UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE TESTING PROGRAM RELIEF REQUESTS

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NUMBER 50-333

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of inservice testing programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995. Guidance is also provided in NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements."

The 1989 Edition of the ASME Code is the latest edition incorporated by reference in Paragraph (b) of Section 50.55a. Subsection IWV of the 1989 Edition, which gives the requirements for IST of valves, references Part 10 of the American National Standards Institute/ASME *Operations and Maintenance Standards* (OM-10) as the rules for IST of valves. OM-10 replaces specific requirements in previous editions of Section XI, Subsection IWV, of the ASME Code. Subsection IWP of the 1989 Edition, which gives the requirements for IST of pumps, references Part 6 of the American National Standards Institute/ASME *Operations and Maintenance Standards* (OM-6) as the rules for IST of pumps. OM-6 replaces specific requirements in previous editions of Section XI, Subsection IWP, of the ASME Code.

On November 2, 1998, the Power Authority of the State of New York (the licensee, also known as the New York Power Authority) submitted the Inservice Testing Program for Pumps and Valves, Third Interval Plan, Revision 2 for the James A. FitzPatrick Nuclear Power Plant. Included in the submittal is one new Relief Request, PRR-06, and one revised Relief Request, VRR-06R1. VRR-06 was originally submitted in the October 21, 1997, third ten-year IST program update, but was retracted by the licensee's July 30, 1998 letter. The staff's

Enclosure

November 17, 1998, safety evaluation (SE) of the licensee's original IST program for the third interval (submitted on October 21, 1997) did not evaluate this relief request. Additionally, one relief request that was evaluated in the staff's SE, VRR-05, has been deleted in Revision 2. The other changes in Revision 2 are mainly editorial and do not affect the conclusions of the staff's November 17, 1998 SE.

2.0 EVALUATION

2.1 Pump Relief Request PRR-06

For the residual heat removal service water (RHRSW)/emergency service water (ESW) system pumps (10P-1A, 10P-1B, 10P-1C, 46P-2A, and 46P-2B), the licensee requests relief from the requirements of OM-6 Section 4.6.1.1. This section specifies that instruments used for pressure measurement be accurate to within ±2% of the full-scale reading on the instrument.

2.1.1 Licensee's Basis for Requesting Relief

The licensee states:

> The RHRSW and ESW pumps are of a vertical submerged open line shaft design. There is no installed instrument for direct measurement of the inlet pressure. Instead, the minimum pumping level is monitored to ensure adequate NPSH [net positive suction head] is available for pump operation. Since the forebay water level is not expected to change significantly during the testing of these pumps, only one measurement per test is required.
>
> During each test, the difference in elevation between the forebay water level and the pump discharge pressure gauge will be determined by measurement. This value will be verified to be less than or equal to the value corresponding to the minimum water level required for pump operation and will also be used to calculate pump differential pressure. This calculation method is in accordance with OM-6, Section 4.6.2.2, and NUREG-1482, Section 5.5.3.
>
> Due to limitations of human factors related to measuring the elevation between the forebay water level and the pump discharge pressure gauge, the accuracy of differential pressure calculation(s) cannot be verified to within ±2% as required by the Code.

2.1.2 Alternate Testing

The licensee proposes:

> In accordance with the guidance provided in NUREG-1482, Section 5.5.3, Differential Pressure for the RHRSW and ESW pumps will be measured as follows:
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> For each pump, the pump correction value will be determined by measuring the difference in elevation between the forebay water level and the pump discharge pressure gauge, and then calculated in accordance with the procedure. The discharge pressure of the pump will be recorded and then added to the pump correction value to determine the Differential Pressure. This value will be recorded during the performance of each test and then

evaluated in accordance with analysis and evaluation criteria specified in OM-6, Section 6, as applicable.

2.1.3 Evaluation

The RHRSW/ESW pumps provide cooling water for safety-related heat loads during a design basis loss-of-coolant accident. OM-6, Section 4.6.1.1 requires that the instruments used for pressure measurement be accurate to within ±2% of the full-scale reading on the instrument.

Pressure gauges are not installed in the inlet of these vertical line shaft pumps. So, instead of directly measuring the inlet pressure for use in determining pump differential pressure, the licensee proposes to use a calculational method.

Guidance on using forebay level to calculate differential pressure is contained in NUREG-1482, Section 5.5.3 and NUREG/CR-6396, Section 3.2. The staff has determined that, if the licensee uses a bay level to calculate the inlet pressure, the calculation should be included in the implementing procedure. The proposed alternate testing method meets this criterion. However, the guidance also states that the licensee should verify that the reading scale for measuring the level and the calculational method yield an accuracy within ±2%. The licensee's statement that "[d]ue to limitations of human factors related to measuring the elevation between the forebay water level and the pump discharge pressure gauge, the accuracy of differential pressure calculation(s) cannot be verified to within ±2% as required by the Code" does not provide sufficient justification for granting relief based on impracticality. In Appendix A to NUREG-1482, Response to Question Group 105, the staff stated that in determining what is "practical within the limitation of design, geometry, and materials of construction of the component," the staff considers modifications such as the installation of instrumentation to be practical as used in 10 CFR 50.55a(f)(4). Therefore, the licensee should either comply with the Code or develop and justify another method of evaluating the hydraulic performance of these pumps.

2.1.4 Conclusion

The proposed alternative is authorized for an interim period of 1 year pursuant to 10 CFR 50.55a(a)(3)(ii) based on the determination that immediate compliance with the requirements would result in a hardship without a compensating increase in the level of quality and safety, given the assurance of operational readiness provided by the proposed alternative during this interim period. This interim period will provide the licensee sufficient time to adequately address differential pressure calculational accuracy. The licensee should either 1) resubmit this relief request with a more detailed description of how the human factors considerations preclude meeting the Code accuracy requirement and provide an indication of the differential pressure calculation accuracy that can reasonably be achieved with the installed system configuration, or 2) install instrumentation to directly measure the pump inlet pressure to the level of accuracy required by the Code.

2.2 Valve Relief Request VRR-06R1

The licensee has requested relief from the requirements of OM-10, Section 4.2.1.4 for the service water/emergency service water valves, 70TCV-120A, 70TCV-120B, 70TCV-121A,

70TCV-121B, 67PCV-101. This section of the Code describes the stroke testing requirements for power operated valves.

2.2.1 Licensee's Basis for Requesting Relief

The licensee states:

> These valves have no position indication or manual control switches. Valve operation is controlled by temperature switches or pressure controllers. Stoke timing these valves would be extremely difficult and require an abnormal system configuration to obtain consistent stroke time results. Performing a stroke time test of these valves is impractical without a compensating level of quality and safety.

2.2.2 Alternate Testing

The licensee proposes:

> In accordance with the guidance provided in NUREG-1482 adequate assessment of the operational readiness of these valves is achieved as follows:
>
> All valves are fail safe tested on a quarterly frequency. Prior to the test the valves are verified to not be in the full open position. During conduct of the test the valve air or electrical control is interrupted and the valve operation is observed locally to verify proper operation and movement to the fail safe full open position.
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> Valves 70TCV-121A,B are also stroked once per operating cycle per Technical Specification 4.11.B.2 during the calibration of their associated instrumentation control loop.
>
> Valves 70TCV-120A,B are also stroked once per operating cycle during the calibration of their associated instrumentation control loop.

2.2.3 Evaluation

The normal function of the temperature control valves 70TCV-120A,B and 70TCV-121A,B are to modulate the flow of chilled water in order to maintain appropriate air temperature and relative humidity in the Operations Office, Control Room, and Relay Room. The safety function of the valves is the same except that failure of the valve actuator mechanism results in valve movement to the maximum cooling water flow position.

The normal function of valve 67PCV-101 is to maintain a backpressure at the common service water return header for the cable tunnel and electric bay coolers. The safety function of this valve is to fail open on loss of air.

Control valves that perform a safety function are required to be tested in accordance with the Code requirements so that the valves can be monitored for degrading conditions. Paragraph 4.2.1.4 of OM-10 requires that power-operated valves be stroke tested. A limiting value of full-stroke time of each valve will be specified, and the stroke time will be measured to the nearest

second and compared to the limiting value. Any abnormalities will be evaluated for possible corrective actions.

These valves have no position indication or manual control switches. It is possible to stroke time the valves. However, it would be very difficult and require an abnormal system configuration. This would result in a hardship for the licensee and doing so may compromise a level of quality and safety. Instead of conforming to Code-required testing, the licensee proposes an alternative that is consistent with the guidance in NUREG-1482, Section 4.2.9.

In NUREG-1482, the staff recommends that licensees investigate alternatives that include stroke-timing with acoustic or other nonintrusive methods, stroke timing with local observation or observation of system conditions, enhanced maintenance with a periodic stroke which may not be timed, stroke timing and fail safe testing during cold shutdowns or refueling outages that involve bypassing control signals and a control system signal calibration to verify the stroke times of the valves. The licensee's proposed alternative to quarterly fail-safe test the valves while locally observing valve operation, along with stroking the valves once per operating cycle during a calibration of their associated instrument control loop, should provide reasonable assurance of the valves' operational readiness.

2.2.4 Conclusion

The proposed alternative to the requirements of OM-10 Paragraph 4.2.1.4 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). Compliance with the specific requirements of this section would result in hardship without a compensating increase in the level of quality and safety.

3.0 SUMMARY

The proposed alternative described in Relief Request VRR-06R1 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), on the basis that compliance with the specific Code requirements would result in unusual difficulty without a compensating increase in the level of quality and safety.

The proposed alternative described in Relief Request PRR-06 is authorized for an interim period of 1 year from the date of the letter forwarding this SE pursuant to 10 CFR 50.55a(a)(3)(ii), based on the determination that immediate compliance with the requirements would result in a hardship without a compensating increase in the level of quality and safety. After that time, the licensee should either 1) resubmit this relief request with a more detailed description of how the human factors considerations preclude meeting the accuracy requirements of the ASME Code, and provide an indication of the differential pressure calculation accuracy that can reasonably be achieved with the installed system configuration, or 2) install instrumentation to directly measure the pump inlet pressure to the level of accuracy required by the ASME Code.

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