inspection of the SG and reinstallation of the temporary manway cover. This action was documented in NCN 5114. In addition, the licensee provided training to personnel, which included lessons learned from this violation. The inspectors reviewed the NCN which documented the results of the SG A cleanliness inspection and evidence of the lessons learned training. The inspectors concluded that adequate actions had been completed to support closure of this item.

Within this area, no violations or deviations were identified.

4.0 On-Site Engineering (37551)

4.1 General

General engineering activities were reviewed to determine their effectiveness in preventing, identifying, and resolving safety issues, events, and problems. During the inspection period the inspectors interfaced routinely with system and design engineers to follow up issues. These issues included a partially submerged containment tendon, painting in ventilation zones, motor bearing lubricants, fire protection, plant thermal performance, and main steam system safety valves.

4.2 CCW Modification Deficiencies

During RFO 8 (Fall 1994), the licensee implemented a modification (MRF 22594) to change the lube oil cooling water source on the CCPs from the chilled water system to the CCW system. The implementation of this modification reduced concerns raised by the Summer IPE which indicated that a reduction in the core damage frequency could be achieved by providing a more reliable cooling source to the CCPs and the CCW pump motors. In general, CCW was found to be a more reliable cooling source than the chilled water system. This more reliable cooling source improved the reliability of RCP seal injection provided by CVCS and CCW cooling of the RCP thermal barrier. As part of the modification, new piping and valves were provided from the CCW system to the CCP lube oil coolers.

The fire hazards analysis assumes the capability for a safe shutdown sequence with the detection of a threatening fire with the reactor at full power. The first phase of this sequence is to place the plant in a stable hot standby condition. Specific systems are necessary to enable the plant to achieve hot standby. Prior to this modification, CCW was needed only to achieve cold shutdown in the licensee's original Appendix R fire protection analysis. Following the modification, parts of the CCW system became necessary to achieve and maintain hot standby to support the CCPs. During the preparation process, the full impact of the modification on the fire protection analysis was not recognized by the licensee. On January 16 during the post modification review of MRF 22594 the licensee identified two potential concerns that involved postulated fires requiring CR evacuation and fall under the alternative and dedicated shutdown capability of Appendix R.

The first concern addressed transferring control for the B train CCW pump from the CR to an alternate remote location. The criteria and interpretations of Appendix R require that control circuits needed for hot standby, when using the alternative shutdown capability, must be fully isolated from the control circuits in the CR. Operators would presently perform a procedure to ensure local control of the B train CCW pump by lifting leads to the pump's control circuitry. This was acceptable when the pump was only needed for cold shutdown, but does not meet the NRC guidance for hot standby equipment. The NRC has ruled that

repairs to systems and equipment required to achieve and maintain hot standby conditions are unacceptable. Repairs have been defined as any action requiring the use of tools or materials and includes removing fuses and installing jumper wires. The use of a repair procedure for the control of the CCW pumps was therefore not consistent with NRC guidance for hot shutdown equipment. The licensee is preparing a modification that would control the B train CCW pump without the need to perform a repair.

On January 18 the licensee identified a second Appendix R issue to the inspectors. The second concern relates to the cabling configuration in the relay room and cable spreading room for the C CCP lube oil cooling water inlet valve, XVG-9684C. The licensee identified that in all locations, except internal to an auxiliary relay panel and termination cabinet, the cables to the valve are protected against hot shorts by the use of dedicated conduits. However, within these two cabinets, the control circuit conductors are not protected against the potential for a hot short. This is a CCW system air operated solenoid valve that opens to admit cooling water into the C CCP lube oil cooler during pump operation. The valve solenoid must deenergize to open the valve. Normally when a CCP starts, its associated oil cooler inlet valve from CCW will open. The potential exists for the valve to spuriously close due to a hot short in the control circuitry of the valve during a fire emergency when the C CCP is aligned to the B train and is considered the only operable B train pump. This condition was not covered by the licensee's operating and emergency procedures.

As a compensatory action, the licensee is administratively restricting the use of the C CCP on B train. The licensee has also made procedural changes in FEP 1.0, Fire Emergency Procedure, revision 9, change A, to control the use of the C CCP or manually fail open valve XVG-9684C.

The licensee has assigned a team to review these problems identified with the CCW modification and determine their root cause. Pending further review and resolution of these modification problems, this issue is identified as URI 50-395/96-01-02, Resolution of Fire Protection Problems Associated With CCW System Modification.

4.3 Calorimetric Review Followup

(Closed) URI 50-395/95-20-02, Resolution of Quality and Programmatic Controls Affecting Calorimetric

This URI concerned programmatic deficiencies in the licensee's calorimetric program. During the review of the calorimetric program the inspectors identified two active procedures that were not being performed at the required intervals stated in the procedure. The inspectors found that the feedwater temperature normalization surveillance is now determined by ES-560.120, Feedwater Temperature Normalization Surveillance. Procedure ES-560.106, Calorimetric Parameter Normalization Surveillance, is redundant and no longer necessary. The inspectors also found that procedure ES-560.107,

Surveillance of Calorimetric and Heat Rate Results, is no longer necessary. Procedure ES-560.107 was used to assure that the error in the calorimetric results was less than two percent. The calorimetric is now based on a Westinghouse methodology documented in WCAP 13812, Westinghouse Revised Thermal Design Procedure Instrument Uncertainty Methodology, dated September, 1993, and endorsed by the NRC. This methodology determined the uncertainties associated with the instrumentation providing the calorimetric calculation inputs. The uncertainty calculated by this methodology is less than two percent.

The inspectors also identified that there were no programmatic controls for the computer software used in the calorimetric calculation. Changes to the software are done informally. A recent example of this was the revision to the moisture carryover constant following the last refueling outage. This software revision was made as part of the SG modification package since there was no formal mechanism to make software revisions. The licensee has acknowledged that there may be some conservatism built into the calorimetric software due to the moisture carryover constant being lower than actual and that potential calculation enhancements could be made with the plant computer upgrade. The licensee has also made an internal commitment to ISEG to develop more rigorous calorimetric program controls by May 1996.

The inspectors concluded that the deficiencies identified in this calorimetric program review had minor safety significance. The deficiencies indicated, however, a problem with the maintenance of safety related procedures in this area and a programmatic problem with calorimetric controls. This failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy. This item is identified as NCV 50-395/96-01-03, Deficiencies in Calorimetric Programmatic Controls. URI 50-395/95-20-02, Resolution of Quality and Programmatic Controls Affecting Calorimetric is closed.

Within this area, one NCV and one URI were identified.

5.0 Plant Support (71750)

5.1 General

During inspection activities and tours of the plant, the inspectors routinely observed aspects of plant support in the areas of radiological controls, physical security, and fire protection. The level of radiological protection controls applied to work activities observed was commensurate with the difficulty and risk associated with the task. Aspects of the fire protection program that were examined included transient fire loads, fire brigade readiness, and fire watch patrols. Effective implementation of the physical security program continued to be demonstrated during inspector observations of: security badge control; search and inspection of packages, personnel, and vehicles; tours and compensatory posting of security officers; and control of protected and vital area barriers.

5.2 Fire Drill Observation

On January 18 the inspectors observed a fire drill in the turbine building in the area of the feedwater pumps. The drill scenario consisted of a lube oil fire in a feedwater pump. The inspectors had several observations which were conveyed to the licensee evaluator following the drill. This drill was only for maintenance personnel on the fire brigade. The inspectors observed that: not all responders were wearing SCBAs in the fire area; initially the foam to fight the fire was not brought to the fire scene; the fire plan book was present but not used by the fire team; and the fire plan book was useable but in poor condition. The inspectors' observations were conveyed for resolution to the evaluator following the drill. The inspectors also observed the critique following the drill and concluded that both the drill and critique were useful training for the fire team. The licensee also stated that the fire book was being enhanced to be more useable at the fire scene.

Within this area, no violations or deviations were identified.

6.0 Other NRC Personnel on Site

None.

7.0 Exit

The inspection scope and finding were summarized on January 31, 1996, by B. R. Bonser with those persons indicated by an asterisk in paragraph 1. An interim exit was conducted on January 12, 1996, by R. D. Gibbs. The inspectors described the areas inspected and discussed in detail the inspection results. A listing of inspection findings is provided. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
IFI	50-395/96-01-01	Open	Partially Submerged Tendon Inspection (paragraph 2.3)
VIO	50-395/94-24-02	Closed	Failure To Have Adequate Work Instructions To Ensure Cleanliness Controls Were Properly Implemented (paragraph 3.3)
URI	50-395/96-01-02	Open	Resolution of Fire Protection Problems Associated With CCW System Modification (paragraph 4.2)
NCV	50-395/96-01-03	Closed	Deficiencies In Calorimetric Programmatic Controls (paragraph 4.3)

<u>Type</u>	<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
URI	50-395/95-20-02	Closed	Resolution of Quality and Programmatic Controls Affecting Calorimetric (paragraph 4.3)

8.0 Acronyms

CCP	Centrifugal Charging Pump
CCW	Component Cooling Water
CFR	Code of Federal Regulations
CR	Control Room
CVCS	Chemical and Volume Control System
DRP	Division of Reactor Projects
EMP	Electrical Maintenance Procedure
ES	Engineering Services
FEP	Fire Emergency Procedure
ft ²	Square Feet
I&C	Instrumentation and Control
IFI	Inspection Followup Item
IPE	Individual Plant Examination
ISEG	Independent Safety Engineering Group
LCO	Limiting Condition for Operation
M&TE	Maintenance and Test Equipment
MS	Main Steam
NCN	Nonconformance Notice
NCV	Non-Cited Violation
NPF	Nuclear Production Facility [Type of license]
NRC	Nuclear Regulatory Commission
OAP	Operations Administrative Procedure
ONO	Off Normal Occurrence
PMTS	Preventive Maintenance Task Sheet
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RHR	Residual Heat Removal
RM	Radiation Monitor
RWST	Refueling Water Storage Tank
SCBA	Self-Contained Breathing Apparatus
SG	Steam Generator
SI	Safety Injection
STP	Surveillance Test Procedure
SW	Service Water
TS	Technical Specification
URI	Unresolved Item
VIO	Violation
WR	Work Request