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

Report No.: 50-395/89-15

Licensee: South Carolina Electric and Gas Company
Jenkinsville, SC 29065

Docket No. 50-395 License No.: NPF-12

Facility Name: Summer

Inspection Conducted: July 24-28, 1989

Inspector: S. E. Sparks 8/16/89
S. E. Sparks Date Signed

Team Members: A. Szczepaniec
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Approved by: G. A. Belisle 8/16/89
G. A. Belisle, Chief Date Signed
Test Programs Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted in the areas of inservice testing and follow-up on previous inspection findings.

Results:

The licensee's service water system inservice testing (IST) program appeared to be adequate to ensure that components are maintained in an operational readiness state, paragraph 2. Service water system IST weaknesses were identified in check valve full stroke and backflow testing, and lack of consideration of test equipment accuracy in determining valve thrust value setpoints, paragraph 2.a. A violation was identified for failure to verify remote valve position indication at the remote shutdown panels, paragraph 2.b. A non-citable violation was also identified and reviewed involving failure to fully implement Section XI IST pump requirements, paragraph 2.e.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

*L. Collier, Inservice Testing Coordinator
*D. Conrad, Engineer, Technical Oversight
*H. Donnelly, Senior Licensing Engineer
*R. Fowlkes, Associate Manager, Shift Engineering
*D. Goldston, Inservice Testing Supervisor
A. Koon, Manager, Nuclear Licensing
*T. McAlister, Quality Assurance Supervisor
*G. Meyer, Design Engineer
H. Sherriff, Metrology Supervisor
J. Skolds, General Manager, Nuclear Plant Operations
*G. South, General Manager, Operations and Maintenance
*M. Williams, General Manager, Nuclear Services

Other licensee employees contacted during this inspection included engineers, operators, technicians, and administrative personnel.

NRC Resident Inspectors

P. Hopkins, Resident Inspector
R. Prevatte, Senior Resident Inspector

*Attended Exit Interview

2. Service Water System Inservice Test Program Inspection (73756)

The purpose of this inspection was to assess how the licensee implements the IST program as it applies to the service water system. Specific pumps, motor operated valves (MOVs), manual valves, check valves, and relief valves were pre-selected for evaluation. The inspection included, but was not limited to the following:

Verification that the IST program is current with relief requests, Safety Evaluation Report (SER), Final Safety Analysis Report (FSAR) commitments, and Section XI of the 1980 Edition of the American Society of Mechanical Engineers (ASME) Code, with Winter Addenda.

Verification that test procedures accomplish program requirements.

Review and verification of test results, corrective actions, and post-modification testing.

Verification of proper accuracy and calibration for plant instrumentation and test equipment.

The inspection results have been divided into the following areas:

Check Valve Full Flow and Backflow Testing

MOV and Manual Valve Testing

Relief Valve Testing

Leak Rate Testing

Pump Testing

a. Check Valve Full Flow and Backflow Testing

The inspectors reviewed the full stroke and backflow IST methods and results obtained during the previous two year period for the following service water system check valves:

3115 A, B, C
3119 A, B
3120 A, B
3135 A, B
3130 A, B
3137 A, B

The inspectors reviewed the following procedures that performed IST on the above service water system check valves:

STP 123.003A, Train A Service Water System Valve Operability Test, Rev. 0

STP 123.003B, Train B Service Water System Valve Operability Test, Rev. 0

SAP 141, Control and Calibration of Measuring and Test Equipment

GTP 302, Inservice Testing of Valves, Rev. 3

STPs 123.003A and 123.003B provide instructions to stroke open the service water check valves utilizing system flow; however, these procedures did not provide any criteria for an acceptable flow rate. The procedures required that flow rates be recorded, but did not specify what flow rates were acceptable. Test results reviewed for service water valves 3115A, B, and C, 3120A and B, 3130A and B, and 3137A and B, indicated that these valves were being verified to full stroke open at flow rates less than design basis accident flow. This testing is not in accordance with Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs, which specifies utilizing full accident flow to verify a check valve full-strokes to the open position. Thus, the maximum required accident condition

flow must be passed through the valve when performing inservice testing. The inspectors noted the following examples where full accident flow was not used for check valve stroking:

> Valves 3115A, B, and C are the respective service water pump discharge check valves. The licensee stated that accident flow through each valve is 12,500 gpm (gallons per minute). Test data obtained for these valves from the previous two year period indicated flow rates of 10,000 gpm to 11,800 gpm, which is less than accident flow.
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> Check valves 3120A and B are the fire main backup supply to emergency diesel generators A and B, and are used to provide alternate service water cooling. Accident flow for each valve is 500 gpm. Test data indicated flow rates of 336 gpm to 408 gpm were obtained, which is less than accident flow.
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> Other check valves reviewed where test data flow rates were less than accident flow were service water header check valves 3130A and B, and service water booster pump discharge check valves 3137A and B.

Generic Letter 89-04 states that the licensee will receive a Safety Evaluation Report for the current IST program in the near future. The licensee will then have six months after receipt to incorporate Generic Letter 89-04 requirements into their IST program, which will include check valve stroking at accident flow conditions. As such, this area will be inspected subsequent to incorporation of Generic Letter 89-04 requirements into the licensee's IST program.

The inspectors also reviewed backflow testing results for check valves, which indicated that backflow testing for service water check valves 3130A and B, 3135A and B, and 3137A and B, had not been performed. The licensee stated that check valves were backflow tested if they were required to shut down the reactor or mitigate a design base accident as described in FSAR Chapter 15. Although check valves 3130A and B, and 3135 A and B, are not required to prevent reverse flow to mitigate a Chapter 15 accident, the FSAR does specify a backflow purpose for these valves. Check valves 3130A and B, which are located in the discharge headers to the service water pond, serve to prevent siphoning of the pond back into the service water system in the event of a major line rupture within the plant as stated in the FSAR Section 9.2.1.2. Check valves 3135A and B are located in each service water booster pump discharge header. FSAR, Section 9.2.1.2, states the check valve purpose is to minimize water hammer in the event that electrical power to the pump and associated motorized discharge valve is momentarily interrupted. The inspectors consider the lack of backflow testing for these check valves to be a weakness in the licensee's check valve program. Although not required to mitigate a FSAR Chapter 15 accident, these check valves do have backflow functions. Consequently, the licensee needs to

perform testing to verify that these valves could perform their intended function.

During the previous two year period, no maintenance or failures occurred on the check valves reviewed, and as such no corrective action for failures and post-maintenance tests could be verified. The inspectors verified that all test data was obtained from instruments that were routinely calibrated.

With the exception of full stroke testing for certain check valves as previously discussed, the inspectors consider the licensee's IST program in the area of service water check valves meets ASME Section XI requirements.

b. MOVs and Manual Valves

The inspectors reviewed the licensee's inservice testing for the following motor operated valves (MOVs) and manual valves from the service water system:

MOVs		Manual Valves
3116A	3116B	3118A
3116C	3128A	3118B
3126A	3126B	3118C
3106A	3126B	3118D
3108A	3108B	3127A
3109A	3109B	3122A
3103A	3103B	3134A
3107A	3107B	3129A

The requirements for IST for the above valves are contained in the licensee's IST Program for Pumps and Valves, which invoke Section XI, Subsection IWV of the 1980 ASME Code and Winter Addenda.

The inspectors interviewed licensee personnel regarding the general methods used during MOV stroke time testing, and reviewed the following implementing procedures for IST of the above valves:

General Test Procedure 302, Inservice Testing of Valves, Rev. 3

STP 123.003A, Train A Service Water System Valve Operability Test, Rev. 0

STP 123.003B, Train B Service Water System Valve Operability Test, Rev. 0

Requirements for stroke timing MOVs are contained in Subsection IWV-3413 of the Code. Stroke time results dating back to 1986 indicated that frequencies for the above valves were in accordance with Section XI requirements. The inspectors also reviewed

maintenance records and non-conforming reports for the above valves dating back to 1986. Subsection IWV-3200 of the Code provides the requirements for post-maintenance testing to demonstrate that the performance parameters which could be affected by replacement, repair, or maintenance are within acceptable limits. The inspectors confirmed that adequate post-maintenance testing had been performed.

The inspectors reviewed the licensee's basis for the specified limiting value for full-stroke times. Subsection IWV-3413 of the Code states that the limiting value of each power operated valve shall be specified by the Owner. A valve in which the stroke time exceeds the ultimate stroke time is declared inoperative if not corrected within 24 hours as required by the Code. In addition, Generic Letter 89-04 states the limiting value for valve stroke time should be based on a reasonable deviation from the valve reference or average stroke time when it is known to be in good condition and operating properly. This deviation should consider reasonable stroke time variations, and should be such that corrective action is taken for a valve that may not perform its intended function. Generic Letter 89-04 also states the limiting full-stroke time value should be less than the Technical Specification (TS) or safety analysis limit. The inspectors did not note any service water system valves in which the specified limiting stroke time was an unacceptable deviation from the reference value, or was greater than TS limits.

Subsection IWV-1100 of the ASME Code provides the scope for requirements for IST of certain Class 1, 2, and 3 valves which are required to perform a specific function in shutting down a reactor to cold shutdown or in mitigating the consequences of an accident. The licensee's IST program did not include all of the MOVs and manual valves selected for review. The inspectors discussed with the licensee the basis for not including any of the above valves in their IST program. Specifically, the following valves were identified and discussed:

> Manual valves 3118A, B, C, and D. The licensee identifies these valves as passive valves, in that no change in position is required to perform a specific function in shutting down the reactor. Passive valves have no exercising requirements.
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> Manual valves 3122A, 3127A, 3129A, and 3134A. The licensee identified these valves as needed for operating convenience or maintenance, and are not needed to perform a specific function in shutting down the reactor. Thus, they are not within the scope of Section XI, Subsection IWV testing requirements.

The inspectors concurred with the licensee's rationale for not including the above valves in the IST Program.

The inspectors also reviewed the licensee's testing methods for verifying remote position indication for valves in the IST Program.

Subsection IWV-3300 of the ASME Code states that valves with remote position indicators shall be observed at least once every two years to verify that valve operation is accurately indicated. Licensee procedures for IST verify accurate valve position indication at a remote location, specifically the main control room. However, remote position indicators are also located on the remote shutdown panels. The remote shutdown system provides the capability to bring the plant to a safe shutdown. Control and indication for components needed for safe shutdown are provided on the shutdown panels, and include status lights for valve position. The licensee performs a periodic channel check of shutdown panel instrumentation; however, this demonstrates that shutdown panel instrumentation is consistent with that in the main control room, and does not verify remote position indication for the open and closed position of valves. Thus, the licensee currently does not verify correct valve position indication at the remote shutdown panels every two years, which is a violation of Subsection IWV-3300 of the Code. This is identified as Violation 395/89-15-01, Failure to Adequately Perform Inservice Testing.

With the exception of verification of remote position indication as discussed above, the inspectors consider the licensee's IST program for service water system MOVs and manual valves meets ASME Section XI requirements.

c. Relief Valve Testing

The following relief valves were evaluated to determine whether they were subject to the ASME Section XI requirements: 3144A, B, and C, 3145A and B, 3146A and B, 3100, and 3124. These valves were found not to be tested per the licensee's IST program. The licensee stated that these valves were not needed to shut down the reactor, or mitigate the consequences of an accident, and thus wre not required to be tested per Section XI requirements. No further inspection of these valves was performed.

d. Leak Rate Testing

The inspectors also reviewed valve seat leakage testing for valves that isolate a high pressure reactor coolant system from a lower pressure system, and containment isolation valves, that are required to be seat leak tested per 10 CFR 50, Appendix J. The service water system contains six containment isolation valves that are required to isolate service water to the two containment cooling heat exchangers. The inspectors reviewed the seat leakage results obtained during the previous two containment leak rate tests. The seat leakage rates were trended and were less than the maximum specified limits.

e. Pump Testing

The following pumps were evaluated to determine whether they were subject to ASME Section XI Code requirements:

XPP-044A, B, C - Service Water Screen Wash Pumps
XPP-039A, B, C - Service Water Pumps
XPP-045A, B - Service Water Booster Pumps

The service water screen wash pumps were required for periodic washing of the service water screens, and are not required to shutdown the reactor nor mitigate the consequences of an accident. They are not required to be in the IST program, which the licensee has recognized, and no further inspection for these pumps was performed by the inspectors.

The service water pumps and service water booster pumps are included in the licensee's IST program. These pumps and their appropriate procedures were inspected per Section XI, Subsection IWP requirements. Applicable procedures reviewed included the following:

STP 123.002, Service Water System Pump Test, Rev. 10

PTP 140.001, Service Water System Pump Performance Test for Flow versus Differential Pressure, Rev. 4

GTP 301, General Procedure for Inservice Testing of Pumps, Rev. 3

A review of procedures and test results for the previous two year was performed. In reviewing the applicable procedure and the pump testing program itself, it was found that the following relief requests were being utilized by the licensee at the time of the inspection:

B.2, Relief requested for measurement of vibration and bearing temperature (service water pumps)
B.3, Relief requested for adjusting flow rate and differential pressure to a single point reference value (service water pumps)
E.2, Relief requested for alert and required action range upper limits (service water pumps)
E.3, Relief requested for vibration measuring instrumentation (pumps identified in GTP-301)
E.4, Relief requested for temperature measuring instrumentation (pumps identified in GTP-301)

Relief request B.2 has been granted by the NRC as stated in a SER, dated April 19, 1988. The remaining relief requests are currently undergoing review by the NRC.

In general, inspection results indicated that the Section XI, Subsection IWP requirements, or the applicable relief request, were met in the following areas:

Scope of test
Frequency of inservice tests
Duration of tests
Instrumentation
Time allowed for analysis of results
Records of inservice tests

Two exceptions were found which indicated that the licensee failed to fully implement the IST program as required by Subsection IWP of the Code. The Code requires in Table IWP-3100-2 and in Subsection IWP-3230 that a pump be declared in the required action range and, therefore inoperative if the flow parameter falls below ninety percent of the flow reference value. Procedure STP-123.002 cites a reference value flow of 2487-2512 gpm. By the Code, the pump should be declared inoperative at 2238 gpm (ninety percent of 2487 gpm). Contrary to this, attachment 1D of STP-123.002 states that the pump's required action range is less than 2000 gpm, and inoperable at a flow rate less than 2000 gpm. The inspectors noted that the procedure has a step to establish the proper flow at the start of the test, but the information in the results table specifies an incorrect action range.

A second example where the Code is not being fully implemented concerns documenting reference value changes. Paragraph IWP-3112 of the Code states that whenever an additional set of reference values is established, the reason for doing so shall be justified and documented in the test record. The inspector noted that the service water pump flow reference values changed on May 17, 1986 for pump 39A, June 10, 1986 for pump 39B, and on June 8, 1986 for pump 39C. Booster pumps 45A and 45B had reference value changes on February 18, 1989, and January 28, 1989, respectively. Discussions with licensee IST personnel indicated the reasoning for the reference value changes was justified, but documentation on the test record sheets was not completed. The only reference to the value change was a note citing the work orders which performed the tests establishing the new values.

These two examples are identified as Violation NCV 50-395/89-15-02, Failure to Fully Implement Section XI IST Pump Requirements. In both examples, the violation was apparently not willful, and the licensee initiated corrective actions before the inspection was completed. Procedure STP-123.002 has been modified to delete the incorrect pump required action range, and establishment of an acceptable flow rate as a prerequisite to continue the test. For the second example, a revision was initiated to procedure GTP-301, which specifies Code requirements and documents pump reference value changes. This NRC identified violation meets the criteria specified in Section V.A of the NRC Enforcement Policy for not issuing a Notice of Violation and is not cited.

3. Bulletin Followup (92703)

(Closed) 85-BU-03, T2515/73, Motor Operated Valve Common Mode Failure During Plant Transients Due to Improper Switch Settings. The purpose of this Bulletin is to require licensees to develop and implement a program to ensure that switch settings for high pressure coolant injection and emergency feedwater system MOVs subject to testing for operational readiness in accordance with 10 CFR 50.55a(g) are properly set, selected, and maintained.

NRC Inspection Report 50-395/88-20 identified several Bulletin 85-03 weaknesses and outstanding action items. The inspectors reviewed the licensee's actions in response to the weaknesses. With the exception of obtaining thrust values at degraded voltages for valves XVG-8809A, B, and C, all Bulletin 85-03 outstanding items have been satisfactorily completed and previous weaknesses corrected. Inspector Followup Item IFI 50-395/89-15-03, was identified to followup on the thrust values for these valves at degraded voltage. A weakness was also identified during the inspection concerning the accuracy of the test equipment utilized to measure MOV thrust values. Procedure EMP-445-008, Limitorque Valve Data, did not incorporate test equipment accuracy into the required valve thrust setpoints, which may lead to incorrect thrust settings.

4. Exit Interview

The inspection scope and results were summarized on July 28, 1989, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed above. Proprietary information is not contained in this report. Dissenting comments were received from the licensee in the area of verifying valve remote position indication on the shutdown panel in that they considered this item did not warrant a violation.

Item Number	Description and Reference
395/89-15-01	Violation - Failure to Adequately Perform Inservice Testing, paragraph 2.b.
395/89-15-02	Non-Citable Violation - Failure to Fully Implement Section XI IST Pump Requirements, paragraph 2.e.
395/89-15-03	Inspector Followup Item - Thrust Values at Degraded Voltage, paragraph 3.

Licensee management was informed that Bulletin 85-03 was closed, paragraph 3.