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

SUPPLEMENT TO SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM RELIEF REQUESTS

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR PROJECT NO. 2 (WNP-2)

DOCKET NO. 50-397

1.0 INTRODUCTION

On December 16, 1994, Washington Public Power Supply System (Supply System or the licensee) submitted its Second Ten-Year Interval Pump and Valve Inservice Testing (IST) Program for WNP-2. In response, on November 27, 1995, the NRC provided a safety evaluation (SE) and associated technical evaluation report (TER) of the Second Ten-Year Interval IST Program for WNP-2. The letter forwarding this SE requested a response to seven recommended actions identified in the TER (Recommendations 4.1 through 4.7) within one year. In a letter to the NRC dated November 25, 1996, the Supply System addressed each of the seven recommended actions contained in the TER.

Section 50.55a of Title 10 of the Code of Federal Regulations requires that inservice testing of 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 and applicable addenda, except where specific relief has been requested by the licensee and granted by the Commission pursuant to 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), or (f)(6)(i). 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 the facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from the ASME Code requirements upon making the necessary findings.

The Supply System has requested relief from certain ASME Section XI testing requirements. The staff's review of the relief requests was performed using Section 3.9.6 of the Standard Review Plan; Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs;" the Minutes of the Public Meeting on Generic Letter 89-04 dated October 25, 1989, and September 26, 1991; and Supplement 1 to Generic Letter 89-04 which contains NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants." The IST Program requirements apply only to components (i.e., pumps and valves) testing and are not intended to provide a basis to change the licensee's current technical specifications for system test requirements.

2.0 EVALUATION

Relief Request RP01

RPO1 was approved by the staff on November 27, 1995, and authorized the use of discharge pressure instead of pump differential pressure for the standby service water and high pressure core spray pumps. When the alternative was authorized, the staff recommended the licensee justify that the pump discharge pressure is less than the calculated differential pressure for the entire range of suction pressures. The licensee has provided the requested information, which is discussed below.

Section 4.6.2.2 of OM-6 allows the licensee to determine differential pressure using a calculational method by determining the difference between the pressure at a point in the inlet pipe and a pressure at a point in the discharge pipe. The licensee stated that "A review of the discharge pressure gauge reading, which is uncorrected for elevation [emphasis added], compared to differential pressure readings shows that basing corrective action on discharge pressure is slightly more conservative than basing it on differential pressure for these pump installations." In other words, the situation presented in the relief request is one where the pump discharge pressure gauge (i.e., measured pressure) is significantly higher than the actual discharge of the standby service water and high pressure core spray service water pumps. In this situation, the measured discharge pressure will be less than the actual pump discharge pressure by some value (Δh - actually a combination of static head and flow losses).

$$P_{measured} = P_{discharge} - \Delta h$$

$$P_{discharge} = P_{measured} + \Delta h$$

Pump differential pressure (ΔP) is the pump discharge pressure minus the pump suction pressure.

$$\Delta P = P_{discharge} - P_{suction}$$

Substituting,

$$\Delta P = (P_{measured} + \Delta h) - P_{suction}$$

$$\Delta P = P_{measured} + (\Delta h - P_{suction})$$

If the pump discharge pressure gauge correction (Δh) is larger than the suction pressure for the entire range of suction pressures, then the measured discharge pressure ($P_{measured}$) will always be less than the differential pressure (ΔP), regardless of whether the suction pressure and/or ΔP are calculated. Consequently, the acceptance criteria based on measured discharge pressure (i.e., 0.95 to 1.10 $P_{measured}$) will be more conservative (narrower range) than the acceptance criteria using differential pressure (i.e., 0.95 to 1.10 ΔP). Therefore, the staff accepts the licensee's position on this issue.

The licensee's update to Relief Request RP01 is responsive to the recommended action and is acceptable to the staff. The proposed alternative remains authorized pursuant to 10 CFR 50.55a(a)(3)(i) based on a determination that the proposed alternative would provide an acceptable level of quality and safety.

Relief Request RP02

RP02 was approved by staff, granting relief from the requirement of Part 6, paragraph 4.6.5. The requirement is to measure the flow rate using a rate or quantity-meter installed in the pump test circuit for the diesel fuel oil transfer pumps, DO-P-1A, DO-P-1B and DO-P-2. The licensee's basis for the relief request was that a rate- or quantity-meter was not installed in the test circuit and to have one installed would be costly and time consuming with few compensating benefits. The alternative to measuring the flow rate, was to calculate the flow rate based on the change in tank level corresponding to a known number of gallons divided by the time required to pump that volume.

When the relief request was granted it was recommended that the licensee ensure that the calculation methods are properly proceduralized and meet quality assurance requirements. The licensee responded that the determination methodology for these pumps shows that the calculated accuracy meets the ASME Code required 2% accuracy and that calculation methods are specified in surveillance procedures and meet the quality assurance requirements.

The licensee's update to Relief Request RP02 is responsive to the recommended action and is acceptable to the staff. The relief request remains granted and the alternative imposed for the fuel oil transfer pumps pursuant to 10 CFR 50.55a(f)(6)(i), based on impracticality and the determination that it will not endanger the life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that would result if the requirement were imposed on the facility.

Relief Request RP05

RP05 was approved by the staff, authorizing use of existing discharge pressure instrumentation for the residual heat removal and high pressure core spray pumps (i.e., use of pressure instruments that exceed the range requirements of Section 4.6.1.2(a) of OM-6). Recommendation 4.3 stated that "In the event these instruments are replaced, the licensee should install instruments which meet all ASME Code requirements."

The Supply System responded that if one of these instruments were to fail, a like replacement would have to be used. The reason for use of pressure instrumentation that exceeds the range requirements of the ASME Code is to provide pressure indication over the full operating range of the pumps. The updated relief request states that "this is not a concern because the existing instrumentation provides pump discharge pressure indication of better accuracy and better resolution than that required by the ASME Code for evaluating pump condition and detecting degradation."

Section 5.5.1 of NUREG-1482 states:

> When the range of a permanently installed analog instrument is greater than 3 times the reference value but the accuracy of the instrument is more conservative than the Code, the staff will grant relief when the combination of the range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements (i.e., up to ± 6 percent).

The guidance provided above indicates that the staff will grant relief when readings obtained from an instrument are at least as accurate as readings obtained from an instrument that meets both the instrument range and instrument accuracy requirements specified in the ASME Code. Therefore, if a licensee requests relief from the ASME Code-specified range requirement, but uses a pressure instrument that is more accurate, such that the combination of range and pressure results in a reading that is equivalent to the ASME Code required instrumentation, then the staff would grant the relief.

The licensee's update to Relief Request RP05 is responsive to the recommended action and remains consistent with the guidance in Section 5.5.1 of NUREG-1482 and is acceptable to the staff. The proposed alternative remains authorized pursuant to 10 CFR 50.55a(a)(3)(i) based on demonstration that the proposed alternative would provide an acceptable level of quality and safety.

Relief Request RP07

An alternative was authorized on November 27, 1995, from Part 6, paragraph 4.6.1.6, which required that the frequency response range of vibration measuring transducers and their read out system shall be from one-third minimum pump shaft rotational speed to 1000 Hz, for the standby liquid control pumps (SLC-P-1A and B). The licensee's basis for the relief request was the difficulty of finding field certifiable instrumentation that could satisfy this criterion. The licensee's proposed alternative was that vibration measurement will be taken using instrumentation accurate within ± 3% of full scale over a frequency range of 6 Hertz to 3 kilohertz. All deviations from the reference value shall be compared with the limits given in Part 6, Table 3 and corrective actions taken as specified in Part 6, paragraph 6.1.

When the alternative was authorized, it was recommended that in the event that the licensee replaces the vibration monitoring instrumentation it does so with instrumentation that meets all the ASME Code requirements. The licensee responded that if it does replace the instrumentation it will do so with instrumentation that meets all ASME Code requirements.

The licensee's update to Relief Request RP07 is responsive to the recommended action and is acceptable to the staff. The proposed alternative remains authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on compliance with the specified requirements of this section would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Revised Relief Request RV02

On November 27, 1995, interim relief was granted to the licensee, for a period of one year or until the next refueling outage, whichever is later, from the ASME Code requirement to perform a quarterly exercise test for each in-series water leg check valve in the low pressure core spray, high pressure core spray, and residual heat removal systems.

The licensee requested the relief based on the impracticality of verifying the ability of each valve in series to close. Testing of the valves would require a modification to install a test connection or grinding out a seal weld to dismantle and inspect the valves.

The proposed alternative to the ASME Code-specified test was to test each pair of series check valves to verify the closure capability of at least one of the valves to prevent reverse flow. Also, if the closure capability of the pair of valves is questionable, both valves shall be declared inoperable and will be repaired or replaced before being returned to service.

The staff's November 27, 1995, SE provided interim approval for this relief request, and recommended that the licensee revise and resubmit this relief request. The recommended action was for the licensee to review their Updated Safety Analysis Report and ensure that both valves are not required to function, and to revise the relief request to include this information and the acceptance criteria.

The staff has reviewed revised Relief Request RV02 and finds it to be consistent with the recommended action of the November 27, 1995, SE and the guidance provided in Section 4.1.1 of NUREG-1482. The staff has concluded that relief is granted and the alternative imposed is acceptable pursuant to 10 CFR 50.55a(f)(6)(i), based on impracticality and the determination that relief will not endanger the life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that would result if the requirement were imposed on the facility. This action supercedes the staff's previous interim approval of Relief Request RV02.

Relief Request RV04

An alternative was authorized on November 27, 1995, to Part 10, paragraph 4.2.1.4, concerning stroke time testing for the following containment isolation valves: PSR-V-X73-1, PSR-V-X80-1, PSR-V-X83-1, PSR-V-X77A1, PSR-V-X82-1, PSR-V-X84-1, PSR-V-X77A3, PSR-V-X82-7, PSR-V-X88-1.

The licensee's basis for the proposed alternative was that these nine solenoid valves are operated by a single key locked switch and to time each valve would require stroking each valve nine times. This repetitive cycling would cause unnecessary wear on the valves and the control switch.

The licensee's proposed alternative was to time the stroke of the slowest of the nine valves and if the stroke time of the slowest valve is in the acceptable range, then the stroke time of all the valves will be considered acceptable.

When the alternative was authorized, it was recommended that the licensee consider all the valves inoperable if the slowest valve is inoperable and to take corrective action in accordance with Part 10, paragraph 4.2.1.9. It was also recommended that the licensee revise the relief request to include information on the rapid acting characteristics of these valves. Additionally, the licensee should ensure that the testing method and procedure are adequate to monitor the position of all nine valves at once.

The licensee responded that the relief request has been revised to indicate the rapid acting characteristics of the valves and to declare all the valves inoperable if the closing stroke time of the slowest valves exceeds the two second limit specified for each valve and to take corrective action in accordance with Part 10 paragraph 4.2.1.9. Review of the surveillance procedure and

testing method confirms that the position of all nine valves can be successfully monitored at once.

The licensee's update to Relief Request RV04 is responsive to the recommended action and is acceptable to the staff. The proposed alternative remains authorized pursuant to 10 CFR 50.55a(a)(3)(i) based on a determination that the proposed alternative would provide an acceptable level of quality and safety.

Relief Request RV05

An alternative was authorized on November 27, 1995, to Part 1, paragraphs 1.3.3.1(b), 3.3.1.1, and 4.1.1.4 concerning test frequency, test sequence, and temperature stability, respectively, for testing the main steam pressure relief valves (MSRV). As part of the approval, the licensee was requested to revise the IST Program to clarify that the ASME 1994 addenda testing frequency requirements will be complied with. The licensee must ensure that no maintenance or set pressure adjustments are made prior to the set pressure determination.

The licensee responded that the testing frequency requirements of the ASME 1994 addenda will be complied with. In addition, the surveillance procedures will be revised prior to the next scheduled testing to ensure that no maintenance or set pressure adjustments will be made prior to the set pressure determination.

The licensee's update to Relief Request RV05 is responsive to the recommended action and is acceptable to the staff. The proposed alternative remains authorized pursuant to 10 CFR 50.55a(a)(3)(i) based on a determination that the proposed alternative would provide an acceptable level of quality and safety.

3.0 CONCLUSION

The staff concludes that Relief Requests RP01, RP05, RP07, RV04, and RV05 will provide reasonable assurance of the operational readiness of the pumps and valves to perform their safety-related functions, as stated. Relief Requests RP01, RP05, RV04, and RV05 remain authorized pursuant to 10 CFR 50.55a(3)(i) based on a determination that the proposed alternatives provide an acceptable level of quality and safety. Relief Request RP07 remains authorized pursuant to 10 CFR 50.55a(3)(ii) based on a determination that compliance with the specified requirements of this section of the code would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

For Relief Request RP02, the staff has determined that the relief request remains granted. The alternative imposed for the fuel oil transfer pumps is acceptable pursuant to 10 CFR 50.55a(f)(6)(i), based on impracticality and the determination that relief will not endanger the life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that would result if the requirements were imposed on the facility.

For revised Relief Request RV02, the staff has concluded that relief is granted and the alternative imposed is acceptable pursuant to 10 CFR 50.55a(f)(6)(i) based on impracticality and the determination that relief will not endanger the life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that would result if the requirements were imposed on the facility. This action supercedes the staff's previous interim approval of Relief Request RV02.

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