



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

Report No.: 50-395/85-24

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

Docket No.: 50-395

License No.: NPF-12

Facility Name: Summer

Inspection Conducted: May 13 - 17, 1985

Inspectors:

*L. P. Modenos*  
L. P. Modenos

*6/6/85*  
Date Signed

*P. D. Wagner*  
P. D. Wagner

*6/4/85*  
Date Signed

*L. E. Foster*  
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Approved by:

*C. A. Julian*  
C. A. Julian, Section Chief  
Division of Reactor Safety

*6/6/85*  
Date Signed

SUMMARY

Scope: This special, announced inspection entailed 100 inspector-hours on site in the areas of emergency diesel generator recent problems and diesel failure history.

Results: No violations or deviations were identified.

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## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. Connelly, Deputy Director, Operations and Maintenance
- \*G. M. Webb, Senior Engineer, Procurement Engineering
- \*F. McKinnon, Associate Manager, Station Quality Control
- \*F. Leach, Quality Assurance Manager
- \*K. Woodward, Operations Manager
- \*C. McKinney, Regulatory Compliance
- \*R. M. Folkes, Regulatory Compliance Engineer
- \*A. R. Koon, Associate Manager, Regulatory Compliance
- \*G. Putt, Manager, Schedule and Materials
- J. Purvis, Materials Supervisor
- A. J. Ginyard, Quality Control Receiving Supervisor
- J. Derrick, Associate Manager, Maintenance Engineering
- J. W. Poston, Mechanical Maintenance Engineer
- S. Bailey, Associate Manager, Procurement Engineering
- T. Frady, Associate Manager, Procurement Systems
- D. Moore, Group Manager, Quality Services

#### NRC Resident Inspectors

- \*C. W. Hehl

- \*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on May 17, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

### 3. Licensee Action on Previous Enforcement Matters

- a. (Closed) IFI (395/85-07-04): Criteria Not Established Limiting the Time to Accomplish Required Reading in the Required Reading Book. The licensee has revised Station Administrative Procedure (SAP) 200, Section 6.13.3, to satisfy the requirements of NUREG-0737, Item I.C.5, concerning prompt feedback of information.

- b. (Closed) VIO (85-08-01): Failure to Issue the Proper Torque Conversion Chart as Required by Mechanical Maintenance Procedure (MMP) 285.003. The licensee has revised MMP 285.003. It is now required that a torque conversion chart be prepared to correlate the torque output to the input indicated on the torque wrench for the specific wrench/crowsfoot/angle combination at the time of issuance. The use of predetermined developed torque data sheets which reflect the exact combination has been discontinued.

#### 4. Unresolved Items

Unresolved items were not identified during this inspection.

#### 5. Recent Emergency Diesel Generator Problems

The inspectors reviewed two recent events which resulted in both emergency diesel generators being inoperable. A brief chronological history of these two events is as follows:

<u>Date</u>	<u>Time</u>	<u>Remarks</u>
May 8, 1985	1930	The "A" diesel generator was declared inoperable due to a defective automatic voltage regulator.
	2000	The "B" diesel generator operability test (STP 125.002) was satisfactorily completed.
	2045	While running diesel "B" per STP 125.002, a loud noise was heard from the "B" diesel.
	2230	Water was discovered in cylinder number one of the "B" diesel.
May 9, 1985	1330	Repairs were completed on the "A" diesel voltage regulator. The "A" diesel was declared operable.
May 11, 1985		The "B" diesel was declared operable following replacement of a fuel injector and satisfactory operability test.

The "A" diesel was declared inoperable due to a malfunction in the automatic voltage regulator module. The licensee installed a conditionally released motor-operated potentiometer. This part failed to operate due to a bad motor gear assembly. The licensee then installed a motor-operated potentiometer which was removed from the manual voltage regulator of the "B" diesel. The licensee verified that the motor from the "B" diesel manual voltage regulator was acceptable for use in the "A" diesel automatic voltage regulator. The "A" diesel then satisfactorily passed the operability test and was declared operable. The licensee intends to return the defective components to the vendor, Colt Industries, for further analysis.

Upon discovery that the "A" diesel was inoperable, the licensee performed the operability test of the "B" diesel as required by Technical Specifications. While diesel "B" was running, a loud noise was heard from the diesel. The "B" diesel was declared inoperable. Later investigation revealed water in the number one cylinder. The licensee conducted a hydrostatic test of the integral cooling water jacket which surrounds the fuel injector for number one cylinder. This test revealed leakage from a plug assembly located near the injector nozzle. This injector was replaced and the diesel underwent a vendor recommended load test. Following a satisfactory operational test, the "B" diesel was declared operable. The licensee then commenced a reactor startup. In order to further assure that water leakage does not occur with replacement injection nozzles, the licensee is revising maintenance procedures 180.006, 180.015 and 180.033 to include provisions for a hydrostatic test of all injection nozzles prior to acceptance and installation.

The inspectors reviewed the following documents with respect to these two events:

- STP 125.009 "B" Diesel Generator Refueling Operability Test, Revision 0, February 14, 1985
- GTP 701 Surveillance Test Master, Revision 4, March 12, 1985
- STP 125.001 Electric Power Systems Weekly Test, Revision 7, February 26, 1985
- STP 125.002 Diesel Generator Operability Test, Revision 10, June 21, 1984
- STP 125.004 Diesel Generator Load Rejection Test, Revision 3, February 1, 1985

Maintenance Work Request (MWR) 8500814

MWR 85E0090

Station Operating Logs

Through a detail review of the above documentation and interviews with licensee personnel, the inspectors concluded that the licensee had followed all applicable procedures and Technical Specification requirements during the operation and testing of the diesels.

## 6. a. Diesel Failure History

The inspectors reviewed the licensee's maintenance history with respect to the five previous diesel failures as discussed in Special Reports 84-007, 84-011 and LER 85-004. The following documents were reviewed:

- SAP - 132      Off-Normal Occurrence Evaluation Reporting and Resolution, Revision 4, April 19, 1985
- SAP - 147      Operating Experience Review Program, Revision 3, February 10, 1984
- SAP-204      Operating Logs and Records, Revision 3, April 2, 1985
- A-NQCP-4      Trend Evaluation of NCNs/PAD MWRs/Requests for Documentation, Revision 1, August 24, 1984
- SAP - 205      Status Control and Removal and Restoration, Revision 3, March 12, 1985

FSAR Section 13.5.1.14

NUREG 0737, Item II.K.3.17

Regulatory Guide 1.108, Revision 1, August 1977

Three of the aforementioned failures occurred on diesel "A" because of high jacket water temperature. These failures were all common and determined to be a result of a sticking jacket water cooling system thermostatic control valve that became dirty from a fuel oil injector leak into the jacket water cooling system. Cleaning and flushing the valve was not adequate after the first two failures. Finally, the valve internals were replaced after the third failure. The other failure on diesel "A" was attributed to the output breaker not closing. This failure was a result of a malfunction of the mode selector switch. A modification was subsequently installed which bypasses the mode selector switch in the emergency mode.

The "B" diesel failed due to a low lube-oil pressure trip. The low lube oil pressure condition could not be repeated and the unit was returned to operable status.

The licensee misinterpreted Section 2.e.2 of Regulatory Guide 1.108 in that the three failures attributed to the high jacket water temperatures were reported as invalid failures instead of valid test failures. The licensee identified this error as reported in LER 85-004. In a letter from Mr. O. W. Dixon, Jr., to Mr. Harold R. Denton, NRC, dated May 1, 1985, the licensee revised their response to Generic

Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," to correct the data on diesel failures reflecting the three failures now classified as valid. The licensee also commenced testing both diesels at least once per three days as required by Technical Specifications. The licensee, in a letter from Mr. O. W. Dixon, Jr., to Mr. Harold R. Denton, NRC, dated April 9, 1985, requested a Technical Specification change modifying the testing schedule for the diesel generators. This new schedule would be determined by using the last 100 valid tests on a per diesel generator basis as opposed to a per nuclear unit basis, and by providing a temporary alternate testing frequency for the "A" diesel. The licensee proposed a reduced testing frequency based on having only two valid failures as of March 28, 1985. The licensee, based on the three common failures associated with the "A" diesel discussed previously in this report, has used the rationale that these failures are collectively one valid failure.

The inspectors reviewed the documentation associated with diesel generator history and interviewed personnel cognizant with past diesel failures. The inspectors made the following observations:

- The licensee was slow to implement the new diesel start logs as specified in Station Administrative Procedure (SAP) 204. Although the revised procedure was issued on May 10, 1985, the new logs were not used until May 15, 1985. The "A" and "B" diesels had been tested subsequent to the issuance of the new revision to SAP-204. Although the revised diesel start logs were slow in being implemented, the inspectors concluded that the safety significance of this finding was minimal. The licensee immediately updated the logs when the problem was brought to their attention.
- The licensee has committed to Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems of Nuclear Power Plants," in both their FSAR, Appendix 3.A, and Technical Specification 4.8.1.1.3. The inspectors reviewed the licensee's programs which examined the trend of critical failure mechanisms, human errors, and common mode failures. The inspectors noted that the licensee performs failure trend analysis through the Off-Normal Occurrence Program (ONO) in conjunction with the Operating Experience Review Program. The licensee also looks at trends associated with specific component failures principally through its Nonconformance Notice (NCN) Program outlined in A-NQCP-4. The trends found in both the ONO and NCN programs are disseminated to appropriate management personnel for corrective actions. The licensee also performs trend evaluation of ECCS outages as described in SAP-205 and NUREG 0737, Item II.K.3.17. The inspectors concluded that the licensee meets the requirements of Regulatory Guide 1.108, although trend analysis is fragmented among different groups within the licensee's organization.



b. Vendor Interface, Spare and Replacement Parts Control

The inspectors reviewed documentation, interviewed personnel, and observed the handling and storage of parts associated with the V. C. Summer Emergency Diesel Generators. This review was performed to determine if programmatic controls of vendors and parts were established and being implemented by the licensee.

Documents examined are listed below:

Vendor Technical Manuals for Emergency Diesel Generators, Manual Nos. IMS-94b-750-1-0 and 94b-750-2-0

Mechanical Maintenance Procedures (MMPs) associated with the Emergency Diesel Generators, MMP 180-001 through MMP 180-006 and other selected DG Maintenance Procedures

NL-113, Vendor Technical Correspondence, Revision 1

TS-144, Review and Processing of Vendor Maintenance and Instruction Manuals, Revision 0

MEP-103, Review of Vendor Technical Manuals, Revision 0

Spare Parts List (Colt) for Outage Items

Licensee Correspondence with Colt Industries (from April 1983 to May 16, 1985)

Colt Correspondence concerning Diesel Generator Parts and QA Program (from April 1983 to May 16, 1985)

Nonconformance Notice 1390 and associated Dispositions (1 thru 16) concerning all Diesel Generator Parts

QAP-14, Review of Nonconformance Documents, Revision 3.

SFR-2528, DG Air Intake Filter Differential Pressure Switches, dated May 16, 1980

ICP 180.002, Emergency DG, Revision 1

NCN 1742, Hold on parts procured from Raychem Process and Energy Division, dated September 28, 1984

LER 82-061 and 83-108

Onsite Certification, OSC 720, Rocker Arm Lube Oil Strainer, dated April 10, 1985

Colt Industries Service Information Letters

#### Licensee's Vendor Audit Files

Standard Practice 717.10, Program for Replacement Parts Certification for Nuclear Installations (Draft copy, dated April 1985)

10 CFR Part 21 Reports that SCE&G received from Colt Industries

Requisition No. 282695, Return of Injection Nozzle P/N 12606903, Serial No. S23099, to Colt for Evaluation, Repair, and Replacement

Trip Report dated, December 5-7, 1984 (Licensee Visit to Colt Industries)

Results of the above document reviews revealed that the licensee has management controls and procedures for the procurement, storage and handling of safety-related equipment, spare, and replacement parts. Review of correspondence, meetings, and QA audit activities associated with Colt Industries revealed that the licensee has been working with Colt Industries to resolve problems associated with sub-vendors' QA programs since the identification of this problem in 1982. The licensee stated that Colt now understands the problems and are cooperating with them to help resolve the QA problems. In order to ensure that replacement parts for the Diesel Generators are acceptable, the licensee has placed all parts obtained from Colt purchase orders on "Hold". These parts are being segregated from other parts and each part will be subjected to an engineering evaluation and QC inspections prior to removal of the "Hold" tag. The licensee has initiated a program to include evaluation of parts by a team composed of Gilbert Associate engineers, Colt Industries engineers, and licensee engineering, QC and QA personnel. Some team personnel are presently on site and the licensee is anticipating a date of September 30, 1985, as a goal for making dispositions on the Diesel Generator spare and replacement parts. Licensee's action will be inspected during subsequent inspections. Until the above action is complete, this is considered Inspector Followup Item, 85-24-01, Disposition of Colt Industries DG Parts. It is noted that the licensee is evaluating other vendors to determine if the same problem exists with their sub-contractors. As a result of this evaluation, Raychem parts are also being placed on "Hold".

Within the area inspected, no violations or deviations were identified.

#### c. Review of Diesel Generator Vendor Technical Manuals

Standby Diesel Generator Set, Volumes 1 and 2 (IMS-94b-750-1-0 and IMS-94b-750-2-0 respectively), were reviewed to determine if the licensee was continuing to review and update these manuals. The manuals were last reviewed per MEP-103 on February 12, 1985, by Maintenance Engineering personnel. Mechanical Maintenance Procedures MMP-180.001 through 180.033 are affected by these manuals. Document



Review Request No. 1053 transmitted the manuals for review on January 31, 1985, per PDP-101. These documents were previously reviewed on December 16, 1980. The reason for the latest review was to reflect the actual condition of V. C. Summer Diesel Generators. Additions made to the manuals included changes on May 2, 1982, which addressed stud torque problems, and a letter dated April 2, 1982, concerning actions to resolve problems due to low lube oil pressure, Robersshaw temperature control valves, and instructions on performing test runs.

A review of the diesel generator technical manual by the inspector revealed that the information concerning differential pressure switches had not been updated to depict installed equipment (Chapter 7, Section 6). A "Hold" tag had been affixed to the manual cover page and referenced SFR 2528 which described the reason and disposition of the original pressure switches. Although ICP 180.002 contains the calibration data for the installed instrument, the vendor's technical manual has not been brought up to date per MEP 103. The licensee committed to initiate action to have the manual updated. This commitment was made on May 16, 1985. Until the manual is updated, this will be Inspector Followup Item, 85-24-02, Update of Technical Manual.