



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

Report No.: 50-395/86-06

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

Docket No.: 50-395

License No.: NPF-12

Facility Name: V. C. Summer

Inspection Conducted: February 1 - 28, 1986

Inspectors: Hugh C. Dance / for 3/10/86
Richard L. Prevatte Date Signed

Hugh C. Dance / for 3/10/86
Perry O. Hopkins Date Signed

Approved by: Hugh C. Dance 3/10/86
Hugh C. Dance, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This routine, announced inspection involved 218 resident inspector-hours on site in the areas of Licensee action on previous enforcement matters, onsite followup of events and subsequent written reports, monthly surveillance observations, monthly maintenance observations, ESF System walkdown, operational safety verification, onsite followup of events at operating reactors, plant physical protection and cold weather preparation.

Results: Two violations were identified: (1) Loop "B" component cooling water and service water pumps were out of service for a period of greater than 72 hours due to incorrect electrical alignment; (2) Hourly fire watch not maintained for an inoperable fire barrier.

An enforcement conference was held on February 28, 1986, in the Region II office to discuss the first violation.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- +*D. Nauman, Vice President, Nuclear Operations
- +*O. Bradham, Director, Nuclear Plant Operations
- *B. Croley, Deputy Director, Operations and Maintenance
- +*K. Woodward, Manager, Operations
- +*J. Skolds, Group Manager, Technical and Support Services
- *M. Quinton, Manager, Maintenance Services
- +*M. Browne, Manager, Technical Support
- *G. Putt, Manager, Scheduling and Materials Management
- +*M. Williams, Manager, Nuclear Education and Training
- *L. Blue, Manager, Support Services
- *S. Hunt, Manager, Quality Assurance Surveillance Systems
- +*A. Koon, Associate Manager, Regulatory Compliance
- *J. Sefick, Manager, Nuclear Security
- *B. Williams, Supervisor, Operations
- + R. Clay, Manager, Nuclear Engineering
- + W. Williams, Santee Cooper, Special Assistant, Nuclear Operations
- + R. J. Waselus, Supervisor, Electrical Engineering

Nuclear Regulatory Commission - Region II

- + R. D. Walker, Deputy Regional Administrator
- + A. F. Gibson, Director, Division of Reactor Safety
- + H. C. Dance, Section Chief, Division of Reactor Projects
- + L. Modenos, Enforcement Specialist
- +*R. Prevatte, Senior Resident Inspector

+Attended Enforcement Conference on February 28, 1986.

*Attended exit interview on March 4, 1986.

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

2. Exit Interview (30702,30703)

The inspection scope and findings were summarized on March 4, 1986, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed the inspection findings. Two violations were identified.

Violation 86-06-01: System electrical alignment errors rendered the "B" Train of component cooling water inoperable for an automatic start on an ESF Actuation and allowed operation of a technically inoperable service water pump for the "B" service water train for a period in excess of the 72 hours allowed by technical specifications (TS). This was a violation of TS 3.7.3, 3.7.4, and 6.8.1. An enforcement conference was conducted in the Region II

office on February 28, 1986, to discuss this problem. Corrective actions taken and planned by the licensee are discussed in Paragraph 9 of this report. Personnel in attendance are shown in Paragraph 1.

Violation 86-06-02: Fire watch log errors resulted in the failure to maintain an hourly fire watch patrol for a degraded fire barrier. This was a violation of TS 3.7.10. See paragraph 8 of this report.

The licensee offered no objections to the above violations but stated that their corrective action should prevent recurrence. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters (92702)

(Closed) Violation 85-15-04, Use of individual cell charger on Class IE battery: The licensee provided a written response to this violation in a letter to Region II dated June 21, 1985. The inspector reviewed the licensee's response and the procedural changes implemented by the licensee to prevent a recurrence of this item. The controls as delineated in Electrical Maintenance Procedure (EMP) 115.004 appear adequate to preclude recurrence.

(Closed) Unresolved Item 85-38-01: This item involved the use of telephone to meet Nuclear Safety Review Committee (NSRC) Quorum Requirements. The licensee had committed to require that a quorum be physically assembled at one location to meet the minimum requirements as required by technical specifications. This item is closed.

4. Onsite Followup of Events and Subsequent Written Reports of Nonroutine Events at Power Reactor Facilities (92700)

The inspector reviewed the following Licensee Event Reports (LER) and Special Reports (SPR) to ascertain whether the licensee's review, corrective action and report of the identified event and associated conditions were adequate and in conformance with regulatory requirements and licensee procedures and controls. Based upon this review the following items are closed:

(Closed) Part 21-80-01, Failed D/G Engine Thrust Bearing Due to Plug Installation.

(Closed) LER 84-049, Reactor Trip: An I & C technician inadvertently imposed a test signal on the output of N-44 power range channel.

(Closed) LER 84-048, Unmonitored Liquid Release: The cause of this event was due to an improper valve line-up.

(Closed) LER 84-027, Maintenance Activities Associated With Feedwater Regulating Valves.

(Closed) SPR 85-001, Power Level Increase Above 100% During Boron Dilution.

(Closed) SPR 84-017, Diesel Generator Ground And Governor Problems.

(Closed) SPR 84-012, Inoperable Steam Line High Range Gamma Monitor.

No violations or deviations were identified.

5. Monthly Surveillance Observation (61726)

The inspectors observed surveillance activities of safety-related systems and components to ascertain that these activities were conducted in accordance with license requirements. The inspectors observed portions of selected surveillance tests including all aspects of one major surveillance test involving safety-related systems. The inspectors also verified that the required administrative approvals were obtained, that the testing was accomplished by qualified personnel, that test instrumentation was properly calibrated, that data met TS requirements, that test discrepancies were rectified, and that the systems were properly returned to service. The following specific surveillance activities were observed:

STP112.001	Reactor Building Spray Valves Monthly Verification
STP102.002	NIS Power Range Heat Balance
STP138.001	Post Accident Hydrogen Removal Valve Operability Test
STP116.001	Reactor Building Cooling Units Functional Test
STP117.001	Iodine Removal System Monthly Test
STP125.002	Diesel Generator Weekly Operability Test
STP106.001	Moveable Rod Insertion Test
STP345.039	Reactor Trip P-4 Trip Actuation Device Operability Test
STP395.038	Steam Generator "B" Steam/Feedwater Flow Instrumentation Calibration
STP122.002	Component Cooling Pump Test
STP134.001	Shutdown Margin Calculation

No violations or deviations were identified.

6. Monthly Maintenance Observation (62703)

The inspectors observed maintenance activities of safety-related systems and components to ascertain that these activities were conducted in accordance with approved procedures, TS and appropriate industry codes and standards.

The inspectors also determined that the procedures used were adequate to control the activity and were accomplished by qualified personnel. The inspectors verified that equipment was properly tested before being returned to service. Additionally, the inspectors reviewed several outstanding job orders to determine that the licensee was giving priority to safety-related maintenance and a backlog which might affect its performance was not developing on a given system. The following specific maintenance activities were observed:

MWR8610172	Investigation of Component Cooling Water Pump "C" Electrical Problems
MWR85E0316	Inspection/Repair Of Torque Switch For Valve XVBO 3112C-0-SW.
MWR85E0326	Inspection/Repair Of Torque Switch For Valve XVGO 3113C-0-SW.
MWR206970004	Repair Conduit for Component Cooling Water Pump "B" Per MCN 20697-D.
MWR860303	Investigate Malfunction Of Rod Control System.
MMP180006 &	Diesel Generator "A" Fuel Oil System Inspection And PMST P0069425 Maintenance.

No violations or deviations were identified.

7. ESF System Walkdown (71710)

The inspectors verified the operability of an engineered safety features (ESF) system by performing a walkdown of the accessible portions of the Emergency Feedwater System. The inspectors confirmed that the licensee's system lineup procedures matched plant drawings and the as-built configuration. The inspectors looked for equipment conditions and items that might degrade performance (hangers and supports were operable, housekeeping, etc.) and inspected the interiors of electrical and instrumentation cabinets for debris, loose material, jumpers, evidence of rodents, etc. The inspectors verified that valves, including instrumentation isolation valves, were in proper position, power was available, and valves were locked as appropriate. The inspectors compared both local and remote position indications.

No violations or deviations were identified.

8. Operational Safety Verification (71707)

The inspectors observed licensee activities to ascertain that the facility was being operated safely and in conformance with regulatory requirements, and that the licensee's management control system is effectively discharging its responsibilities for continued safe operation. Inspection included observation of control room staffing, and shift turnovers, tours of the facility, interviews and discussions with licensee personnel, verification of safety system status, and reviewing facility records.

On February 14, 1986 a review by the licensee identified that the TS Channel Checks for steam generator levels and steam pressure on steam generator "B" and "C" were not recorded on the 16-24 watch on January 29, 1986. TS 4.3.1.1 requires these channel checks at least once per 12 hours. This requirement was exceeded by 1 hour 55 minutes plus allowable tolerance. Subsequent readings indicated that these parameters were within their allowable ranges. Associated annunciators and protective devices would have provided alarms if these parameters had exceeded their limits during this period. It has been determined that this was not a recurring type deficiency. The licensee has counseled the operators and other personnel who reviewed these records as to the seriousness of this deficiency. This is a violation; however, since the Commission wishes to encourage and support licensee initiative for self identification and correction of problems and since this item meets the applicable criteria of 10 CFR 2, Appendix "C", no Notice of Violation will be issued.

On February 22, 1986 with the plant in Mode 1, the licensee, while reviewing firewatch records identified that the fire watch for Auxiliary Building Room AB12-07 (Fire Barrier Removal permit 860046) had been deleted from the hourly fire watch patrol log at 11:00 a.m. on February 20, 1986 and was not reestablished until 12:00 a.m. on February 22, 1986. The fire barrier was not inspected for a period of approximately 47 hours. This is contrary to the requirements of TS 3.7.10 which requires the licensee to establish and maintain hourly fire watches for inoperable fire barriers. This incident is similar to deviation 395/85-26-17. This is a violation: Failure to maintain hourly Fire Watch (86-06-02).

One violation was identified as noted.

9. Onsite Followup of Events at Operating Reactors (93702)

While operating in Mode 1 at 100 percent reactor power on February 2, 1986 at 8:05 p.m. a reactor trip occurred. This resulted from a main feedwater pump trip on low suction pressure and subsequent turbine trip and reactor trip. This trip resulted from a circuit being deenergized for maintenance on the condensate polishers. Deenergizing this circuit resulted in the condensate polisher bypass valve (XVG-690C0) closing. Since the condensate polishers were not in operation, all condensate flow to the deaerating tank was lost. This resulted in a loss of feedwater flow to the main feedwater pumps and the subsequent trip.

The cause of this incident was the incorrect listing for this electrical circuit contained in the General Maintenance Procedure (GMP) 112.000 load list. This list did not indicate any power supply to the polisher bypass valve. The listing for the circuit that was deenergized specifically noted that opening this circuit would not interrupt condensate flow. The licensee has corrected this deficiency and has implemented a program for reverification of this list. The inspector will verify completion of these activities as a part of the routine inspection program. This item will be tracked as an Inspector Followup Item: electrical load list (IFI 86-06-03).

While conducting the recovery and startup from the reactor trip that occurred on February 2, 1986, a safety injection occurred at 7:41 a.m. on February 3, 1986. The reactor was critical at approximately 10 percent power and the main turbine was in the process of being rolled up to 1800 rpm. With the speed increasing at a selected rate of 10 percent/minute, spurious operation of the Electric Hydraulic Control System or the turbine control valves resulted in a "jump" in turbine speed from approximately 400 to approximately 1000 rpm. This large steam demand resulted in a safety injection signal being generated from a 2/3 logic of low steam pressure on the main steam lines. All systems with the exception of component cooling water (CCW) loop "B" responded as required. The "B" CCW pump was manually started by the operator. The safety injection (SI) was terminated in approximately five minutes since primary and secondary system parameters were well above any setpoints that require a SI after the unit had tripped.

An investigation by the licensee and the resident inspector into the circumstances as to why CCW "B" pump failure to automatically start revealed that the pump had been tagged out of service at 7:30 p.m. on January 27, 1986 to accomplish maintenance work request (MWR) 20697004. This work was to perform repairs on electrical conduit CCM 22B per modification 20697. When this pump was taken out of service, CCW pump "C" (swing pump) was aligned to loop "B" to provide service for the idle CCW loop. The work on this system was completed and inspected on January 29, 1986 and the clearance tags were removed at 11:00 a.m. on January 30, 1986. Although this component was still listed as inoperative, in the removal and restoration (R & R) log, a routine scheduled surveillance test was successfully conducted and the pump was run on February 1, 1986. The clearance tag was not replaced on the "B" pump after the test was completed. When the clearance tags were removed at 11:00 a.m. on January 30, 1986, and the breaker was racked up on "B" pump, with "C" pump still aligned to "B" loop, this electrical alignment prevented either "B" or "C" pumps from starting automatically in response to an SI signal. This deficiency in alignment, which rendered the "B" loop of CCW inoperable for automatic start, was discovered as a part of the post trip review after the SI on February 3, 1986. The MWR on CCW "B" pump was then completed, the R & R cleared, and CCW "B" was restored to a correct system alignment at 5:30 p.m. on February 3, 1986. This incident resulted in "B" and "C" CCW pumps, supplying loop "B" of CCW, being inoperable for a period of approximately 100 hours. "B" and "C" pumps were operable from the main control board and as noted above "B" CCW pump was manually started after the SI as required by emergency operating procedures.

The above is contrary to the requirements of TS 3.7.3 which requires that at least two independent component cooling water loops be operable in Modes 1,2,3 and 4. The action statement in the limiting conditions for operation permit operation for 72 hours with one loop inoperable. The "B" loop CCW inoperability is an example of the violation discussed below.

During this investigation it was also determined that the following similar problems existed in the service water system. Service water (SW) pump "C" was removed from service at 7:30 p.m. on January 29, 1986 to accomplish MWR

85E0316 (inspection/repairs to the torque switch for the service water pump discharge valve) and MWR 85E0326 (inspection/repairs to the screen wash pump discharge valve). The subsequent tagout, valve and system alignment rendered the pump inoperable and it was logged in the R & R log at 7:35 p.m. on January 29, 1986.

The work was completed and the clearance tag was removed at 8:00 p.m. on January 30, 1986. "C" SW pump was aligned to "B" loop, "B" pump was stopped and "C" was started to permit testing of "C" SW pump between the hours of 12:36 a.m. and 8:55 a.m. on January 31, 1986. The electrical alignments accomplished at this time rendered "B" SW pump inoperable to automatically start on an SI signal. There is no documentation to indicate that the test was completed on this shift. Discussions with shift personnel indicate that it was tested satisfactorily and had been intended to declare the pump operable after the associated paperwork had been completed. The "C" pump was left running even though it was still logged as inoperable in the R & R log.

The post trip review and recovery following the reactor trip occurred at 8:05 p.m. of February 2, 1986 required that system alignment be verified by operations prior to mode changes. In addition to the above, the "Conduct of Operations" procedure (SAP 200) requires that the shift supervisor, the Control Room Supervisor, the Operator At The Controls and the Shift Technical Advisor review the R & R log each shift and verify plant and system alignments. The SI previously discussed occurred at 7:41 a.m. on February 3, 1986. The "C" SW pump remained running until this item was identified by the Senior Resident Inspector as part of the post trip review on February 3, 1986. After identification of this item, the associated MWR's were closed, the "C" pump was retested, and declared operable and correct breaker alignment were then made to insure operability of the "B" pump and loop "B" at 6:15 p.m. on February 3, 1986. The above incident had resulted in operating "C" SW pump after maintenance on its discharge valve without a documented retest and the only operable pump "B" being unable to automatically respond to an accident signal for a period of approximately 100 hours. "B" SW pump was operable manually from the main control board during this period.

The above is contrary to the requirements of TS 3.7.4 which requires that at least two independent service water loops be operable in Modes 1, 2, 3 and 4. The action statement allows operation for 72 hours with one loop inoperable. The inoperability of the SW pumps, due to electrical interlocks, is a second example of the violation discussed above. These examples constitute a violation: Inoperable CCW and SW Pumps (395/86-06-01).

In addition to the above TS violations, it was also noted that:

- a. The unique interlock associated with racking up both pump breakers of an idle CCW or SW loop was not recognized. Therefore, operations personnel were not familiar with, nor had they received

training in the logic associated with correct alignment of breakers and control switches for the swing pumps.

- b. The R & R log is not being properly utilized and is not being properly reviewed against equipment operating status as required by procedures.
- c. System operating procedures (SOP) 117 (service water) and 118 (component cooling water) do not adequately address breaker/control switch alignment for swing pump operation.
- d. The failure of engineering and maintenance to provide timely completion of paperwork extended the periods of equipment inoperability.

Upon identification of the above items the licensee took prompt corrective action to determine the cause of the above problems. An engineering review of the control circuitry for swing pumps identified that the system design had not been incorporated into system operating procedures. Standing instructions on correct system alignment was issued to address this deficiency while permanent procedure changes were being developed. This item was reviewed by plant management and the Plant Safety Review Committee prior to plant restart to insure that all safety concerns had been resolved.

Long term corrective action will update the applicable system operating procedures and increase operator training in the areas of electrical interlocks. The licensee is also performing an evaluation of the circuit design for swing components and developing design changes to incorporate the electrical interlocks for swing components into the Bypass/Inoperable Status Indication (BISI) System. The licensee has implemented the use of special control boards tags to identify equipment that has been logged out of service in the "R & R" log to provide a visual aid to the operator of system and component status. A new "package" concept for processing maintenance work request should reduce the delay in restoring equipment to and operable status and reduce the administrative burdens on operations personnel. The licensee's corrective action on these deficiencies was timely, the corrective action was indicative of management involvement and this should preclude recurrence.

One violation with examples was identified as noted.

10. Plant Physical Protection (71707)

The inspectors noted the following on a daily basis: Gates and doors in protected and vital area barriers were closed and locked when not attended; isolation zones described in the physical security plan were not compromised or obstructed; and, personnel were properly identified, searched, authorized, badged, and escorted as necessary for plant access control.

11. Cold Weather Preparations (71714)

The inspectors conducted a review of licensee cold weather preparations to ascertain that the licensee maintained effective implementation of the program of protective measures for extreme cold weather. During the inspection, the inspectors verified that the licensee had inspected systems susceptible to freezing to verify the presence of heat tracing, space heaters, and/or insulation; the proper setting of thermostats; and that the heat tracing and space heating circuits were energized. The inspectors also determined that, for systems which had been subjected to maintenance and/or modification during the past year, that any required protective measures were reestablished, and during periods of prolonged shut down, that areas that are no longer kept warm by normal plant operations are adequately protected.

Although these inspections had been routinely conducted in the past no specific procedural requirements were established to insure the evolution was completed prior to periods of extreme cold weather. The licensee has issued standing instructions to insure that the task is accomplished when required.

No violations or deviations were identified.