



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

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AN INSERVICE TESTING PROGRAM RELIEF REQUEST FOR
LIMERICK GENERATING STATION, UNITS 1 AND 2
DOCKET NOS. 50-352 AND 50-353

INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing (IST) of 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 written 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 (g)(6)(i). In 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 with certain requirements of the applicable Code edition and addenda is impractical for its facility.

The Regulation, 10 CFR 50.55a(a)(3)(i), (a)(3)(ii), and (g)(6)(i), authorizes the Commission to grant relief from ASME Code requirements upon making the necessary findings. The NRC staff's findings with respect to IST Program Relief Request GPRR-3 are presented in this safety evaluation.

The IST program associated with this safety evaluation covers the first ten-year inspection interval. The first ten-year interval for Units 1 and 2 commenced February 1, 1986 and January 8, 1990, respectively. The licensee's IST program for pumps and valves was submitted by letter dated November 23, 1988. Relief Request GPRR-3 was submitted by letter dated January 23, 1990. The staff's safety evaluation on overall IST program for the first ten-year interval was issued March 5, 1991.

The IST program is based on the requirements of Section XI of the ASME Code, 1986 Edition.

EVALUATION

IST Program Relief Request GPRR-3 has been reviewed by the staff with the assistance of its contractor, EG&G Idaho, Inc. (EG&G). The granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the alternative proposed testing.

The 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."

The licensee's basis for requesting relief from the ASME Code testing requirements and the staff's evaluation of that request is summarized below for the submitted relief request.

RELIEF Request No. GPRR-3

Relief Request. The licensee has requested relief from the instrument accuracy and allowable range requirements of Section XI Paragraphs IWP-4110 and -4120, for the Diesel Fuel Oil Transfer, Standby Liquid Control and Safeguard Piping Fill pumps. The licensee has proposed to use ultrasonic flow instrumentation, which is accurate to within +5% of reading, to measure flow rates.

Licensee's Basis for Relief Request. PECO proposes to measure flow using ultrasonic flow instrumentation that is calibrated to an accuracy with +5% of-reading instead of the ASME Code required +2% of full-scale. Although this equipment does not meet the Code requirements exactly, it meets the intent of the Code by ensuring that data collected during inservice testing is measured to the degree of accuracy specified in Articles IWP-4110 and IWP-4120. Because the Code does not address digital instruments and of-reading accuracy limits, a conversion of full-scale accuracy to of-reading accuracy is necessary to compare the ultrasonic instrument accuracy to the accuracy specified in the Code. Also, because the ultrasonic flow transducers are capable of measuring flow over the entire range of the instrument (0 to 40 feet/second), a percentage of full-scale accuracy would be meaningless when measuring low flow rates associated with small diameter pipes. To ensure that the most accurate data is collected during inservice testing, the technicians are provided guidance through the vendor manuals to select the transducer that is best suited for the pipe where flow is being measured.

For instruments to be in compliance with ASME Section XI Subsection IWP, two requirements must be satisfied. The first requirement (specified in IWP-4110, Table IWP-4110-1) states that flow instrumentation must be accurate to within +2% of the full-scale value; the second requirement (specified in IWP-4120) states that "the full-scale range of each instrument shall be three times the reference value or less." PECO's interpretation of these requirements allows for establishing a maximum of-reading error of +6% that would be acceptable per the ASME Code.

Magnetic flow meters, which provide greater accuracy, were considered. However, because the magnetic flow meters are not seismically qualified, they are not suitable for use in the required applications. Also, installation of these meters would require significant piping modifications.

The licensee considers that the ultrasonic flow instruments provide the necessary accuracy for pump performance trending purposes and to detect pump degradation. Also, the licensee considers that it meets the intent of the ASME Code since the ultrasonic flow instrument is accurate to within +5% of-reading. Although the existing method of measuring flow is acceptable (i.e., measuring change in tank level as a function of time), ultrasonic flow measurement provides more accurate data.

ALTERNATE TESTING. Use ultrasonic flow instrumentation, which is accurate to within +5% of-reading, for measuring IST flow data.

Evaluation. Section XI, Paragraph IWP-4110 requires the use of flow instrumentation with an accuracy of +2% of full-scale and IWP-4120 requires that the instrument full-scale range be equal to or less than three times the reference value. The worst case combination of these two requirements could result in an instrument that is only accurate to +6% at the reference value with higher inaccuracies for readings below the reference value. It is possible to use instrumentation whose accuracy does not meet the Section XI accuracy requirements but still is able to provide equivalent or better indication accuracy at the reference value than is allowed by the Code. Ultrasonic flow instruments are generally digital or multi-range instruments that cover a broad range of flow rates whose accuracy is not based on the full-scale range but rather on the indicated value. Use of instrumentation with an accuracy of +5% of the indicated value should be a reasonable alternative to the Code even though the Code accuracy requirement is not met. It would be a hardship without a compensating increase in the level of quality and safety to require the licensee to purchase instrumentation that meets the Code accuracy and range requirements since installation of such replacement instrumentation would require breaking the pressure boundary to install the measurement equipment and would not be significantly more accurate at and below the reference value than the instruments the licensee has proposed to use to measure IST data for these pumps.

The Section XI full-scale range requirements are not appropriate for digital or multi-range instruments whose accuracy and readability is not a function of the instrument full-scale range. These instruments are capable of reading accuracy. Multi-range instruments either automatically switch or can be manually switched to the range that results in a reading that is closest to being in the center of the scale. Requiring the licensee to use a single range analog instrument would be a hardship without a compensating increase in the level of quality and safety.

The licensee's proposal will provide a reasonable alternative to the ASME Code requirements. However, since the purpose of the Code is to monitor operational readiness and detect degradation, the licensee has stated that it will continue to obtain the most accurate IST test data possible with respect to the Code required accuracy. Therefore, when replacing this instrumentation, if the use of ultrasonic flow metering is retained, the licensee should purchase the instrumentation with the best obtainable accuracy consistent with reliability and suitability to the application, and with respect to ASME Code requirement accuracy.

CONCLUSION

Based on the review of the licensee's IST relief request, the staff concludes that the relief request as evaluated by this SE will provide reasonable assurance of the operational readiness of the pumps to perform their safety related functions. The staff has determined that granting relief, pursuant to 10 CFR 50.55a(a)(3)(ii) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest. Based on the determination that compliance with the Code requirements would be a hardship without providing a compensating increase in the level of quality and safety, relief is granted from the Code accuracy and range requirements as requested. IST Program Relief Request GPRR-3 for Limerick Generating Station, Units 1 and 2, provided by a submittal dated January 23, 1991, is acceptable for implementation.

Principal Contributor: E. Sullivan, Jr.

Dated: March 8, 1991

IST program changes such as additional relief requests or changes to relief requests should be submitted for staff review but should not be implemented prior to review and approval by the NRC. New or revised relief requests meeting the positions in Generic Letter 89-04, Attachment 1, can be implemented provided the guidance in Generic Letter 89-04, Section D, is followed. Program changes that involve additions or deletions of components from the IST program should be provided to the NRC.

Should you have any questions concerning the above, please do not hesitate to contact us.

Sincerely,

/s/

Walter R. Butler, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation

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