



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30303

Report No.: 50-395/84-11

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

Docket No.: 50-395

License No.: NPF-12

Facility Name: Summer

Inspection at Summer site near Jenkinsville, South Carolina

Inspector: *C. W. Hehl* 5/18/84  
C. W. Hehl Date Signed

Approved by: *Floyd S. Cantrell* 5/18/84  
Floyd S. Cantrell, Section Chief Date Signed  
Division of Reactor Projects

SUMMARY

Inspection on April 1 - April 30, 1984

Areas Inspected

This routine, unannounced inspection involved 172 inspector-hours on site in the areas of plant tour, plant operations review, Technical Specification compliance, physical protection, maintenance and surveillance review, non-routine event reports, bulletin responses, licensee action on previous inspection findings and review of selected special reports.

Results

Violation - Inadequate implementation of required procedures, four examples.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*O. Bradham, Director, Nuclear Plant Operations
- J. Connelly, Deputy Director, Nuclear Plant Operations
- \*K. Woodward, Manager, Technical Services
- \*M. Browne, Manager Technical Support
- \*J. Harrison, Manager, Nuclear Security
- D. Lavigne, Associate Manager, Quality Assurance
- \*A. Koon, Associate Manager, Regulatory Compliance
- B. Williams, Supervisor of Operations
- \*H. Donnelly, Senior Engineer, Nuclear Licensing
- \*J. Derrick, Associate Manager, Maintenance Engineering
- \*R. Campbell, Engineer, ISEG
- \*M. Crooks, Emergency Coordinator
- \*H. Fields, Regulatory Interface Engineer

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

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on April 30, 1984, with the persons indicated in paragraph 1 above. The following issues were discussed in detail: the apparent loss of operating shift awareness of safety system status and the associated four examples of failure to adequately implement procedures (paragraph 10); a review of special reports involving inadvertent safety injections, loose-part detection instrumentation, and radiation monitoring instrumentation (paragraph 13); a review of licensee event reports Nos. 82-032, 83-090 and 84-014 (paragraph 11); a review of inspector followup items 83-36-03 and 84-10-01 (paragraph 12); a review of IE Bulletin (IEB) responses for IEBs 83-BU-04, 83-BU-06, 83-BU-07 and 83-BU-08 and related inspector followup items (paragraph 14).

The licensee acknowledged the inspection findings and took no exceptions, but made the following observation: that, with regard to the four examples of failure to implement procedures, this violation is regarded by the licensee as a symptom of temporary degradation of outage control which is presently under review to preclude recurrence during subsequent outages.

### 3. Licensee Action on Previous Enforcement Matters

Not inspected.

#### 4. Unresolved Items

Unresolved items were not identified during this inspection.

#### 5. Plant Tour

The inspector conducted plant tours periodically during the inspection interval to make an independent assessment of equipment conditions, plant conditions, radiological controls, safety and adherence to regulatory requirements. The inspector also verified that monitoring equipment was operating properly, equipment was properly tagged, operations personnel were aware of plant conditions and plant housekeeping efforts were adequate. During tours, the inspector looked for the existence of unusual fluid leaks, piping vibrations, pipe hanger and seismic restraint settings, various valve and breaker positions, adequacy of firefighting equipment and instrument calibration dates. Some tours were conducted on backshifts. No violations or deviations were identified.

#### 6. Plant Operations Review

The inspector periodically reviewed shift logs and operations records including surveillance test procedure data sheets, instrument traces and records of equipment malfunctions. The review also included the control room logs, tagout log and the removal and restoration log. The inspector routinely observed operator alertness during plant tours. Shift turnovers were observed to verify that they were conducted in accordance with approved procedures.

The unit began this reporting period in cold shutdown as a result of a preplanned spring maintenance outage which began on March 23, 1984. The major maintenance items to be accomplished during this outage were discussed in IE Report 84-08. Following this outage, the unit was brought critical at 1:53 a.m. on April 22, 1984.

At 9:03 a.m. on April 22, 1984, during the rolling of the main turbine with the reactor at 12% power, the plant experienced a turbine trip resulting in a direct reactor trip. The turbine trip was caused by a spurious main turbine shaft driven oil pump low pressure signal. Licensee post reactor trip evaluation determined that all safety systems functioned properly. Licensee investigation of the main turbine lube oil pressure determined it to be within the normal pressure range and pressure switch calibration was correct. No definitive cause for the main turbine shaft driven lube oil pump pressure low trip could be determined. The unit was returned to criticality following this event at 5:28 p.m. on April 22, 1984.

At 2:47 a.m. on April 25, 1984, with the unit at 100% power, a main turbine trip occurred resulting in a direct reactor trip. The turbine trip occurred while technicians were reinstating the main turbine thrust bearing wear detector (the thrust bearing wear detector had been previously removed from service for maintenance). The turbine trip resulted in a Turbine Trip (P-7) reactor trip. All systems functioned as designed with the exception of two

of the three feedwater regulating valves which failed to close on receipt of a feedwater isolation signal. The feedwater regulating valves receive a close signal following a reactor trip (P-4) coincident with a low reactor coolant temperature. Subsequent licensee evaluations determined that exhaust metering valves used to adjust the closure time for the feedwater regulating valves were out-of-adjustment, resulted in the failure of the two valves to close upon receipt of the isolation signal. The exhaust metering valves were readjusted, the feed regulating valves tested and returned to operable status. The spurious thrust bearing wear detector turbine trip was attributed to personnel error while reinstating the trip circuitry.

During preparations for restarting the unit on April 25, 1984, secondary water chemistry was determined to have deteriorated significantly and upon investigation the licensee identified several leaking main condenser tubes. Further licensee investigation determined that the condenser tube leaks resulted from mechanical impingement of internal condenser support structures on nearby tubes. The internal condenser support structures were associated with a low pressure heater and condenser steam dump baffle plates. Licensee evaluations postulate that the support structures broke as a result of cumulative cyclic stressing of these supports that occurred during startup program hot functional testing and secondary plant trips occurring since plant startup. The subject support structures were repaired, the affected tubes plugged and secondary chemistry was returned to required status. The unit was returned to criticality at 8:05 p.m. on April 28, 1984.

At 8:55 a.m. on April 29, 1984, during the rolling of the main turbine with the reactor at 11% power, the plant experienced a turbine trip resulting in a direct reactor trip. The turbine trip was caused by a spurious main turbine shaft driven oil pump low pressure signal. Licensee post trip evaluation determined that, with the exception of one feedwater isolation valve, all safety systems functioned properly. One feedwater isolation valve which receives a close signal following a reactor trip (P-4) coincident with low reactor coolant temperature failed to actuate following receipt of the automatic close signal. Subsequent licensee evaluation determined that the failure of the feedwater isolation valve to close resulted from a failure of an air driven hydraulic pump utilized to charge the valves accumulators. The subject valve uses hydraulic pressure to open and close. The failed air driven hydraulic pump was replaced, the feedwater isolation valve tested and returned to operable condition. No definitive cause for the spurious turbine shaft driven lube oil pump low pressure could be determined. During preparations for unit restart, source range nuclear instrument channel, N-31, was determined to be inoperable. At the end of this reporting period, the unit was being maintained in hot shutdown pending repair of the inoperable source range instrument.

No violations or deviations were identified in this area except as identified in paragraph 10.

## 7. Technical Specification Compliance

During the reporting interval the inspector verified compliance with selected Limiting Conditions of Operation (LCO) and results of selected surveillance tests. The verifications were accomplished by direct observation of monitoring instrumentation, valve positions, switch positions and review of completed logs, records and chemistry results. The licensee's compliance with LCO action statements were reviewed as they happened.

No violations or deviations were identified.

## 8. Physical Protection

The inspector verified by observation and interviews during the reporting interval that measures taken to assure the physical protection of the facility met current requirements. Areas inspected included the organization of the security force, the establishment and maintenance of gates, doors and isolation zones in the proper condition, that access control and badging were proper, and procedures were followed.

No violations or deviations were identified.

## 9. Maintenance and Surveillance Review

The inspector witnessed and reviewed the results of selected maintenance and surveillance activities during this inspection interval. The activities were reviewed to ensure that test instrumentation was calibrated, results of surveillance met the acceptance criteria, Post Maintenance Testing was conducted by qualified personnel, and approved procedures were being used. LCOs were reviewed to ensure they were met during the activities and that the system was restored to normal at the completion of the activity. Findings in this area were satisfactory except as identified in paragraph 10.

## 10. Onsite Review of Reactor Events

On April 12, 1984, with the plant in Mode 5 (Cold Shutdown), the licensee reported finding "A" charging pump's manual discharge isolation valve in the closed position, thus rendering a required boron injection flow path inoperable. Upon discovery at approximate 2:00 a.m. on April 12, 1984, the subject manual isolation valve, XVG 8485A, was opened, establishing an operable boron injection flow path. Subsequent licensee investigation determined that valve XVG 8485A had been closed at approximately 3:00 p.m. on April 11, 1984, during pre-test valve alignments in preparation for Type C Local Leak Rate Testing (LLRT) of alternate cold leg injection line containment isolation valve, XVG-8885.

Surveillance Test Procedure (STP) - 115.033, Safety Injection and Chemical and Volume Control System Valve Leakage Test, Revision 0, was the LLRT procedure being performed when XVG-8485A was closed on April 11, 1984. Required Shift Supervisor review and authorization to begin work on STP

115.033 was given on April 9, 1984. At the time of this review Type C testing of valve XVG-8885, which requires the closure of valve XVG-8485A, was not included in STP 115.033. Change "A" to STP 115.033, dated April 11, 1984, added the requirement to conduct a Type C test on XVG-8885. Several valves, including XVG-8885 had been prematurely deleted from the Type C LLRT program based on submitted amendments to the Technical Specifications (TSs) and the Inservice Inspection (ISI) program.

On April 11, 1984, the operators performing STP 115.033 briefed the on-duty shift supervisor of the status of the Type C testing, indicating that they were ready to perform LLRTs on the SI injection line containment isolation valves XVG-8884, XVG-8885 and XVG-8886. During this briefing, the operators conducting the LLRTs asked the shift supervisor if he had any preference as to the order of testing the above valves. The shift supervisor expressed no preference, so the operators conducting the LLRTs selected the SI line containment isolation valve XVG-8885 and initiated the applicable portion of STP 115.033. Pretest activities for Type C testing of valve XVG-8885 requires establishing a pre-test valve alignment to facilitate venting and draining piping upstream and downstream of the valve. The pretest valve alignment included closure of valve XVG-8485A and the opening of SI line isolation valve XVG-8885. Venting and draining operations continued and were not complete at approximately 8 p.m. on April 11 when the LLRT personnel were preparing to leave for the day. Prior to leaving, one of the operators performing the LLRTs briefed the on-duty control room operator regarding the status of work on STP 115.023, including the closed status of valve XVG-8485A. The control operator noted the condition and a discussion between the control room operators and the operator performing the LLRT determined that the closed valve did not make inoperable the required boron injection path as the valve could be manually reopened if needed. The operator performing STP 115.033 left for the evening. Neither the LLRT operator or the control room operator briefed the shift supervisor as to the status of valve XVG-8485A, which has no position indication in the control room. Subsequent records review determined that the control room operator did not enter the status of XVG-8485A in his log book or note its position on his shift turnover briefing sheet. Consequently, during shift change at approximately 11:30 p.m. on April 11, 1984, operating shift awareness of the closed status of valve XVG-8485A was lost.

At approximately 2:00 a.m. on April 12, 1984, during a walkdown of the control room panels, the on duty shift supervisor determined an apparent misalignment of the boron injection flowpath. An operator was dispatched to investigate and determined that charging pump "A" manual discharge isolation valve XVG-8485A's locking tab had been removed and the valve was closed. Valve XVG-8485A was reopened and a new locking tab installed. The NRC was notified of this event at 5:56 a.m. on April 12, 1984.

Subsequent to this event, on April 15, 1984, with performance of STP 115.033 again in progress, the existence of an operable boron injection flow path once again came into question. At 4:00 a.m. on April 15, 1984 the shift supervisor ordered the designated boron injection flow path to be shifted from charging pump "A" to charging pump "B" to alleviate flow path concerns

during LLRT Type C testing of valves associated with charging pump "A". During shift change at approximately 7:00 a.m. on April 15, 1984, the on-coming shift supervisor questioned the operability of the emergency power source for charging pump "B". This operability question arose because emergency diesel generator "B" had previously been declared inoperable for maintenance and modifications and as of that date (April 15) had not been declared operable in the operating department's Removal and Restoration Log Book. At 7:10 a.m., based on this operability question, the designated operable boron injection flow path was shifted to charging pump "C" which has the capability of receiving power from either train of emergency power and would not be adversely affected by the on going Type C tests. This operability question was subsequently resolved, with the determination that emergency diesel generator "B" had been technically operable since April 12, 1984. Subsequent interview of the shift supervisor who on April 15, 1984 initiated the shift to charging pump "B" determined that on that date he had failed to recognize the requirement for an operable emergency power source for the charging pump associated with the boron injection flow path.

A review of these events with regard to regulatory compliance and associated safety concerns are as follows.

- a. Technical Specification 3.1.2.3 requires that with the plant in mode 5 (Cold Shutdown) or mode 6 (Refueling) one charging pump in the boron injection flow path consisting of either boric acid system to charging pump to reactor coolant system or refueling water storage tank via a charging pump to reactor coolant system be operable and capable of being powered from an operable emergency power source. The action statement associated with TS 3.1.2.3 requires that with no charging pumps operable, or capable of being powered from an operable emergency power source, core alterations or positive, reactivity changes are to be suspended.

Review of this event has determined the following concerning compliance with TS 3.1.2.3 during the period on April 11 and 12 when valve XVG-8485A was closed.

- No core alterations or positive reactivity additions occurred.
- Charging pump "A" was inoperable due to the closed discharge valve (To be discussed further below).
- Charging pump "B" was technically inoperable due to an inoperable emergency power source (Diesel generator "B" was inoperable).
- Charging pump "C" was operable and capable of being powered from an operable emergency power source.

Therefore, with charging pump "C" capable of being powered from an emergency power source and since no core alterations or positive reactivity additions occurred, the licensee was technically in compliance with TS 3.1.2.3.

- b. As identified above, several valves including XVG-8885 had been prematurely deleted from the Type C LLRT program based on submitted amendments to the TS and the ISI program. This premature deletion based on submittals requires further inspector review and as such is an inspector followup item (84-11-01).
- c. Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained regarding surveillance and test activities of safety-related equipment. Station Administrative Procedure (SAP) 134 describes the administrative controls established to control TS surveillance activities. SAP-134, section 5.5 delineates the responsibilities of the shift supervisor with respect to effective conduct of surveillance activities. Specifically, the shift supervisor shall:
- (1) Evaluate each request to perform a surveillance activity and
  - (2) Determine if plant conditions allow performance and
  - (3) Achieve proper plant conditions for the test and
  - (4) Assure that performance of the test will not place the plant in an unsafe condition.

Contrary to these requirements, the shift supervisors authorizing the performance of STP 115.033 on April 11, 1984 and April 15, 1984 did not adequately perform the above evaluations and determinations. These are examples one and two of a violation of TS 6.8.1 (84-11-02).

- d. Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained for applicable procedures recommended in Appendix "A" of Regulatory Guide 1.33, Revision 2, February 1978. Appendix "A" of Regulatory Guide 1.33 recommends procedures for shift and relief turnover. Station Administrative Procedure (SAP)-200, Conduct of Operations, implements this procedure requirement. SAP-200, Section 6.2 requires that during shift relief, the off-going individual is to insure that the relieving individual is capable of accepting the duties of the position.
- Contrary to the above, on the evening of April 11, 1984, the off-going control room operator failed to ensure the relieving control room operator was cognizant of the status of valve XVG-8485A, thus limiting his capability of accepting the duties of his position. This is a violation of TS 6.8.1 and as such is the third example of violation 84-11-02.
- e. Technical Specification 6.8.1 requires that written procedures be established, implemented and maintained for applicable procedures recommended in Appendix "A" of the Regulatory Guide 1.33, Revision 2, February 1978. Appendix "A" of Regulatory Guide 1.33 recommends procedures for Equipment Control (e.g., locking and tagging). Special

Instruction 84-05, Locked Valve Control implements this procedure requirement. Special Instruction 84-05, Section 2.0 requires certain reviews, actions and verifications be performed and documented when changing the position of a locked valve.

Contrary to the above, on the evening of April 11, 1984, during the conduct of STP 115.03, the locking tab was removed and the valve position changed but the reviews, actions and verifications were not performed and documented as required by Special Instruction 84-05. This is a violation of TS 6.8.1 and as such is example four of violation 84-11-02.

Although the April 11 and 15, 1984, events described above did not technically result in the inoperability of the required boron injection flow path and the above delineated inadequate implementation of procedures taken individually did not constitute a significant safety hazard, the maintenance of operating shift awareness of system alignments in all plant conditions (including cold shutdown) is of major concern.

#### 11. Review of Nonrouting Event Reports by the Licensee (Unit 1)

The following License Event Reports (LERs) were reviewed for potential generic impact, to detect trends, and to determine whether corrective actions appeared appropriate. Events which were reported immediately were reviewed as they occurred to determine if Technical Specifications were satisfied.

All LERs were reviewed in accordance with the current NRC enforcement policy.

(Closed) LER 83-090, Control rod insertion limits were violated due to the failure of operating personnel to establish plant parameters.

(Closed) LER 82-032 Nuclear blowdown monitor tank damaged, diaphragm inside tank distorted such that it blocked off the tank overflow.

(Closed) LER 84-014, Loss of power to security inverters.

#### 12. Review of Previous Inspection Findings

(Closed) IFI 83-36-03, Review licensee's final actions resulting from small explosion caused by welding in Reactor Building. On February 3, 1984, revision of General Test Procedure 307 was issued to establish and implement the activities necessary to properly back-purge (with inert gas) safety related and non-safety related equipment prior to and in some case during maintenance activities. The inspector considers this followup item closed.

(Closed) IFI 84-10-01, Review implementation of modifications to static switches on security inverters. The inspector reviewed licensee documentation implementing these modifications. The modifications were performed on April 23, 1984.

### 13. Review of Selected Licensee Special Reports

Special report, Inadvertent Safety Injections, dated April 15, 1983. This special report which was submitted in accordance with the requirements of Technical Specification 3.5.3, discusses two inadvertent Safety Injection (SI) events that occurred on March 19, 1983. These inadvertent SI events were addressed in IE Reports 83-09 and 83-15. The inspector reviewed licensee and vendor evaluations of the effect of these events on system integrity, as well as, the implementation of licensee identified corrective actions discussed in the subject special report. The inspector had no further questions regarding these evaluations or the licensee implemented corrective action except with regard to the potential for misapplication of generic Emergency Operating Procedures (EOPs). This issue of misapplication of generic EOPs occurred during the March 18, 1983 inadvertent SI and resulted in the issuance of IE Information Notice No. 83-20. Presently, the licensee EOP for SI does not identify operating modes or conditions for which they apply thus the potential for misapplication of the EOP still exists. This item requires further review and is identified as inspector followup item (84-11-03).

Special report, Loose-Part Detection Instrumentation, dated August 3, 1983. This special report was submitted in accordance with the requirements of Technical Specification 3.3.3.10 as a result of sensor channels 750 and 751 of the digital metal impact monitoring system failing channel checks. The inspector reviewed licensee documentation of corrective maintenance performed on these sensor channels. Sensor channels 750 and 751 were repaired and returned to service on December 2, 1983. The inspector had no further questions concerning this report.

Special Report, Radiation Monitoring Instrumentation, dated July 25, 1983. This special report, which was submitted in accordance with the requirements of Technical Specification 3.3.3.1, reported the inoperability of main steam line radiation monitor, RMG-19B. The inspector reviewed documentation of the implemented alternate method of monitoring main steam line radiation levels required by TS 3.3.3.1 during the period RMG-19B was inoperable. The inspector had no further questions concerning this special report.

### 14. Review of Responses to IE Bulletins

(Closed) 83-BU-04, Failure of the Undervoltage Trip Function of Reactor Trip Breaker. The licensee responded to this bulletin on March 23, 1983. Independent verification that the licensee's program complies with the bulletin requirements is documented in IE Report 50-395/83-09. Contained within the licensee March 23, 1983 submittal was a commitment to change the maintenance frequency from the present eighteen month cycle to the manufacturer's recommended yearly inspection. The inspector reviewed

documentation indicating the maintenance frequency has been changed to semi-annual, once every 162 days. This bulletin is considered closed.

(Closed) 83-BU-08, Electrical Circuit Breakers with Undervoltage (UV) Trip Feature in Use in Safety-Related Applications Other than the Reactor Trip System. On March 19, 1984 and April 10, 1984, the licensee submitted responses indicating that SCE&G had not identified any Westinghouse type DB, Westinghouse type DS, General Electric type AIC-2 or other vendor circuit breakers with undervoltage trip feature in safety-related systems. This bulletin is considered closed.

(Closed) 83-BU-06, Nonconforming Material Supplied by Tubeline Corporation. The licensee responded to this bulletin by letters dated November 17, 1983 and March 22, 1984. The results of the licensee's review determined that with the exception of two flanges on an uninstalled spare Reactor Coolant Pump (RCP), no Tubeline Corporation parts/materials were supplied to SCE&G. Analysis of samples taken from the two suspect RCP flanges verified the flange material is acceptable. The inspector reviewed documentation of the licensee's reviews and the above mentioned analysis and had no further questions.

(Closed) 83-BU-07, Apparently Fraudulent Products Sold By Ray Miller, Inc. The licensee responded to this bulletin by letter dated March 22, 1984. The licensee's reviews determined that two vendors had procured materials from Ray Miller, Inc., for use at V. C. Summer. For the procured materials that had been installed in safety-related applications, the licensee performed an evaluation to determine significance to safety of these materials. All safety-related applications in which the suspect material was determined to be significant to safety were then subjected to visual examinations. With the exception of one galvanized square head plug on the recycle holdup tank, disposition of all materials ascertained to have a safety significance were acceptable. An evaluation of the safety significance of the galvanized plug indicates that the plug does not perform in a pressure retaining capacity and failure of the plug would not result in the inability of the tank to perform its function. The licensee has committed to replacing this galvanized plug during the refueling outage scheduled to begin in September 1984. This galvanized plug replacement will be tracked as an inspector followup item (84-11-04). The inspector reviewed the licensee's aforementioned evaluations, the methods and procedures for segregation of safety and nonsafety materials, and the methodology for upgrading materials for use in safety systems. The inspector had no further questions regarding implementation of this bulletin.