UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENCLOSURE

EVALUATION OF RELIEF REQUEST
YANKEE ROWE NUCLEAR POWER STATION
PUMP AND VALVE INSERVICE TESTING PROGRAM

INTRODUCTION

This evaluation documents the review of a relief request submitted by Yankee Atomic Electric Company for their Yankee Rowe Nuclear Station Pump and Valve Inservice Testing (IST) Program, as described and forwarded to the NRC by a letter dated August 9, 1990.

This relief request was evaluated utilizing the criteria and guidance contained in the Code of Federal Regulations 10 CFR 50.55a and Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs." Relief may be recommended where it is determined that the request adequately meets one or more of the following criteria:

The proposed alternative provides a level of quality and safety essentially equivalent to that afforded by the Code required testing.

Testing the affected components in accordance with the Code requirements is impractical and the proposed testing provides adequate assurance of operational readiness.

Testing the affected components in accordance with the Code requirements would place an unreasonable burden on the licensee without a compensating increase in safety and the proposed alternative testing provides adequate assurance of operational readiness.

EVALUATION

This request is analogous to the licensee's request for relief for the shutdown cooling pump which was granted by NRC letter dated April 11, 1990.

The licensee has requested relief from the quarterly pump testing requirements of the 1980 Edition through Winter 1980 Addenda of Section XI, Paragraph IWP-3400, for the low pressure surge tank cooling pump, P-23. The licensee has proposed testing this pump during cold shutdowns and refueling outages. The licensee stated in the August 9, 1990, request:

> "The low pressure Surge Tank Cooling Pump, P-23, is used as an alternative to the Shutdown Cooling Pump P-19 to cool the Main Coolant System from 330°F to 140°F or less during plant cooldowns. The only testing circuit available to supply a positive suction head to the pump for the quarterly inservice testing is taking suction from and discharging to the Low Pressure Surge Tank (LPST).
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> The LPST functions during plant operation to provide a surge volume for Main Coolant System (MCS) volume control. The LPST receives letdown flow from the MCS and is the suction source for charging back to the MCS. In addition, it provides the source for flow through ion exchangers which maintain primary water quality.
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> During power operation, mixing between the LPST and the MCS via charging and letdown operations maintains the LPST boron concentration in equilibrium with the MCS. Inventory additions to the LPST are carefully controlled to maintain this equilibrium. Any disturbances in the LPST boron concentration will result in a change in the MCS boron concentration via charging and letdown operation. Changes in the MCS boron concentration require compensating action by plant operators to maintain steady state power operation.
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> Despite its name, the LPST cooling pump is not used to cool the LPST. This is accomplished using the Purification Pumps, P-16. The boron concentration in the LPST Cooling System Piping is significantly greater (several hundred ppm) than the LPST concentration. Mixing of this water with the LPST inventory as a result of pump testing would dramatically change the LPST boron concentration and, due to charging and letdown operation, result in undesirable changes in core reactivity in which the operators would have to respond.
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> The only means available to preclude test-induced reactivity changes would be to halt charging and letdown operation for both the duration of the test and a sufficient post-test time interval to equiliberate the LPST boron concentration. Iterative sampling and LPST make-up operations would be required to accomplish this. It is expected that several hours would be required to perform these actions in a manner which assures that steady state power operation is maintained. This would result in an extended loss of normal charging and bleed operations. Testing of the low pressure surge tank cooling pump during power operation is impractical because it would result in the loss of the normal volume control function of the low pressure surge tank.

Based on the above, relief is requested from this code requirement.

As an alternative to quarterly testing, the LPST cooling pump will be tested during cold shutdown, and refueling outages.

During this testing, the code-required parameters of flow, differential pressure, vibration, bearing temperature, and lubrication will be observed and measured. Testing the pump at this time will also allow the pump to operate at normal temperatures, pressures, and flow rates, providing more accurate and useful performance data."

We agree with the licensee's analysis that the only flow path for testing the pump during power operations takes suction from, and discharges to, the LPST. Because the shutdown cooling system boron concentration is significantly higher than the LPST boron concentration, recirculatioon of the LPST water with the low pressure surge tank cooling pump to accomplish pump testing would increase the boron concentration of the LPST. Since the LPST serves as a suction source for the charging pumps, performing this testing with the system in its normal lineup would cause an increase in the MCS boron concentration. This would result in a reactivity transient which could cause a plant trip. Power operation without charging or letdown flow would be a complex evolution. However this abnormal plant lineup would have to be maintained for a considerable length of time while the low pressure surge tank cooling pump is tested and the LPST boron concentration is reestablished at the necessary value. The undesirable lineup could result in a disruption of MCS chemistry control since the purification system would not be available and could also result in a loss of pressurizer level control. Additionally, this testing flow path is not equipped with flow instrumentation. Therefore, the flow rate measurements required by the Code could not be obtained without system modifications. The unplanned shutdowns which could arise due to this testing during power operation and the system modifications necessary for the installation of flow rate instrumentation would be burdensome for the licensee due to the costs involved.

The shutdown cooling system is used during cold shutdowns and refueling outages to remove reactor decay heat. Testing of the low pressure surge tank cooling pump can be accomplished at this time and all Code required parameters can be measured. This testing should provide reasonable assurance of operational readiness.

CONCLUSION

Based on the determination that performing pump testing at the Code required frequency is impractical, that the licensee's proposed alternative would provide reasonable assurance of operational readiness, and considering the burden on the licensee if Code requirements were imposed, relief may be granted as requested.

Dated:

Principal Contributor: V. L. Rooney