



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

Report No.: 50-395/90-27

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

Docket No.: 50-395

License No.: NPF-12

Facility Name: V. C. Summer

Inspection Conducted: October 1 - 31, 1990

Inspector: *Robert C. Haag* 11/16/90  
Robert C. Haag, Senior Resident Inspector Date Signed

Approved by: *Floyd S. Cantrell* 11/16/90  
Floyd S. Cantrell, Section Chief Date Signed  
Division of Reactor Projects

SUMMARY

Scope:

This routine inspection was conducted by the resident inspector onsite in the areas of monthly surveillance observations, monthly maintenance observation, operational safety verification, onsite follow-up of written reports of nonroutine events at power reactor facilities, and onsite follow-up of events at operating power reactors. Selected tours were conducted on backshift or weekends. Backshift or weekend tours were conducted on five occasions.

Results:

The plant operated at or near 100 percent power throughout the inspection period. A failure to obey radiological contamination controls was identified by the inspector during a preventive maintenance activity on a reactor building spray pump motor (paragraph 3). Testing and repair activities for early warning system sirens lacked timely notification of siren failures and resulting corrective action (paragraph 4). The identification of a design deficiency for the chilled water system expansion tank indicated an indepth review by engineering personnel during a system related engineering evaluation (paragraph 6.b). An inspector follow-up item was identified on the stroke time testing accuracy for air operated valves (paragraph 6.a).

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*W. Baehr, Manager, Chemistry and Health Physics
- \*K. Beale, Supervisor, Emergency Services
- \*C. Bowman, Manager, Maintenance Services
- \*M. Browne, Manager, Systems Engineering & Performance
- \*B. Christinsen, Manager, Technical Services
- \*H. Donnelly, Senior Engineer, Nuclear Licensing  
S. Furstenberg, Associate Manager, Operations
- \*G. Gibson, Manager, Nuclear Protection Services  
D. Goldston, Supervisor, Test Unit  
D. Haile, Engineer, Nuclear Licensing
- \*W. Higgins, Supervisor, Regulatory Compliance
- \*A. Koon, Manager, Nuclear Licensing
- \*D. Moore, General Manager, Station Support  
K. Nettles, General Manager, Nuclear Safety  
H. O'Quinn, Associate Manager, Maintenance Services
- \*C. Price, Manager, Technical Oversight
- \*J. Proper, Associate Manager, Quality Services
- \*M. Quinton, General Manager, Engineering Services
- \*L. Shealy, Senior Engineer, ISEG  
S. Skidmore, Engineer, Design Engineering
- \*J. Skolds, Vice President, Nuclear Operations  
G. Sault, General Manager, Nuclear Plant Operations
- \*G. Taylor, Manager, Operations
- \*M. Williams, General Manager, Administrative & Support Services  
K. Woodward, Manager, Nuclear Operations Education and Training

Other licensee employees contacted included engineers, technicians, operators, mechanics, security force members, and office personnel.

\*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

### 2. Monthly Surveillance Observation (61726)

The inspector observed surveillance activities of safety related systems and components listed below to ascertain that these activities were conducted in accordance with license requirements. The inspector verified that required administrative approvals were obtained prior to initiating the test, testing was accomplished by qualified personnel in accordance with an approved test procedure, test instrumentation was calibrated, limiting conditions for operation were met. Upon completion of the test,

the inspection verified that test results conformed with technical specifications and procedure requirements, test results were reviewed by personnel other than the individual directing the test, any deficiencies identified during the testing were properly reviewed and resolved by appropriate management personnel, and the systems were properly returned to service. Specifically, the inspector witnessed/reviewed portions of the following test activities:

- \* STP-345.037, Train "A" solid state protection system actuation logic and master relay test.
- \* STP-105.003, Safety injection valve operability test. The inspector observed retest of the accumulator fill check valve XVC08861. During the initial test, pressure on the test gauge used for back leakage indication spiked high. After several flushing evolutions, the valve reseated during the test and the STP was satisfactorily completed. However, the licensee informed the inspector that additional engineering oversight would be provided for future testing of the check valve to determine if additional corrective action is needed.
- \* STP-105.001, Quarterly test of "B" charging/safety injection pump.
- \* STP-115.002, Reactor building air lock test. The inspector observed the RB personnel air lock barrel test and the retest of the interlock mechanism for the escape air lock. The initial interlock test failed when the outer door vent valve opened while the inner door was open. This potential release pathway defeated the intent of the interlock mechanism. This condition was corrected by repairing shaft couplings. During the repair activity the licensee identified that the technical manual for the escape air lock stipulates a maximum force of 30 pounds when using the levered arm operating mechanism. The licensee believes that excessive force may have contributed to the interlock malfunction and to the extended repair effort. During the retest a spring scale was used to ensure that less than 30 pounds of force was used to open the air lock door. The inspector questioned the licensee to determine if the 30 pound maximum force was critical to the operability of the interlock mechanism, and if additional actions were needed to prevent the use of excessive force during future door openings. After reviewing this issue the licensee installed permanent signs with operating instructions at the air lock. Included in the instructions were requirements to control the force used when opening the air lock doors.
- \* STP-503.002, Calibration of the thermal overload protection devices for motor operated valves XVG3108D and XVG3109D (RB cooler 2B inlet and outlet valves).

No violations or deviations were identified.

### 3. Monthly Maintenance Observation (62703)

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: that 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, quality control records were maintained, activities were accomplished by qualified personnel, parts and materials used were properly certified, and radiological and fire prevention controls were implemented. Work requests were reviewed to determine the status of outstanding jobs and to ensure that priority was assigned to safety-related equipment maintenance that may affect system performance. The following maintenance activities were observed:

- \* Investigation and repair of the erratic reading from loop "B" service water temperature indicator ITI-4510 (MWR 9001/51)
- \* Preventive maintenance on "B" service water traveling screen (PMTS P0137220)
- \* Preventive maintenance on the "A" reactor building spray pump motor (PMTS P0133417). The work involved visual inspections, changing the motor bearing oil and meggering the motor. The inspector noted that the electricians were not wearing any protective clothing while changing the oil even though the motor and pump were roped off as a contaminated area. The inspector questioned the licensee concerning radiological practices while working in a contaminated area. The licensee responded that the "Contaminated Area" sign, which included a statement to contact HP prior to entry, allows the HP's to establish protective clothing requirements. Additionally, the licensee stated that prior to performing the work, the electricians were informed of the the need to wear protective gloves when working on the motor. A health physics problem report was subsequently initiated. Resulting action involved counseling the electricians on the errors committed and informing the remaining electricians of the event and the need to obey radiological postings. This NRC identified violation is not being cited because criteria specified in Section V.A of the NRC Enforcement Policy were satisfied.
- \* Addition of lube oil to the "A" emergency diesel generator. Approximately 110 gallons of oil was added to the diesel. The licensee stated that this was the first oil addition since the oil was changed out during the last refueling outage. For approximately

five months after the outage, the diesel had been tested on a seven day interval due to previous failures of the diesel. Based on these numerous diesel starts the licensee stated that it was not unusual to add this quantity of lube oil.

- \* Investigation and repair of the governor speed control for the emergency feedwater pump turbine TPP-008 (NCN 4046). Initially, the turbine tripped on low lube oil pressure during a surveillance trip. The applicable 72 hour TS LCO was entered. Replacement of a relief valve which regulates lube oil pressure resolved the low lube oil trip problem. During the subsequent retest the licensee was unable to obtain proper speed control from the control room or from the local speed control knob on the governor. Several adjustments and maintenance test runs were performed before the licensee thought the speed control problem was corrected. During the next retest effort, which took place on the third day of the 72 hour LCO, turbine speed dropped when a load (flow through the pump) was placed on the turbine. A Woodward governor technical representative was brought onsite and he completed additional adjustment of the governor. The STP was then satisfactorily performed and the turbine was declared operable with three hours remaining on the 72 hour LCO. The inspector considers this repair activity an additional example of the licensee's need to improve their technical expertise for the turbine governor controls (previously identified in Inspection Report 50-395/90-22). The licensee should continue with previous efforts to improve the technical knowledge of Woodward governors among plant personnel.

No violations or deviations were identified.

#### 4. Operational Safety Verification (71707)

- a. The inspector conducted daily inspections in the following areas: control room staffing, access, and operator behavior; operator adherence to approved procedures, TS, and limiting conditions for operations; examination of panels containing instrumentation and other reactor protection system elements to determine that required channels are operable; and review of control room operator logs, operating orders, plant deviation reports, tagout logs, jumper logs, and tags on components to verify compliance with approved procedures.

The inspector conducted weekly inspections in the following areas: verification of operability of selected ESF systems by valve alignment, breaker positions, condition of equipment or component(s), and operability of instrumentation and support items essential to system actuation or performance.

Plant tours included observation of general plant/equipment conditions, fire protection and preventative measures, control of activities in progress, radiation protection controls, physical security controls, plant housekeeping conditions/cleanliness, and missile hazards.

The inspector conducted biweekly inspections in the following areas: verification review and walkdown of safety related tagout(s) in effect; review of sampling program (e.g., primary and secondary coolant samples, boric acid tank samples, plant liquid and gaseous samples); observation of control room shift turnover; review of implementation of the plant problem identification system; verification of selected portions of containment isolation lineup(s); and verification that notices to workers are posted as required by 10 CFR 19.

Selected tours were conducted on backshifts or weekends. Inspections included areas in the cable vaults, vital battery rooms, safeguards areas, emergency switchgear rooms, diesel generator rooms, control room, auxiliary building, containment, cable penetration areas, service water intake structure, and other general plant areas. Reactor coolant system leak rates were reviewed to ensure that detected or suspected leakage from the system was recorded, investigated, and evaluated; and that appropriate actions were taken, if required. On a regular basis, RWP's were reviewed and specific work activities were monitored to assure they were being conducted per the RWP's. Selected radiation protection instruments were periodically checked, and equipment operability and calibration frequency were verified.

In the course of monthly activities, the inspector included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital areas access controls; searching of personnel, packages and vehicles; badge issuance and retrieval; escorting of visitors; and patrols and compensatory posts.

- b. On October 5, 1990, the inspector was informed by emergency preparedness personnel that both early warning sirens in zone B-1 had failed the growl test. Procedure EPP-022, Verification of Communications Operability, provides instructions for performing the test and required actions for siren failures. Per EPP-022, a zone is considered inoperable if less than 50 percent of the sirens are operable. A note on the growl test data sheet requires that the emergency planning unit or shift supervisor be notified immediately when a zone is determined to be inoperable. The electricians, who performed the growl test, actually discovered that zone B-1 sirens were inoperable on October 4, 1990, but did not make the immediate

notification until the following day. After the emergency planning unit was notified of the siren failures, the remaining notifications required by EPP-022 were made in a timely manner. Notification of the communications department for repair of the sirens was made at that time. Subsequently, the inspector was informed that the sirens were repaired on October 8, 1990.

Based on the length of time (four days) from the discovery to the repair of the sirens, it does not appear that the licensee took corrective actions for an inoperable zone of the early warning siren system. The inspector expressed concern that personnel involved with testing and repair of sirens may lack the sensitivity to ensure that timely resolution or compensatory measures are taken for inoperable zones of the siren system. For 1990, the average failure rate during the monthly growl test has been 9 percent. In addition, 39 inadvertent actuations of sirens have occurred in 1990 which also rendered the sirens inoperable. With the large number of siren failures, the inspector believes the licensee should be sensitive to the criteria for zone operability and the resulting actions necessary for timely repairs. The licensee informed the inspector that the electricians performing the growl test would be re-instructed on the critical aspects of EPP-022, and that the communication department would be re-instructed in the requirement for siren repairs to be made in a timely manner. The licensee has also been planning to replace the radio activation portion of the early warning siren system, however, this modification is not scheduled for completion until late 1991.

No violations or deviations were identified.

5. Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities (92700)

The inspector reviewed the following LER's to ascertain whether the licensee's review, corrective action and report of the identified event or deficiency was in conformance with regulatory requirements, TS, license conditions, and licensee procedures and controls.

(Closed) LER's 89-11 and 89-15, Manual reactor trips due to lifting of pressurizer safety valves. The licensee determined the cause of both events was the loss of the loop seal for the safety valves. Both valves had initial seat leakage, which caused an increase in the loop seal temperature. As leakage increased, loop seal temperature increased correspondingly until the loop seal was finally lost. This caused a reduction in the lift setpoint of the safety valves and the premature lifting of the "C" valve in May, 1989, and "A" valve in August, 1989. During the last refueling outage, modifications were completed to remove the loop seals for the three pressurizer safety valves. Temperatures were closely monitored during the plant startup to ensure the valves were properly performing. Seat leakage from the safety valves, which is monitored as a function of the daily RCS leakage, has been negligible since the refueling outage.

(Closed) LER 90-03, Computer software error which resulted in a nonconservative setpoint calculation for the RB purge exhaust radiation monitor. This condition had existed since the initial startup of the plant in October, 1982. A review of previous releases verified that the instantaneous release limits of TS had not been exceeded. The computer software used in the setpoint calculation for the RB purge exhaust radiation monitor was corrected. The procedures and software for all other effluent monitor setpoints were reviewed to ensure compliance with the ODCM and TS. No additional errors were identified.

6. Onsite Follow-up of Events at Operating Power Reactors (93702)

- a. While performing diagnostic testing on air operated isolation valves in the VU system, the licensee discovered the actual stroke time for valve XVT6490A was four to five seconds, while the recent STP stroke time was 1.8 seconds. A previous NCM disposition had addressed isolation valve stroke times which exceeded the 1.5 second design basis value. In the NCM disposition, the 1.8 second stroke time was used in the operability evaluation for the VU system. After the licensee discovered the actual stroke time was greater than 1.8 seconds, XVT6490A was tagged closed which allowed continued VU system operation.

Several days later the inspector noted that the position of the limit switch for valve XVT6490B appeared similar to the limit switch arrangement for XVT6490A. The licensee believes that the incorrect positioning of XVT6490A limit switch caused the erroneous STP stroke time. The inspector was concerned that the STP stroke time for XVT6490B may not have reflected actual valve stroke time. While reviewing this concern and the finalized diagnostic test data, the licensee noted that a small deviation may exist between the actual and STP stroke times for XVT6490B. While evaluating this difference the licensee tested the remaining four isolation valves in the VU system. The actual stroke times for these valves were approximately five seconds greater than previous STP values. The resulting actions from the NCM evaluation included raising the low level setpoint for the VU system expansion tank and modifying the alignment of the nonessential portions of the VU system. Additionally, the licensee reviewed the previous STP stroke times for other air operated valves and compared them with the minimum design basis stroke times. The licensee stated that for these valves the margins between minimum and the STP stroke times were large enough to compensate for possible error in stroke time measurements. While the amount of margin addresses the immediate operability concern for other air operated valves, the issue of accuracy for STP stroke time testing for air operated valves has not been resolved. The licensee informed the inspector that they are reviewing this issue to determine which areas of the test program require improvement. Final resolution and inspector review of the air operated valve test program is identified as Inspector Follow-up Item (IFI) 395/90-27-01.



- b. On October, 26, 1990, the licensee identified a design deficiency in the chilled water system. The deficiency involved the ability of the expansion tank to provide sufficient system makeup water in the event of a non-seismic line break. The VU system has two independent trains with a separate expansion tank for each train. Four air operated valves in each train isolate non-essential loads from the essential portion of the VU system. The isolation valves receive a closed signal from a safety injection actuation or an expansion tank low level signal.

During a review of the stroke times for these isolation valves, the licensee questioned the ability of the expansion tank, with a 3/4 inch surge line, to provide timely indication of a piping break or provide sufficient make up until a break was isolated. The licensee's architect and engineering firm reviewed this concern and concluded that the safety function of the VU system could not be assured following a pipe rupture. A postulated seismic event could result in a common mode failure of both trains of VU. Possible components effected by the loss of cooling water flow are various safety related room coolers, charging pump gear and oil coolers, and component cooling water pump motor jacket coolers. The licensee made the appropriate one-hour report per 10 CFR, Part 50.72. Gilert/Commonwealth also made a 10 CFR, Part 21 report concerning the design deficiency.

The licensee's immediate corrective action was to close the eight valves which isolated non-essential portions of the VU system. Additional action was taken to monitor and compensate for the loss of cooling water to various non-safety related areas. Several options are being reviewed by the licensee for permanent resolution to this problem. The inspector will follow the licensee's corrective actions including any additional measures that may result from the ongoing monitoring program. Documentation of the inspector's follow-up review will be included in the close out of the LER and Part 21 addressing this issue.

No violations or deviations were identified.

#### 7. Other Areas

Two regional inspections were performed at the Summer Plant during this inspection period. The first inspection involved material control and accountability, while the second inspection dealt with the radiological effluent and primary chemistry programs.

#### 8. Exit Interview (30703)

The inspection scope and findings were summarized on November 6, 1990, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed the inspection findings.

The error in contamination controls during a preventive maintenance task was discussed with the licensee and the need for management to identify if this was an isolated case or if additional corrective measures are needed. An apparent lack of sensitivity while testing and repairing early warning system sirens was also discussed with the licensee. The inspector noted that the identification of the VU system design deficiency was a result of indepth reviews and questioning by engineering personnel.

No dissenting comments were received from the licensee. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during the inspection.

#### 9. Acronyms and Initialisms

EPP	Emergency Planning Procedure
ESF	Engineered Safety Feature
HP	Health Physics
IFI	Inspector Follow-up Item
LCO	Limiting Conditions for Operations
LER	Licensee Event Reports
MWR	Maintenance Work Request
NCN	Non-Conformance Notice
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ODCM	Offsite Dose Calculation Manual
PMTS	Preventive Maintenance Task Sheet
RB	Reactor Building
RWP	Radiation Work Permits
SPR	Special Reports
STP	Surveillance Test Procedures
TS	Technical Specifications
VU	Chilled Water