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Project Title:
Clone of 10 CFR 50.55a Request Associated with the Monticello Sixth Inservice Testing (IST) Ten-Year Interval PR-02 (L-MT-21-054)

Proposed Alternative Number or Identifier:
PR-02

Request Type:
10 CFR 50.55a(z)(1)

Inservice Inspection (ISI) or Inservice Testing (IST)
Inservice Testing (IST)

Requested Completion Date:
September 23, 2022

Brief Description of Proposed Alternative
Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests NRC authorization of this 10 CFR 50.55a request to support the implementation of the sixth IST ten-year interval for Monticello Nuclear Generating Plant (MNGP). Proposed Alternative No. PR-02 requests authorization for an alternative for determination of pump flow rate testing for Residual Heat Removal (RHR) and Residual Heat Removal Service Water (RHRSW) pumps. Summary of Commitments: This submittal makes no new commitments and no revisions to existing commitments.

Proposed Duration of Alternative (in terms of ISI/IST Program Interval with Start and End Dates):
This request, upon approval, will be applied to the MNGP sixth IST ten-year interval starting October 1, 2022 and is scheduled to end May 31, 2032.

Applicable ASME Code Requirements
ISTB-3510, General, paragraph (b), Range, subparagraph (1) states, "The full-scale range of each analog instrument shall be not greater than three times the reference value."

Applicable American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV Code), or ASME Operation and Maintenance of Nuclear Power Plants (OM Code), Edition and Addenda
American Society of Mechanical Engineers (ASME) OM Code, Operation and Maintenance of Nuclear Power Plants, 2017 Edition with no Addenda.

Current ISI or IST Program Interval Number and Start/End Dates

MNGP is currently on its fifth IST ten-year interval that is scheduled to end on September 30, 2022. The MNGP sixth IST ten-year interval begins on October 1, 2022.

Applicable ASME Code Components and/or System Description

P-202A/B/C/D, 11/12/13/14 RHR Pumps (Class 2) (Group A)

P-109A/B/C/D, 11/12/13/14 RHRSW Pumps (Class 3) (Group A)

Component/System Function

The Group A RHR pumps (P-202A/B/C/D) must operate to satisfy Low Pressure Coolant Injection and Containment Spray/Cooling requirements during post-accident conditions as well as performing a function during normal shutdown cooling.

The Group A RHRSW pumps (P-109A/B/C/D) are required to operate to remove the heat rejected by the RHR system during normal shutdown and accident operations. The pumps must also supply a source of water for the RHR-RHRSW Intertie.

Reason for Request

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), an alternative to the requirement of ISTB-3510(b)(1) is proposed for the following instruments: flow transmitters FT-10-111A/B and FT-10-97A/B, flow isolators FY-4105 and FY-4106, and flow indicators FI-7188 and FI-7189. These instruments are used in loops to determine pump flow rate during tests of pumps P-202A/B/C/D (RHR) and P-109A/B/C/D (RHRSW). The basis of this request is that the proposed alternative would provide an acceptable level of quality and safety.

The instrument loops are each designed to indicate flow while two parallel pumps are operating (RHR or RHRSW). During inservice testing, only one pump operates at a time. The resulting reference value of flow for one pump is less than one-third of each instrument's range. Each instrument loop is verified to have an as-found accuracy that is within 2% of full-scale for analog instruments.

The current relevant data for the instruments is included in Table PR-02-1 below:

Table PR-02-1

Loop Instruments	Pumps	Instrument Span (Range)	Equivalent Reference Value	Range to Reference Value Ratio
A RHR Pumps				
FT-10-111A and FI-7189	P-202A	4-20 mA (16 mA)	(6.46-4) = 2.46 mA	(16/2.46) = 6.50
	P-202C	4-20 mA (16 mA)	(6.59-4) = 2.59 mA	(16/2.59) = 6.18
B RHR Pumps				
FT-10-111B, FY-4106, and FI-7188	P-202B	4-20 mA (16 mA)	(6.43-4) = 2.43 mA	(16/2.43) = 6.58
	P-202D	4-20 mA (16 mA)	(6.43-4) = 2.43 mA	(16/2.43) = 6.58
A RHRSW Pumps				
FT-10-97A and FI-7189	P-109A	10-50 mA (40 mA)	(18.44-10) = 8.44 mA	(40/8.44) = 4.74

	P-109C	10-50 mA (40 mA)	(18.40-10) = 8.40 mA	(40/8.40) = 4.76
B RHRSW Pumps				
FT-10-97B, FY-4105, and FI-7188	P-109B	4-20 mA (16 mA)	(7.43-4) = 3.43 mA	(16/3.43) = 4.66
	P-109D	4-20 mA (16 mA)	(7.42-4) = 3.42 mA	(16/3.42) = 4.68

Transmitters FT-10-111A, FT-10-111B, and FT-10-97A output signals are read on a millivolt (mV) display with the pump test procedures specifying a reference target range that corresponds one to one mV to milliamp (mA). The transmitter FT-10-97B output signal is converted from a 10-50 mA range to a 4-20 mA range via FY-4105, RHR SERVICE WATER FLOW ISOL, and read on a mV display with the pump test procedures specifying a reference target range that corresponds one to one mV to mA of the converted signal range. The equivalent reference value is the center of this reference flow signal range and is in mA, which was converted to the same range to reference value ratio. Dividing the transmitter range by the equivalent reference mA value shows the instrument range to exceed the reference value by more than a factor of 3.

The FY-4105 output equivalent reference values are 7.43 mA (P-109B) and 7.42 (P-109D). Thus, the range to reference value ratios are also (16/3.43) = 4.66 and (16/3.42)=4.68 and when taken at the FY-4105 output, which is equivalent to the (40/8.44) = 4.74 and (40/8.40) = 4.76 at FT-10-97B output.

Full Description of Proposed Alternative

NSPM proposes to use the existing station instruments to measure pump inservice test parameters. A loop check is performed on the flow instrumentation for these systems that verifies the As-found accuracy is within the 2% accuracy requirement given in Table ISTB-3510-1, Required Instrument Accuracy.

A loop check calibration is performed on each loop. The RHR pumps in division A and B of the RHR system have a calibration acceptance band that is ±0.135 mA or ±0.84%. The RHRSW pumps in division A of RHRSW have a calibration acceptance band that is +/- 0.485 mA or ±1.21%. The RHRSW pumps in division B of RHRSW have a calibration acceptance band that is +/- 0.2 mA or ±1.25%.

The loop accuracy is more restrictive than the 2% accuracy requirement with the loop accuracy and range to reference value product remaining less than or equal to six. This will all be completed as part of the routine calibration task. The increased accuracy is listed in Table PR-02-02.

Description of Basis for Use

The instrument loop is verified to have an as-found accuracy in accordance with paragraph ISTB-3510, *General,* subparagraph (a), *Accuracy*. Subparagraph ISTB-3510(a) requires that instrument accuracy be within the limits of Table ISTB-3510-1, *Required Instrument Accuracy*, which specifies an accuracy requirement of ±2% of full-scale for analog flow instruments. Subparagraph ISTB-3510(b)(1) requires that the full-range of each analog instrument be no greater than three times the reference value. The combination of these two requirements (i.e., accuracy equal to ±2% of full-scale and full-scale being up to 3 times the reference value) yields a permissible inaccuracy of ±6% of the reference value.

Table PR-02-2 shows the accuracy of each loop for measuring pump flow, ranges, reference values, range to reference value ratios, and calculated effective accuracies. The calculated effective instrument loop accuracies are less than the Code required effective accuracy of ± 6%. Therefore, these instruments yield readings at least equivalent to the reading achieved from instruments that meet OM Code requirements (i.e., up to ± 6%) and, thus, provide an acceptable level of quality and safety as described in NUREG-1482, Revision 3, Section 5.5.1, Range and Accuracy of Analog Instruments.

Table PR-02-2

Instrument Loop	Pumps	Instrument Span (Range)	Equivalent Reference Value	Range to Reference Value Ratio	Effective Loop Accuracy with more restrictive Instrument Accuracy
A RHR Pumps					
FT-10-111A and FI-7189 loop	P-202A	4-20 mA (16 mA)	(6.46-4) = 2.46 mA	(16/2.46) = 6.50	(6.50 x 0.84%) = **±5.46%**
	P-202C	4-20 mA (16 mA)	(6.59-4) = 2.59 mA	(16/2.59) = 6.18	(6.18 x 0.84%) = **±5.19%**
B RHR Pumps					
FT-10-111B, FY-4106, and FI-7188 loop	P-202B	4-20 mA (16 mA)	(6.43-4) = 2.43 mA	(16/2.43) = 6.58	(6.58 x 0.84%) = **±5.53%**
	P-202D	4-20 mA (16 mA)	(6.43-4) = 2.43 mA	(16/2.43) = 6.58	(6.58 x 0.84%) = **±5.53%**
A RHRSW Pumps					
FT-10-97A and FI-7189	P-109A	10-50 mA (40 mA)	(18.44-10) = 8.44 mA	(40/8.44) = 4.74	(4.74 x 1.21%) = **±5.73%**
	P-109C	10-50 mA (40 mA)	(18.40-10) = 8.4 mA	(40/8.40) = 4.76	(4.76 x 1.21%) = **±5.76%**
B RHRSW Pumps					
FT-10-97B, FY-4105, and FI-7188	P-109B	4-20 mA (16 mA)	(7.43-4) = 3.43 mA	(16/3.43) = 4.66	(4.66 x 1.25%) = **±5.83%**
	P-109D	4-20 mA (16 mA)	(7.42-4) = 3.42 mA	(16/3.42) = 4.68	(4.68 x 1.25%) = **±5.85%**

Using the provisions of this request as an alternative to the requirements of ISTB-3510(b)(1) provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(z)(1), since use of the installed instruments with the higher instrument loop accuracy calibration requirements yields a reading that is as at least equivalent to that achieved using instruments that meet the Code requirements as described in NUREG-1482, Revision 3, Section 5.5.1.

Describe Hardship or Unusual Difficulty

Not Used.

Any Additional Information (submission attachments listed here)

None.

Precedents

A similar request (PR-02) was previously approved for the fifth IST ten-year interval at MNGP, as documented in NRC safety evaluation, "Monticello Nuclear Generating Plant – Relief from the Requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants for the Fifth 10-Year Inservice Testing Program Interval (TAC Nos. ME8067, ME8088, ME8089, ME8090, ME8091, ME8092, ME8093, ME8094, ME8095, and ME8096)," dated September 26, 2012. (ADAMS Accession No. ML12244A272)

References

NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Revision 3, dated July 2020.