



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

SAFETY EVALUATION BY THE OFFICE OF
NUCLEAR REACTOR REGULATION
RELATED TO THE INSERVICE TESTING PROGRAM
AND REQUESTS FOR RELIEF
NORTH ANNA UNITS 1 AND 2

1.0 INTRODUCTION

By letter dated June 14, 1990, Virginia Electric and Power Company (the licensee) submitted a relief request related to the inservice pump and valve testing program for North Anna Units 1 and 2. Relief request P-7 requested relief from requirements for outside recirculation spray pumps concerning test duration and inlet pressure measurements.

2.0 RELIEF REQUEST P-7

The licensee requested relief from ASME Section XI, IWP-3100 and IWP-4200, pump test requirements, to run the pump for 5 minutes prior to measurements and to measure differential pressure, respectively. This relief request is applicable only for testing of the outside recirculation spray pumps 1-RS-P-2A, 1-RS-P-2B, 2-RS-P-2A and 2-RS-P-2B.

2.1 Basis for Relief

The test loop for these pumps contains a small volume of water. A 4-inch test recirculation line branches off the 10-inch pump discharge line a short distance from the pump. The recirculation line discharges into the sump which is a cylinder approximately 50 feet long and 2 feet in diameter. Because of the small volume in the test loop, the hydraulic parameters stabilize quickly. Therefore, a 5-minute stabilization period is not necessary to achieve repeatable test results.

In addition, if the pump is run for too long a period, the water will heat up due to the limited water volume. This heatup can lead to excessive pressure in the test loop.

The recirculation test loop will be filled with water to establish initial conditions for testing. Inlet pressure remains constant for the test loop from test to test, therefore, any change in differential pressure will be directly indicated by monitoring pump discharge pressure. The licensee proposes that these pumps be flow-tested using their recirculation test loops every quarter. After a 2-minute stabilization period, discharge pressure (instead of differential pressure), flow rate and vibration measurements will be taken.

3.0 EVALUATION

The licensee proposes to test these pumps quarterly to verify operability using recirculation test loops. The recirculation test loops for these pumps are closed paths containing limited volumes of water. The licensee has reason for concern that excessively high pressure created by heatup can be produced

in the closed loop if the pump is allowed to run too long. The system conditions stabilize quickly with the limited water volume and the licensee has determined that the 5-minute warmup run is not required to achieve repeatable test results. The proposed 2-minute stabilization run prior to parameter measurements should provide adequate system conditioning for obtaining repeatable test results suitable for assessing pump operational readiness. Based on our review, we find that the licensee's proposed test duration before taking measurements will provide an acceptable level of quality and safety, and therefore relief may be granted from the requirements of IWP-3100, pursuant to 10 CFR 50.55a(a)(3)(i).

Furthermore, instrumentation does not exist in the pump inlet, and therefore pressure measurements cannot be taken. The recirculation test loop will be verified to be filled with water and vented to establish initial test conditions. The pump takes suction from and discharges to the same sump in a closed loop during testing. Therefore, the pump suction pressure will remain constant for the test loop from test to test and monitoring the discharge pressure would only provide an indication of changes in the differential pressure developed by the pump. However, the allowable pump differential pressure ranges of Table IWP-3100-2 are based on a ratio of test and reference values of differential pressure, not discharge pressure. Therefore, if only discharge pressure is measured, the static inlet pressure must be calculated to determine a differential pressure applicable to the Table IWP-3100-2 ranges.

4.0 CONCLUSION

Based on our review, we find the licensee's proposal to be acceptable provided the static suction pressure, based on head, is calculated and used with the measured discharge pressure to determine differential pressure developed by the pump.

If relief from the requirement to measure differential pressure is not granted, a system modification would not be necessary to allow direct measurement of pump inlet pressure. This modification would be burdensome for the licensee and the additional information provided would have minimal impact on the licensee's ability to detect pump operational readiness or degradation. Based on the impracticality of obtaining suction pressure measurements, the burden on the licensee if these code requirements were imposed, and the licensee's proposed alternate testing methods, we conclude that relief may be granted from the requirements of IWP-4200 pursuant to 10 CFR 50.55a(g)(6)(i), provided the inlet pressure is calculated and used as described above to determine differential pressure developed by the pump. This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden that could result if the requirements were imposed.

Dated: November 8, 1990

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