



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

May 2, 2022

**MONTICELLO NUCLEAR GENERATING PLANT – AUTHORIZATION AND SAFETY
EVALUATION FOR ALTERNATIVE REQUEST NO. VR-02 (EPID L-2021-LLR-0081)**

LICENSEE INFORMATION

Recipient's Name and Address: Mr. Thomas A. Conboy
Site Vice President
Northern States Power Company - Minnesota
Monticello Nuclear Generating Plant
2807 West County Road 75
Monticello, MN 55362

Licensee: Northern States Power Company

Plant Name(s) and Unit(s): Monticello Nuclear Generating Plant

Docket No(s): 50-263

APPLICATION INFORMATION

Submittal Date: October 5, 2021

Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.: ML21278A185

Alternative Provision: The applicant requested an alternative under Title 10 of the *Code of Federal Regulations* (10 CFR), paragraph 50.55a(z)(2).

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

Applicable Inservice Inspection (ISI) or Inservice Testing (IST) program interval and Interval Start/End Dates: Sixth 10-year IST interval currently scheduled to begin on October 1, 2022, and end on May 31, 2032.

IST Requirement: ASME OM Code, Subsection ISTC, paragraph ISTC-3100, Preservice Testing, subparagraph (e), states: "Active pneumatically operated valves (AOV) shall meet the Preservice Test requirements of Mandatory Appendix IV of this Division." Paragraph ISTC-5130, Pneumatically Operated Valves, states: "Active AOVs shall meet the requirements of Mandatory Appendix IV of this Division." Mandatory Appendix IV, "Preservice and Inservice Testing of Active Pneumatically Operated Valve Assemblies in Nuclear Reactor Power Plants," paragraph IV-3300, Preservice Testing, states, in part: "Each of the following tests shall be performed for each AOV during the preservice period: ... (b) a stroke test." Paragraph IV-3400,

Inservice Testing, states, in part: "Each of the following tests shall be performed for each AOV: (b) a stroke test in accordance with paragraph IV-3420." Paragraph IV-3420, Stroke Testing, states, in part: "Stroke testing shall be performed as follows: (a) All AOVs, within the scope of this Appendix, shall have a stroke test performed quarterly if practicable ... (b) Stroke testing includes stroke time measurement as follows: (1) The limiting value(s) of full-stroke time of each valve shall be specified by the Owner.... (e) See para. IV-7100 for acceptance criteria." Paragraph IV-3510, Inservice Stroke Test Reference Values, states, in part: "...AOVs in pre-2000 plants (as defined in Subsection ISTA), inservice stroke test reference values shall be determined from the results of preservice testing. For pre-2000 plants, inservice stroke test reference values may be determined from the results of inservice testing." Paragraph IV-7100, Stroke Test Acceptance Criteria, states, in part: "Test results shall be compared to the reference values established in accordance with paragraphs. IV-3510, IV-3520, and IV-3530." Paragraph IV-7200, Stroke Test and Fail Safe Corrective Action, states, "If a valve fails to exhibit the required change of obturator position or exceeds the limiting values of full stroke time [see paragraph IV-3420(b)(1)], the valve shall be immediately declared inoperable."

Brief Description of the Proposed Alternative: Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (NSPM or the licensee), hereby requests the U.S. Nuclear Regulatory Commission (NRC) authorization of this 10 CFR 50.55a request to support the implementation of the sixth IST Interval for Monticello Nuclear Generating Plant (Monticello). Proposed Alternative No. VR-02 requests authorization for an alternative to residual heat removal (RHR) heat exchanger flow control valve stroke timing. Summary of Commitments: this submittal makes no new commitments and no revisions to existing commitments.

For additional details on the licensee's request, please refer to the documents located at the ADAMS Accession No(s) identified above.

STAFF EVALUATION

ASME OM Code 2017 Edition Mandatory Appendix IV, paragraph IV-3300, "Preservice Testing," (b), requires a stroke test. Paragraph IV-3400, "Inservice Testing," (b) requires a stroke test in accordance with paragraph IV-3420, "Stroke Testing." Mandatory Appendix IV, section IV-2000, "Supplemental Definitions" defines a stroke test as "exercising (as defined in section ISTA-2000) the AOV by operating one complete open and close cycle and testing that includes a full-stroke time (as defined in section ISTC-2000)." Mandatory Appendix IV, paragraph IV-3420, requires that a limiting value of full stroke time be established for an AOV and that the stroke time be measured whenever such a valve is full stroke tested.

RHR service water (SW) valves CV-1728 and CV-1729 are air operated control valves on the outlet line of the RHR SW side of the "A" and "B" RHR heat exchangers, respectively. Their safety function is to open to the throttled position to regulate flow at the RHR heat exchangers to maintain a differential pressure between the RHR system and the RHR SW system to preclude the possibility of radioactive material being discharged during normal shutdown cooling or containment spray/cooling modes of operation. These control valves maintain a differential pressure between the RHR SW process stream and the RHR process stream during RHR SW system operation. Failure of the valves in the open position would cause run-out of the associated RHR SW pump (if only a single pump is operating) causing pump damage.

These valves are also interlocked to receive a closed signal when the RHR SW pumps are de-energized. This interlock is provided to ensure that system water inventory is not lost during

system shutdown. Stroke time testing of these valves when the RHR SW pumps are de-energized would result in the loss of liquid fill for a significant portion of the RHR SW system, as well as require the bypassing of an interlock designed to minimize the potential for water hammer. Such testing increases the possibility of adverse water hammer during startup of the RHR SW system and would require filling and venting of the system following the stroke time testing. In addition to the adverse impact on the plant operation, such testing could result in system or component damage. Proper stroke testing or full stroke exercising would, therefore, require the plant to make major modifications of the control logic of the valves.

Stroke time testing or full stroke exercising during pump operation would require either of the valves to be initially in the closed position during pump operation. Establishing the initial test conditions of a closed valve during pump operation would result in an undesirable deadheading of the pump. Subsequent opening of the valve to perform stroke time testing or full stroke exercising could result in pump runout if a single RHR SW pump is in operation, an undesirable condition which adversely impacts pump integrity and performance. The pump runout concern can be avoided by stroke timing the valve open during operation of both RHR SW pumps; however, this exacerbates the pump deadheading concerns and would result in undesirable transients on the system that could cause system or component damage.

The RHR SW pumps are not started automatically on an emergency core colling system initiating signal. The system must be started manually, and flow established by the operator using the differential pressure indicating controller located in the control room. There is ample time for this system to be placed into operation following a design basis loss-of-coolant accident (LOCA) condition. The primary safety function of valves CV-1728 and CV-1729, is to throttle open to the desired flow to remove decay heat from the RHR system when it is in shutdown cooling or containment spray/cooling mode. For the design basis LOCA, the system is placed in service through operator action within 10 minutes. For the design basis fire, system initiation is assumed within 40 minutes. Based on these system initiation time frames, stroke time testing of these valves does not indicate their ability to perform the safety function described in the Updated Safety Analysis Report (USAR).

The proposed alternative test in lieu of these requirements for RHR SW valves CV-1728 and CV-1729 was listed in the alternative request submittal dated October 5, 2021. Specifically, the request proposes to perform quarterly partial stroke exercise tests which will verify the capability of the valves to operate properly to pass the maximum required accident flow as well as the valve position (approximately 50 percent open) necessary to achieve required flow conditions. Testing of the valves in this manner demonstrates valve performance capability and provides an indirect means for monitoring valve degradation. In addition, a full stroke exercise and valve position indication will be verified during full stroke exercising when the associated train is isolated at least once every 2 years. The NRC staff has determined that the proposed alternative provides reasonable assurance of the valves' operational readiness.

CONCLUSION

The NRC staff has determined that complying with the specified requirements described in the licensee's request referenced above would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The proposed alternative provides reasonable assurance that CV-1728 and CV-1729 are operationally ready.

The NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2).

The NRC staff authorizes the use of proposed alternative VR-02 at Monticello for the Sixth 10-year IST interval currently scheduled to begin on October 1, 2022, and end on May 31, 2032.

All other ASME OM Code requirements for which an alternative was not specifically requested and approved remain applicable.

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Date: May 2, 2022

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**MONTICELLO NUCLEAR GENERATING PLANT – AUTHORIZATION AND SAFETY
EVALUATION FOR ALTERNATIVE REQUEST NO. VR-02 (EPID L-2021-LLR-0081) DATED
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