ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-397/95-28

License: NPF-21

Licensee: Washington Public Power Supply System
3000 George Washington Way
P.O. Box 968, MD 1023
Richland, Washington

Facility Name: Washington Nuclear Project-2

Inspection At: Richland, Washington

Inspection Conducted: September 11-15, 1995

Inspector: P. Goldberg, Reactor Inspector, Engineering Branch
Division of Reactor Safety

Approved: _____ 10-6-95
C. VanDenburgh, Chief Engineering Branch, Date
Division of Reactor Safety

Inspection Summary

Areas Inspected: Routine, announced inspection of followup on previous inspection findings.

Results:

Engineering:

- The licensee had adequately addressed the unresolved item of nonconservative fouling factors for the residual heat removal heat exchangers. The licensee was able to demonstrate that the standby service water system was capable of providing adequate flow to the residual heat removal heat exchangers with fouling factors adjusted for instrument uncertainties (Section 2.2)

- A number of improvements had been made in the pressure relief valve program. The licensee was in the process of gaining an understanding of the importance of ring settings for the valves. In addition, the licensee had drafted a pressure relief valve program which would be implemented by the end of March 1996 (Section 2.3).

- The licensee had adequately addressed the unresolved item of the acceptability of the automatic depressurization system check valves with leakage in excess of the action level leakage identified in the ASME Section XI test procedure. The licensee was able to demonstrate that the valves would remain open for greater than 2 hours with a 10 scfh leakage rate (Section 2.4).

Summary of Inspection Findings:

- Violation 397/9503-01 was closed (Section 2.1)
- Unresolved item 397/9503-03 was closed (Section 2.2)
- Unresolved item 397/9503-04 was closed (Section 2.3)
- Unresolved item 397/9503-05 was closed (Section 2.4)
- Violation 397/9503-06 was closed (Section 2.5)

Attachment:

- Attachment - Persons Contacted and Exit Meeting

DETAILS

1 PLANT STATUS

During this inspection, the plant was operating at 100 percent power.

2 FOLLOWUP ON ENGINEERING OPEN ITEMS (92903)

2.1 (Closed) Violation 397/9503-01: Failure to change General Electric drawings in the Washington Public Project-2 Final Safety Analysis Report to reflect the installation of a modification

Background

The licensee had prepared a safety evaluation to support a modification to install a bypass valve around residual heat removal Valve RHR-V-6A. However, the safety analysis report drawing, General Electric Piping and Instrument Drawing 02E12-04.10.1, sheets 1 and 2 had not been revised to reflect the installation of the modification. Washington Public Project-2 Procedure EI 2.8 required that the preparer of a drawing change notice indicate the changes to be made on a given drawing including safety analysis report drawings. The failure to identify this drawing as a drawing requiring revision was identified as a failure to implement a procedure.

Followup

The inspector reviewed the General Electric Drawing 02E12-04.10.1, Revision 19, dated March 9, 1995, and determined that the drawing had been revised to reflect the installation of the modification. In addition, the licensee emphasized to the design engineers involved the requirement to update all documents affected by a design change.

The licensee stated that for future corrective actions, the General Electric drawings would be removed from the Final Safety Analysis Report and designated as historical information which would not be updated. In addition, the licensee stated that the Final Safety Analysis Report would be changed to satisfy Regulatory Guide 1.70 by other means so that the use of the General Electric drawings would not be necessary.

Conclusion

The inspector concluded that the licensee's corrective actions were adequate.

2.2 (Closed) Unresolved Item 397/9503-03: Licensee's review of the standby service water system's ability to provide adequate flow to the residual heat removal heat exchangers with fouling factors adjusted for instrument uncertainties and the review of the service water system requirements for hot weather months

Background

This unresolved item was opened due to the licensee not including instrument uncertainties into test data used for fouling factor calculations for the residual heat removal heat exchangers. The standby service water flow rate for the residual heat removal heat exchangers was developed in Calculation ME-02-93-05 using a tube side fouling value of 0.002. The fouling factors calculated on the basis of the results of heat exchanger testing varied from 0.0009 to 0.00143 without instrument uncertainties included. Therefore, with instrument uncertainties, the actual fouling factor could have been greater than the value assumed in the calculation, which could have resulted in less heat transfer than needed. In addition, the review of the service water system requirements for the hot weather months was identified as part of the unresolved item.

Followup

The inspector reviewed Calculation Modification Record CMR-95-0656, dated September 14, 1995, which applied to Calculation Number ME-02-93-05. This calculation had not been closed out and incorporated into Calculation ME-02-93-05 at the time of this inspection, so the results were preliminary. This calculation determined the minimum service water flow at which the design heat loads would be removed with: (1) an 80.0°F pond water temperature and the normal residual heat removal flow for the shutdown cooling mode, and (2) an 88.7°F pond water temperature with normal residual heat removal flow for the containment spray cooling mode. This calculation also determined the amount of fouling in the tubes that would still allow removal of the design heat loads with 6500 gpm service water flow rates for both modes and the amount of fouling in the tubes which would allow removal of the design heat loads with 6900 gpm service water flow rates for both modes. The calculation determined that the lowest acceptable flow rate for the shutdown mode was 5450 gpm for 80°F pond water and that the lowest acceptable flow rate for the containment spray cooling mode was 5700 gpm for 88.7°F pond water. The calculation concluded that the results were conservative since the actual temperatures during both modes would be lower than the temperatures used in the analysis. The fouling at which design heat loads could still be removed with 6500 gpm service water flow was determined to be 0.00227, and with 6900 gpm flow the fouling was determined to be 0.00239.

The inspector reviewed Operating and Engineering Test Procedure 8.4.42, "Thermal Performance Monitoring of RHR-HX-1A and RHR-HX-1B," Revision 4. This test was conducted at the beginning of each refueling outage to obtain equipment and performance data to evaluate the thermal performance of the residual heat removal heat exchangers. The licensee addressed the instrument

uncertainties when they reviewed the thermal performance monitoring test of the residual heat removal heat exchangers conducted in April 1995. The licensee found that the uncertainties contributed significantly to increasing the fouling factor calculated from the test. The fouling factor calculated from the test was 0.00112. When the uncertainties were added the factor became 0.00199, which was still less than the design fouling factor. The inspector also reviewed the flow test data performed on the residual heat removal heat exchanger in May 1995 during a flow balance test. Even after a reduction for instrument inaccuracies, the flow through the 1B heat exchanger was measured to be 6983 gpm. The licensee stated that since design heat loads could still be removed with a fouling factor of 0.00239 as long as the flow through the residual heat removal heat exchanger was 6900 gpm, there was sufficient margin. In addition, the inspector reviewed a table that listed service water flow requirements for extreme hot weather. The table included uncertainties in flow measurements and there was still sufficient margin for hot weather operation. The licensee stated that the thermal performance monitoring procedure would be revised to include instrument uncertainties and the tables presented to the inspector would be formalized.

Conclusion

The inspector concluded that the licensee had adequately addressed the concerns and there were no further concerns regarding instrument inaccuracies.

2.3 (Closed) Unresolved Item 397/9503-04: A number of concerns were identified with the pressure relief valve program

Background

This unresolved item had been open due to a number of concerns with the licensee's pressure relief valve program. Some of these concerns included the licensee's lack of understanding of the importance of ring positions for relief valves with adjustable rings, valves that were greatly oversized for their application, and horizontally mounted pressure relief valves.

Followup

The inspector reviewed a draft of the licensee's pressure relief valve program dated September 1995. The purpose of the program was to ensure that all safety-related pressure relief valve set points were selected, set, and maintained so that the valves would operate reliably. The scope of the program included relief valve selection, design basis review, testing, maintenance, tracking, trending and reporting. The inspector concluded that the draft program plan appeared to be very good. The licensee stated that the scheduled date for the program to be implemented was the end of March 1996.

The inspector reviewed the relief valve engineer's notebook and noted that the engineer had been in contact with the various suppliers of pressure relief valves. In addition, the licensee was in process of reviewing all safety relief valve data packages for ring settings. For example, the engineer had

contacted Crosby Valve and Gage Company concerning the safety-related valves and had obtained copies of the original test sheets which provided the as-shipped ring settings for adjustable ring valves. The licensee stated that the manufacturer's ring settings were to be incorporated into the work orders for each valve by the valve serial number. In addition, the licensee stated that the majority of the relief valves were used for thermal relief applications where the valve had to relieve a little pressure but not a continuous flow. For thermal relief applications, a relief valve did not generally achieve a full lift, therefore, the ring settings did not affect the performance of the valve.

The inspector reviewed four work order packages for relief valves. Work Order Task KE26, dated July 1995, contained a copy of the original manufacturer's test sheet which listed the as-shipped ring setting. The inspector noted that in the body of the work order the valve was set to the same ring setting. Work Order Tasks ST77, dated May 22, 1995, ST79, dated May 22, 1995, and RH14, dated May 12, 1995, also contained the manufacturer's recommended ring settings.

A previous inspection noted that the maximum flow that Relief Valve RCIC-RV-19T would see was 33 gpm and that the valve had a rated capacity of 200 gpm. The inspector was concerned that the low flow condition of 33 gpm could be sufficiently below the rated flow and that valve chattering could occur, possibly damaging the valve. The inspector reviewed an August 4, 1995, letter from the licensee to the valve vendor, which expressed the same concern. The vendor's response indicated that the valve was greatly oversized and could lead to an instability problem if the valve were required to open. The licensee stated that the valve had opened a few times and valve instability problems had not been observed. In addition, the licensee stated that they were in the process of reviewing their options for replacing the valve.

The inspector reviewed the licensee's vendor Test Procedure T-16186, "General Electric Company Purchase Order No. 205-AH930, Crosby Factory Order No. N-63949," Revision 6. This test procedure specified that the valves mounted on the residual heat removal heat exchangers had been tested in the horizontal position, instead of the standard vertical position. Therefore, the inspector concluded that mounting the valves in the horizontal position was acceptable since they had been tested in that position.

Conclusion

The inspector concluded that the licensee had developed a satisfactory relief valve program, and implemented adequate control of relief valve ring settings. In addition, the inspector concluded oversized valves and the horizontally mounted valves were acceptable.

2.4 (Closed) Unresolved Item 397/9503-05: Basis for acceptability of ADS air accumulator check valves with excessive leakage

Background

This unresolved item was opened because four of the seven automatic depressurization system (ADS) air accumulators had check valves with leak rates in excess of the action value of 1 scfh provided in Procedure 7.4.0.5.53, "CIA-V-40 and CIA-V-36 Operability Test," Revision 4. The procedure had been prepared to meet the ASME Code Section XI requirements. The problem was documented in Problem Evaluation Request 292-804, dated July 1, 1992. A reportability evaluation was performed which concluded that the four leaking valves were not reportable to the NRC and that the ADS valves were operable. This conclusion was based on a reportability evaluation that stated that calculations indicated that leak rates of less than 10 scfh would be adequate to ensure the short-term operation of the ADS valves. However, the inspector questioned the basis of the acceptability of a 10 scfh leak rate.

Followup

During this inspection, the licensee stated that the calculation referred to in the reportability evaluation had not been located, and was believed to have been an informal analysis to support the evaluation. Nevertheless, the licensee stated that Calculation NE-02-88-21, "Availability of Reactor Relief Valve Accumulators during Postulated Maximum Fire Scenario," dated February 1989, had previously analyzed the ability of the nitrogen accumulators to maintain the main steam safety relief valves open in the ADS mode in response to a control room fire when the nitrogen supply was isolated because of a loss of offsite power. In response to this concern, the licensee used the same formula and calculated how long the ADS accumulators would hold the main steam safety relief valves open with a leak rate of 10 scfh. The calculated value was 2.35 hours. In addition, the licensee noted that Final Safety Analysis Report Figure 6.3-4b showed that the depressurization period of the ADS was approximately 6.5 minutes. This figure plotted reactor pressure versus time after a break assuming a small break and high pressure core spray failure.

The licensee also stated that there were two nitrogen systems for the accumulators, one nonsafety and the other safety-related. The ADS safety-related nitrogen supply was designed to provide long-term makeup capability for the accumulators to compensate for nitrogen losses due to valve cycling and accumulator leakage.

Conclusion

The inspector concluded that there was no operability concern with the leakage rate of the check valves because, even with a leakage rate of 10 scfh, the valves would remain fully open for 2.5 hours.

2.5 (Closed) Violation 397/9503-06: Washington Nuclear Project-2 procedure for the testing and repair of pressure relief valves was inadequate

Background

This violation was issued due to an inadequate procedure for the testing and repair of pressure relief valves. Procedure 10.2.8, "Testing and Repair of Safety and Relief Valves," Revision 15, contained a number of paragraphs that discussed ring positions. The procedure had been found to be misleading and inaccurate.

Followup

The inspector reviewed Revision 16, dated April 26, 1995, of the procedure and found the procedure had been revised to correct the concerns identified in the violation. The inspector noted that the revised procedure contained instructions for following the valve vendor's recommendations for setting the adjusting rings, provided instructions requiring the signature of the Authorized Nuclear Inspector to document his review of the requirements for as-found and post maintenance testing of ASME Section III relief valves, and contained detail for maintaining and adjusting various manufacturer's relief valves.

Conclusion

The inspector concluded that the pressure relief valve test procedure had been adequately revised based on the above.

ATTACHMENT

1 PERSONNEL CONTACTED

1.1 Licensee Personnel

J. Burn, Director Engineering
L. Fernandez, Licensing Engineer
C. Foley, Licensing Engineer
J. Irish, B.P.A.
J. McDonald, Assistant Engineering Director
T. Meade, Engineering Programs Manager
M. Monopoli, Maintenance Manager
S. Mulkey, Engineering Programs Supervisor
J. Parrish, Vice President Nuclear Operations
G. Smith, Director Quality Assurance
J. Swailes, Plant Manager

1.2 NRC Personnel

R. Barr, Senior Resident Inspector
G. Johnston, Senior Project Inspector

2 EXIT MEETING

An exit meeting was conducted on September 15, 1995. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.