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January 16, 2020

L-MT-20-001
10 CFR 50.55a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Monticello Nuclear Generating Plant
Docket No. 50-263
Renewed Facility Operating License No. DPR-22

10 CFR 50.55a(z)(1) Request VR 05: Request for Approval of an Alternative for Pressure Isolation Valve Testing

Pursuant to 10 CFR 50.55a(z)(1), "Alternatives to codes and standards requirements," the Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), requests approval of an alternative to 10 CFR 50.55a, "Codes and standards," for the Monticello Nuclear Generating Plant (MNGP). NSPM is currently operating the MNGP in the fifth 10-year interval of the Inservice Test (IST) Program in compliance with the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (OM Code) – 2004 Edition with Addenda through OMb-2006.

This request is for approval of an alternative to the conduct of pressure isolation valve testing each refueling outage and instead proposes to adopt a performance based testing approach similar to that established under 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," Option B, "Performance-Based Requirements."

NSPM is submitting this 10 CFR 50.55a(z)(1) request for the remainder of the fifth 10-year IST interval for MNGP, scheduled to end on May 31, 2022. The basis for this alternative is that the proposed testing approach provides an acceptable level of quality and safety. NSPM requests approval of this alternative by February 16, 2021.

If there are any questions or if additional information is needed, please contact Mr. Richard Loeffler at (612) 330-8981 or Richard.Loeffler@xenuclear.com.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

Christopher R. Church
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC

10 CFR 50.55a(z)(1) Request VR 05
Request for Approval of an Alternative for Pressure Isolation Valve Testing

1.0 ASME Code Components Affected

Alternative testing is requested for the following valves associated with the Residual Heat Removal (RHR) and the Core Spray (CSP) Systems:

Valve Identifier	Description	System	ASME Code Class	OM Cat.
MO-2014	RHR Low Pressure Coolant Injection (LPCI) Inboard Isolation Valve	RHR	1	A
MO-2015	RHR LPCI Inboard Isolation Valve	RHR	1	A
MO-1753	11 Core Spray (CS) System Motor Operated Inboard Injection Valve	CSP	1	A
MO-1754	12 Core Spray System Motor Operated Inboard Injection Valve	CSP	1	A
MO-2029	Reactor Coolant to RHR Shutdown Cooling Supply Isolation Valve	RHR	1	A
MO-2030	Reactor Coolant to RHR Shutdown Cooling Supply Isolation Valve	RHR	1	A
RHR-81	Thermal Overpressurization Relief Check Valve for Penetration X-12	RHR	1	AC
AO-10-46A	RHR Injection Check Valve	RHR	1	AC
AO-10-46B	RHR Injection Check Valve	RHR	1	AC
AO-14-13A	11 Core Spray Injection Air-Operated Check Valve	CSP	1	AC
AO-14-13B	12 Core Spray Injection Air-Operated Check Valve	CSP	1	AC

2.0 Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) – 2004 Edition with Addenda through OMb-2006.

3.0 Applicable Code Requirements

ASME OM Code, Subsection ISTC-3522, “Category C Check Valves,” states category C check valves shall be exercised as follows:

(a) During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel by using the methods in ISTC-5221. …

(b) If exercising is not practicable during operation at power and cold shutdowns, it shall be performed during refueling outages.

ASME OM Code, Subsection ISTC-3630, “Leakage Rate for Other Than Containment Isolation Valves,” states, in part:

> Category A valves with a leakage requirement not based on an Owner's 10 CFR 50, Appendix J, program, shall be tested to verify their seat leakages within acceptable limits. Valve closure before seat leakage testing shall be by using the valve operator with no additional closing force applied.

ASME OM Code Subsection ISTC-3630(a), “Frequency,” states, "Tests shall be conducted at least once every 2 years".

4.0 Reason for the Request

Pursuant to 10 CFR 50.55a, “Codes and standards,” paragraph (z)(1), “Alternatives to codes and standards requirements,” an alternative is proposed to the requirements of ASME OM Code Section ISTC-3522, “Category C Check Valves,” and Subsection ISTC-3630(a) under Section ISTC-3630, “Leakage Rate for Other Than Containment Isolation Valves,” for the subject pressure isolation valves (PIVs). Approval of this alternative will allow PIV testing to be performed at the Monticello Nuclear Generating Plant (MNGP) on a performance-based frequency. The proposed 10 CFR 50.55a(z)(1) alternative provides for more efficient plant operation while maintaining an acceptable level of quality and safety.

Since PIVs may or may not be containment isolation valves, they are not necessarily included in scope for performance-based testing as provided in 10 CFR 50, Appendix J, “Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors,” Option B, “Performance-Based Requirements.” The concept behind the 10 CFR 50, Appendix J, Option B alternative for containment isolation valve testing is that licensees should be allowed to adopt cost-effective methods, including the setting of test intervals, for complying with regulatory requirements. Nuclear Energy Institute (NEI) 94-01,

"Industry Guideline for Implementing Performance Based Option of 10 CFR 50, Appendix J," Revision 3-A (Reference 1), describes a risk-informed basis for extending containment isolation valves test intervals under Option B. That justification shows that for containment isolation valves which have demonstrated good performance by successful completion of two consecutive leakage rate tests over two consecutive cycles, licensees may increase their test frequencies. Additionally, it states that if the component does not fail within two operating cycles, further failures appear to be governed by the random failure rate of the component. NEI 94-01 also presents the results of a comprehensive risk analysis, including the conclusion that "the risk impact associated with increasing [leak rate] test intervals is negligible (i.e., less than 0.1 percent of total risk)."

The valves identified in this request for a 10 CFR 50.55a alternative are all in water applications. Testing is currently performed with water pressurized to at least 1000 psig.

This alternative is intended to provide for performance-based scheduling of PIV tests at the MNGP. One reason for requesting this alternative is to allow for divisional outages to reduce the required resources. Another reason is to reduce the dose accumulated through PIV testing consistent with NRC and industry As Low As Reasonably Achievable (ALARA) radiation dose principles. Review of historical data from the past four consecutive refueling outages identified that testing these PIVs each outage results in an average personnel dose of approximately 850 mrem. The proposed extended test intervals (assuming the PIVs are on extended frequency) would provide a savings of approximately 1.7 rem over three refueling outages.

NUREG-0933, "Resolution of Generic Safety Issues," Issue 105, "Interfacing Systems LOCA at LWRs," (Reference 2) discusses the need for PIV leak-rate testing based primarily on three pre-1985 historical failures of applicable valves industrywide. These failures all involved human errors in either operations or maintenance. None of these failures involved inservice equipment degradation.

The performance of PIV leak-rate testing provides assurance of acceptable seat leakage with the valve in a closed condition. For power-operated valves testing is full-stroke testing in accordance with the ASME OM Code to ensure their functional capabilities. For check valves, functional testing is accomplished in accordance with Subsection ISTC-3520, "Exercising Requirements," and Subsection ISTC-3522, "Category C Check Valves." For the Category C Check Valves, the closed functional testing is credited to the PIV leak rate test. Performance of the separate two-year PIV leak rate testing provides assurance that the Category C PIV Check Valves are capable of closing, but otherwise does not contribute any additional assurance of functional capability.

5.0 Proposed Alternative and Basis for Use

NSPM proposes pursuant to 10 CFR 50.55a, "Codes and standards," paragraph (z)(1), "Alternatives to codes and standards requirements," the following alternative to the ASME OM Code requirements.[1] The specific test interval for each PIV would be a function of its performance and be established in a manner consistent with the containment isolation valve testing process under 10 CFR 50, Appendix J, Option B. Performance-based scheduling of PIV testing will be controlled in a manner similar to the methods described in NEI 94-01, Revision 3-A. PIV test performances would occur at a nominal frequency ranging from every refueling outage to every third refueling outage, subject to acceptable valve performance. Valves that have demonstrated good performance for two consecutive cycles may have their test interval extended up to 75-months, with a permissible extension (for non-routine emergent conditions) of nine months (84 months total).

A conservative control will be established such that if any valve fails the PIV test, the test interval will be reduced consistent with Appendix J, Option B, requirements. Any PIV leakage test failure would require the component to return to the initial interval of every 30 months until good performance can again be established.

The primary basis for this proposed alternative is the historically good performance of the PIVs. Attachment 1 to this enclosure entitled, "Leakage History of MNGP Pressure Isolation Valves," provides the leakage history for the subject PIVs for four consecutive refueling outage test performances with one exception. During the 2019 Refueling Outage (RFO), the Reactor Coolant to RHR Shutdown Cooling Supply Isolation Valves (MO-2029 and MO-2030) tested satisfactorily; however, the test results were lost. Therefore, these two valves will be tested during the 2021 RFO.

The functional capability of the check valves is demonstrated by the open and close exercise test. The open testing is separate and distinct from the PIV testing and is currently performed at a refueling outage frequency, in accordance with ASME OM Code Section ISTC-3522, "Category 2 Check Valves." The closed testing will take credit for the PIV leak rate testing and will be on the same frequency as the PIV leak rate testing. The fact that the PIVs exhibit good historical performance (no test results have exceeded the Required Action Limit) shows that the Category C check valves are exhibiting the required obturator movement to close and remain closed.

Note that NEI 94-01, Revision 3-A, is not the sole basis for this relief request, given that NEI 94-01, Revision 3-A, does not address seat leakage testing with water. The NEI

1. ASME OM Code, Subsection ISTC-3522, "Category C Check Valves," requires if exercising is not practicable during operation at power and at cold shutdowns, that exercising be performed during refueling outages. Subsection ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," requires under ISTC-3630(a) of the OM Code that tests be conducted at least once every two years.

document is being cited as an approach similar to the requested alternative method. If the proposed alternative is authorized and the valves exhibit good performance, the PIV test frequency will be controlled similar to the method described in NEI 94-01, Revision 3-A, so that testing of these PIVs would not be required each refueling outage.

The extension of test frequencies proposed is consistent with the guidance provided in 10 CFR 50, Appendix J, Type C leak rate tests as detailed in NEI 94-01, Revision 3-A, Paragraph 10.2.3.2, "Extended Test Interval," which states:

> Test intervals for Type C valves may be increased based upon completion of two consecutive periodic as-found Type C tests where the result of each test is within a licensee's allowable administrative limits. Elapsed time between the first and last tests in a series of consecutive passing tests used to determine performance shall be 24 months or the nominal test interval (e.g., refueling cycle) for the valve prior to implementing Option B to Appendix J. Intervals for Type C testing may be increased to a specific value in a range of frequencies from 30 months up to a maximum of 75 months. Test intervals for Type C valves should be determined by a licensee in accordance with Section 11.0.[2]

Additional bases for this proposed alternative are:

- Separate functional testing of motor-operated valve (MOV) PIVs is performed in accordance with the ASME OM Code.

- The low likelihood of valve mispositioning during power operations (e.g., procedures and interlocks).

- Relief valves in the low pressure (LP) piping – these relief valves may not provide Intersystem Loss of Coolant Accident (ISLOCA) mitigation for inadvertent PIV mispositioning but their relief capacity can accommodate conservative PIV seat leakage rates.

- Alarms that identify high pressure (HP) to LP leakage – Operators are highly trained to recognize symptoms of the presence of a ISLOCA and to take appropriate actions.

Following NRC approval of this alternative, leakage test intervals will be established based on performance. The leakage test intervals remain consistent with the process established under 10 CFR 50 Appendix J, Option B.

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2. Section 11.0 is entitled, "Bases for Performance and Risk-Based Testing Frequencies for Type A, Type B, and Type C Tests."

Extending the PIV leakage test interval based on good performance and low risk factor, as noted in NUREG/CR-5928, “ISLOCA Research Program Final Report” (Reference 3), is a logical progression to a performance-based program, and provides an acceptable level of quality and safety. Therefore, this proposed alternative is being submitted pursuant to 10 CFR 50.55a(z)(1).

7.0 Duration of the Proposed Alternative

The proposed alternative would apply to the remainder of the Fifth 10-year IST interval at the MNGP, which is currently scheduled to end on May 31, 2022.

8.0 Precedents

Several recently approved alternatives to allow conduct of PIV testing under a performance-based testing approach similar to that established under 10 CFR 50, Appendix J, Option B are listed below:

1. LaSalle County Station, Units 1 and 2, September 2019 (Reference 4)

2. Limerick Generating Station, Units 1 and 2, October 2019 (Reference 5)

3. Peach Bottom Atomic Power Station, Units 2 and 3, May 2018 (Reference 6)

4. Dresden Nuclear Power Station, Units 2 and 3, October 2015 (Reference 7)

9.0 References

1. Nuclear Energy Institute (NEI) 94-01, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” Revision 3-A, dated July 2012

2. NRC NUREG-0933, “Resolution of Generic Safety Issues, Issue 105, Interfacing Systems LOCA at LWRs (Rev. 4) (NUREG-0933, Main Report with Supplements 1-34)”

3. NRC NUREG/CR-5928, “ISLOCA Research Program Final Report,” dated July 1993 (ADAMS Accession Number ML072430731) (not-publicly available)

4. LaSalle County Station, Units 1 and 2 – Request From the Requirements of the ASME Code Related to Pressure Isolation Valve Testing Frequency (EPID L-2019-LLR-0062), dated September 10, 2019 (ADAMS Accession Number ML19217A306)

5. Limerick Generating Station, Units 1 and 2 – Safety Evaluation of Relief Requests GVRR-8, 11-PRR-1, 90-PRR-1 and 47-VRR-2, Regarding the Fourth 10-year Interval of the Inservice Testing Program (EPID L-2018-LLR-0384, EPID L-2018-LLR-0385, EPID L-2018-LLR-0386, and EPID L-2018-LLR-0387), dated October 28, 2019 (ADAMS Accession Number ML19228A195)

6. Peach Bottom Atomic Power Station, Units 2 and 3 – Safety Evaluation of Relief Request GVRR-2 Regarding the Fifth 10-year Interval of the Inservice Testing Program (EPID No. L-2017-LLR-0094), dated May 30, 2018 (ADAMS Accession Number ML18141A600)

7. Dresden Nuclear Power Station, Units 2 and 3 – Relief Request to Use an Alternative from the American Society of Mechanical Engineers Code Requirements (CAC Nos. MF5809 and MF5090), dated October 27, 2015 (ADAMS Accession Number ML15174A303)

ENCLOSURE, ATTACHMENT 1

MONTICELLO NUCLEAR GENERATING PLANT

10 CFR 50.55a(z)(1) REQUEST VR 05

REQUEST FOR APPROVAL OF AN ALTERNATIVE FOR PRESSURE ISOLATION VALVE TESTING

(1 Page Follows)

Leakage History of MNGP Pressure Isolation Valves

The following table shows the leakage history for the subject valves at MNGP for four consecutive test performances.

Component	System	Required Action Limit (gpm)	1R26 (2013)		1R27 (2015)		1R28 (2017)		1R29 (2019)	
			Measured Value (gpm)	2013 Date	Measured Value (gpm)	2015 Date	Measured Value (gpm)	2017 Date	Measured Value (gpm)	2019 Date
MO-2014	RHR	< 0.50	0.225	April 1	0.370	May 2	0.0992	April 19	0.2654	April 26
MO-2015	RHR	< 0.50	0.209	April 24	0.282	April 16	0.1578	April 28	0.1817	April 16
MO-1753	CSP	< 0.50	0.005	April 2	0.000	May 2	0.000	April 21	0.000	April 26
MO-1754	CSP	< 0.50	0.0024	April 24	0.0036	April 16	0.0072	April 28	0.00136	April 20
MO-2029	RHR	< 0.45	0.145	May 4	0.181	May 9	0.01076	May 2	Note 1	April 28
MO-2030	RHR	<0.50	0.070	May 4	0.0057	May 9	0.1709	May 2	Note 1	April 28
RHR-81	RHR	<0.50	0.000	April 1	0.010	May 2	0.008	April 19	0.012	April 26
AO-10-46A	RHR	< 0.50	0.246	April 1	0.360	May 2	0.1004	April 19	0.2391	April 26
AO-10-46B	RHR	< 0.50	0.189	April 24	0.215	April 16	0.1052	April 28	0.1865	April 16
AO-14-13A	CSP	< 0.50	0.050	April 2	0.0134	May 2	0.012	April 21	0.080	April 26
AO-14-13B	CSP	< 0.50	0.0036	April 24	0.0024	April 16	0.0072	April 28	0.00272	April 20

Note 1 – As discussed in Section 5.0 the tests were performed during 1R29 within acceptance criteria. However, the Work Order was lost so the specific value for the particular valve is unknown.