UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-280/94-13 and 50-281/94-13

Licensee: Virginia Electric and Power Company
Glen Allen, VA 23060

Docket Nos.: 50-280 and 50-281 License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: May 16-20, 1994

Inspector: Lawrence P. King 5/26/94
Lawrence P. King Date Signed

Approved by: [signature] 6/3/94
Paul Kellogg, Chief Date Signed
Operational Program Section
Operations Branch
Division of Reactor Safety

SUMMARY

Scope:

This was a special announced inspection in the areas of Low Head Safety Injection flow testing and review of setpoint calibrations and scaling. The inspector reviewed the periodic test of the Unit 2 Low Head Safety Injection Pumps to determine if degradation had occurred. The inspector also reviewed administrative procedures, calculations and schedules to determine the licensee progress on the setpoint validation program.

Results:

The inspector determined that the inservice testing required in the past was done using a recirculation flow at shutoff head. This would not provide adequate data to accurately predict degradation but met the requirements of the ISI program. The last two eighteen month surveillances have generated a pump curve over the full range of flows. No degradation is evident.. The licensee program for setpoint validation is on schedule and as a result a design change has been prepared and the low pressurizer trip setpoint change will be implemented to provide more margin between the actuation of safety systems and the safety analysis requirements for the low pressurizer pressure trip. The inspector considered the licensee setpoint validation program a strength and in particular the Instrument Procedure Support Documents.

No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

*B. Benthall, Licensing Supervisor
*M. Kansler, Station Manager
*R. MacManus,Supervisor System Engineering
*W. McBride, Supervisor Corporate Electrical Engineering
*G. Mietus, Senior Staff Engineer, Electrical Engineering
*J. Munro, Senior Staff Engineer, Electrical Engineering
*T. Raspanti, System Engineer
*S. Roberson, I&C Procedures Lead
*V. Shifflett, Licensing Engineer
*T. Sowers, Superintendent of Engineering
*S. Stanley, Supervisor of Procedures
E. Watts, Supervisor of Design Electrical Engineering

NRC Representatives

M. Branch, Senior Resident Inspector
*S. Tingen, Resident Inspector

*Attended Exit Interview

2. Background on Unit 2, Low Head Safety Injection (LHSI) Pumps

In March 1992, a flow test was conducted on the Unit 1, LHSI system based on NRC findings documented in IR 50-280,281/92-06. The results of this flow test indicated the Unit 1, LHSI pumps were unable to produce the required flow. Because of the results of the Unit 1, LHSI flow test, the licensee tested the Unit 2, LHSI pumps in March 1993. The NRC findings were documented in IR 50-280,281/93-08. Two concerns were identified as a result of the March 1993 testing. The first concern was that the licensee did not have a Loss of Coolant Accident (LOCA) analysis to cover the shortfall in LHSI pump flow, and the second concern was that the pumps might be experiencing degradation. An unresolved item (URI) was written to review the LHSI performance data, and the licensee was to reanalyze the LOCA analysis and submit a 10 CFR 50.46 report. The results of the NRC review are documented in paragraph 4.

3. Background on Setpoint Review

In January 1993, a special, announced inspection in the area of Plant Instrumentation Setpoints was conducted. The results are documented in IR 50-280,281/93-01. Inspector follow-up item 93-01-01 was written to review upgraded Channel Statistical Analyses (CSA), setpoints, and calibration procedures. The results of the NRC review are documented in paragraph 5.

4. Unit 2, LHSI Pump Test

The inspector reviewed the 10 CFR 50.46 report dated April 27, 1994. The analysis used the revised Westinghouse BASH code to reanalyze the core and predict the fuel's Peak Centerline Temperature (PCT). The 100°F penalty was removed as a result of including the power shape sensitivity model. The results of the large break LOCA calculated a PCT of 2114°F when the LHSI pumps delivered 2970 gpm at a Reactor Coolant System (RCS) backpressure of 0 psig with a full refueling water storage tank (RWST). A review of the licensee periodic test 2-PT-8.3C dated March 24, 1993, documented that the Unit 2, LHSI A pump delivered 2999.5 gpm and the B pump delivered 3013.5 gpm. The test was considered acceptable because the pumps were capable of delivering more than the required 2970 gpm.

5. Review of Safety-Related Setpoints

a. Pressurizer Low Pressure Safety Injection (SI)

Inspection Reports 50-280/93-01 and 50-281/93-01 identified that the pressurizer setpoint required was 1715 psig. This is 15 psig higher than the required technical specification (TS) value of 1700 psig. When the Safety Analysis Limit - Channel Statistical Analysis was taken into account, there was a small margin of conservatism. The inspector reviewed Technical Report EE-0100 Appendix 7, "Pressurizer Pressure Protection," which developed the scaling requirements for the Low Pressurizer Pressure Actuation Signal and found it adequate. The inspector also reviewed Design Change 93-005-3 which replaced the installed Rosemount Model 1153 Series D RCS pressurizer transmitters with Rosemount Model 1154 Series H transmitters. The replacement of these transmitters is due to excessive channel inaccuracies calculated for pressurizer low SI actuation during harsh environmental conditions. The setpoints will be changed from 1715 to 1775 to provide allowance for channel statistical allowance and to ensure operability. The new transmitters have been installed on Unit 1 and will be installed on Unit 2, during the next mini outage in June. Raising the operational setpoint in combination with transmitter replacement, will assure safety injection on low-low pressurizer pressure even though the current accident analysis does not take credit for this function.

b. RCS Low Flow Trip

Inspection report 50-280/93-01 and 50-281/93-01 stated that the CSA for RCS Low Flow Trip calculated in EE-0138 was 3.09 percent of span instrumentation error which was greater than the error assumed in the Final Safety Analysis Report (FSAR).

The inspector reviewed EE-0183 Rev.2 dated March 22, 1994, which calculated the CSA for reactor trip to be 1.74 percent. A review of EE-0101 Rev.0, Appendix A-1, "Analytical Limits, Setpoints and

Calculations" indicates a CSA value of 1.37 percent. The CSA of 1.74 percent is for delta pressure span and the CSA of 1.37 percent is for percent of flow span. The inspector reviewed the calculation that proved this relationship. The present calculations support a margin value of 3.63 percent. The margin value plus the CSA is equivalent to 5 percent difference between the trip setpoint of 92 percent and the safety analysis limit of 87 percent.

c. SI Accumulator Level

Inspection Reports 50-280/93-01 and 50-281/93-01 stated that the inspectors review of the CSA for SI Accumulator Level found a transmitter span of 23.83 inches water column (w.c.) used. This was not consistent with EE-0376, SI Accumulator Level Transmitter Spans Revision 0, which calculated a span of 23.68 percent w.c. The inspector recalculated the span found in EE-0376 and determined the allowance was ±2.43 percent of span instead of ±2.28 percent of span. The inspector reviewed ET No. CEE-94-015, Rev 0, dated May 4, 1994, which addressed this concern. The calculation contained in the ET No. CEE-94-015, Rev 0, demonstrated that the original calculation, No. EE-0377, Rev 0, Addendum 0A, dated October 7, 1992, provided satisfactory bounding information. The calculation showed that by reducing decimal rounding errors and inserting the transmitters high line pressure adjusted span of 0 - 23.68 inch w.c., the resultant CSA value is bounded by the value present in EE-0377 .

The inspector reviewed DR S-94-920 dated April 7, 1994, which stated that while researching documents related to the SI Accumulator upgrade, it was discovered that the SI Accumulator Level Curve in DRP, Att., Rev 21, did not match the design data contained in EE-0376 Rev 0. The inspector talked to engineering and found that changing the level versus volume curve should not have occurred as a result of the new CSAs developed. This issue is considered closed.

6. Setpoint Validation Program

The licensee has made significant progress in the setpoint and validation program. Corporate Engineering was working in conjunction with the procedures group at the plant to develop all the supporting documentation for the safety-related setpoints. The documents reviewed included Instrument Procedure Support Documents (IPSD), Channel Calibration Procedures, Scaling Documents, and Technical Reports developed by Corporate Engineering. The inspector verified that the values used in the calibration procedures were in agreement with the information generated in the IPSD. A direct correlation was found in the procedures reviewed. The IPSDs identified the basis for the values and information contained in the Functional Tests and the Channel Calibration procedures. Within the scope of this inspection the following procedures were reviewed:

1-IPSD-MS-FLOW, "IPSD Steam Line Flow Channels"

1-IPSD-RC-FLOW, "IPSD Reactor Coolant Flow Channels"

1-IPSD-FW-FLOW, "IPSD Feedwater Flow Protection and Control"

1-IPT-CC-FW-F-476, "Feedwater Flow Loop F-1-476 Channel Calibration"

1-IPT-CC-RC-F-414, "Reactor Coolant Flow Loop F-1-414 Channel Calibration"

1-IPT-CC-MS-F-474, "Steam Line Flow Protection Loop F-1-474 Channel Calibration"

7. Exit Meeting

The inspection scope and finding were summarized on May 20, 1994, with those persons identified in Paragraph 1. The inspectors described the areas inspected, and discussed in detail the inspection findings.

ITEM	STATUS	DESCRIPTION
IFI 93-01-01	Closed	Review of upgraded csas, setpoints, and calibration procedures
URI 93-08-01	Closed	Review of LHSI pump performance data Unit 2