



2807 West County Road 75
Monticello, MN 55362

February 14, 2019

L-MT-19-011
10 CFR 50.73
10 CFR 21

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

LER 2018-002-00, C Outboard Main Steam Line Isolation Valve Delayed Closure Due to Foreign Material in the Air Valve

Northern States Power Company, a Minnesota Corporation (NSPM), doing business as Xcel Energy, hereby submits Monticello Nuclear Generating Plant (MNGP) Licensee Event Report (LER) 2018-002-00 "C Outboard Main Steam Line Isolation Valve Failed to Close Due to Foreign Material in the Air Valve" pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition which was prohibited by the plant's Technical Specification. Additionally, this report also constitutes a 10 CFR 21 notification.

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
Minnesota Department of Commerce



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

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Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. Facility Name Monticello Nuclear Generating Plant	2. Docket Number 05000-263	3. Page 1 OF 4
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4. Title
C Outboard Main Steam Isolation Valve Delayed Closure Due to Foreign Material in the Air Valve

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
12	20	2018	2018	- 002	- 00	02	14	2019	Facility Name	Docket Number
										05000

9. Operating Mode 1	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)			
	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. Power Level 100	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(iii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input checked="" type="checkbox"/> Other (Specify in Abstract below or in NRC Form 366A)		

12. Licensee Contact for this LER

Licensee Contact Stephen Sollom, Regulatory Affairs Senior Engineer	Telephone Number (Include Area Code) 612-342-8982
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
B	SB	ISV	H198	Yes					

14. Supplemental Report Expected
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No
15. Expected Submission Date

Month	Day	Year

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On November 16, 2018 at approximately 20:34 hours while operating in Mode 1 at 25% power, the plant was performing a functional test to demonstrate fast-closure of "C" Outboard Main Steam Isolation Valve (MSIV) AO-2-86C. The delay of the valve closure was caused by silicone based foreign material intrusion in the air solenoid valve body attributed to manufacturing of the air control assembly. The Monticello Nuclear Generating Plant (MNGP) Technical Specifications (TS) Surveillance Requirement (SR) 3.6.1.3.6 requires that the isolation time of each MSIV is ≥ 3 seconds and ≤ 9.9 seconds. The "C" Outboard MSIV failed to close on the first attempt and failed stroke time acceptance criteria on the second closure attempt. During the second functional test the stroke time was measured at approximately 16 seconds. The valve was declared inoperable and subsequently repaired.

The component failure is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS 3.6.1.3 "Primary Containment Isolation Valves," since "C" Outboard MSIV was inoperable for greater than the TS 3.6.1.3 Required Action A.1, Completion Time of 8 hours to isolate a main steam line, and the Completion Time for TS 3.6.1.3 Require Action F, to be in Mode 3 in 12 hours and Mode 4 in 36 hours when the completion time of A.1 is not met. There were no actual safety consequences that affect public health and safety associated with this condition since the primary containment isolation function was maintained. Additionally, this report also constitutes a 10 CFR Part 21 notification.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Monticello Nuclear Generating Plant	05000-263	2018	- 002	- 00

EVENT DESCRIPTION

On November 16, 2018 at approximately 20:34 hours while operating in Mode 1 at 25% power, the plant was performing a functional test to demonstrate fast-closure of "C" Outboard Main Steam [SB] Isolation Valve [ISV] (MSIV) AO-2-86C. During this functional test, "C" Outboard MSIV was given a close signal via the control room hand switch [HS]. The "C" Outboard MSIV was not observed to close via light indication and no movement was observed via a locally mounted camera. After approximately 50 seconds, the hand switch was returned to auto/open. A second attempt to close the "C" Outboard MSIV via the control room hand switch was performed. Movement did not occur for approximately eight seconds after placing the hand switch to close, however, once the valve started to move, the stroke time was eight seconds. The MNGP Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.3.6 requires that the isolation time of each MSIV is ≥ 3 seconds and ≤ 9 seconds. The measured closing time of the second functional test was approximately 16 seconds. With the SR not being met, the valve was declared inoperable.

On November 17, 2018 at approximately 02:14 hours, Operations closed and deactivated "C" Inboard MSIV AO-2-80C to comply with TS 3.6.1.3. The valve closed as expected.

Onsite troubleshooting activities commenced and the air control assembly was removed for bench testing, disassembly, and inspection. The air control assembly consists of a cluster of three AVCO solenoid valves (SV1, SV2, and SV3) which control air to three Norgren pilot air valves (V1, V2, and V3). During the bench testing, all three AVCO solenoid valves and two Norgren pilot air valves (V3 and V2) operated correctly. Minor corrosion and adhesive wear was observed inside the Norgren air valve assembly. Minor wear was also noted on AVCO SV1 and SV2 and small pieces of foreign material noted in SV2 during the troubleshooting disassembly but a conclusive failure mechanism was not determined during onsite troubleshooting activities. Most of the air control assembly, three AVCO solenoid valves and two Norgren valves (V1 and V3), was replaced and the "C" Outboard MSIV was declared operable after completing the functional test on November 20, 2018 at approximately 00:19 hours. The Norgren pilot air valve V2 operated correctly and did not show signs of wear; therefore, it was not replaced.

The parts were sent out to an external vendor for forensic testing. During this detailed analysis a silicone based foreign material was identified in AVCO SV2 which could restrict air flow from the solenoid vent upon de-energizing. The external laboratory testing indicated that the corrosion and adhesive wear on the Norgren air valve assembly (V3 and V2) was not significant enough to cause the delayed closure. Using results from the vendor forensics, a causal evaluation (CE) was completed on December 20, 2018 which concluded that the failure mechanism would have rendered the MSIV incapable of meeting the TS closure time requirement since the previous fast closure test. The last time the "C" Outboard MSIV demonstrated the capability of performing the fast closure was May 3, 2017 during the performance of the functional test.

EVENT ANALYSIS

The event was determined to be reportable in accordance with 10 CFR 50.73 (a)(2)(i)(B), "Any operation or condition which was prohibited by the plant's Technical Specifications". Specifically this component failure is reportable with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by TS 3.6.1.3 "Primary Containment Isolation Valve," since "C" Outboard MSIV was inoperable for greater than the TS 3.6.1.3, Required Action A.1, Completion Time of 8 hours to isolate a main steam line, and the Completion Time for TS 3.6.1.3, Required Action F, to be in Mode 3 in 12 hours

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and Mode 4 in 36 hours when the completion time of A.1 is not met. Additionally, this report also constitutes a 10 CFR Part 21 notification.

This event is not classified as a safety system functional failure as the "C" Inboard MSIV was operable during the period from May 3, 2017 through November 20, 2018.

SAFETY SIGNIFICANCE

There were no actual safety consequences that affect public health and safety associated with this condition. The "C" Inboard MSIV on "C" Main Steam line was operable from May 3, 2017 until the "C" Outboard MSIV was declared operable on November 20, 2018. The "C" Inboard MSIV was tested for both leak rate and closing time during the last refueling outage (Spring 2017) and each test was completed satisfactorily. Additionally, the inboard MSIVs and their air actuators are a different design than those on the outboard MSIVs. The station performs maintenance and testing activities on the inboard MSIVs and the site's operational history does not indicate a performance issue with the inboard MSIVs. Therefore, the primary containment isolation capability of the main steam lines remained operable which ensured the required isolation safety function was maintained.

CAUSE

The direct cause of "C" Outboard MSIV delayed closure was attributed to silicone based foreign material intrusion in the solenoid valve body attributed to manufacturing of the air control assembly. The foreign material was introduced during original manufacturer fabrication as the air control assembly was delivered to the site as a complete unit and no additional silicone based thread sealant was applied during plant installation. In addition, foreign material is not expected to originate from the plant air system as the air supply filters out 99.99% of all particles 1 micron and larger and 98% of all particles 0.07 microns and larger.

The laboratory testing and third party vendor analysis concluded that the most likely cause of the anomalous behavior of the "C" Outboard MSIV was debris within AVCO solenoid valve SV2 interfering with the closure of port 2 and the withdrawal of control air from the Norgren pilot valves V1 and V3. The corrosion and adhesive wear observed on the components of the Norgren pilot valve V1 would have contributed to the sluggish response of the "C" Outboard MSIV but could not have been the sole cause of the failure to close.

CORRECTIVE ACTION

- The immediate corrective action was to replace the air control assembly and complete the functional test for fast closure for the "C" Outboard MSIV. Then the valve was declared operable.
- The functional bench test for the MSIV air control assembly was developed to address a previous concern of binding and misalignment that caused the Norgren valves to stick (LER 2017-002-00). The functional bench test for the MSIV air control assembly will be revised to include a step for air venting to remove potential foreign material left over from the manufacturing process.
- The functional bench testing is planned to be performed for the "A", "B", "C", and "D" Outboard MSIV valves.

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air control assemblies during the next refueling outage.

FAILED COMPONENT INFORMATION

Description: Rotork-Hiller MSIV Actuator AVCO Solenoid Manifold Sub-Assembly

Manufacturer: Appendix B Supplier: Rotork-Hiller, subcomponent AVCO solenoid valve

Part Number: Rotork-Hiller Actuator Serial Number 1526309, AVCO solenoid valve series B6930-081

PREVIOUS SIMILAR EVENTS

There were two previously similar LERs 2017-002-00 and LER 2015-006-00. The cause of these events was determined to be binding and misalignment of the Norgren valves on the "D" Outboard MSIV. The cause of the delayed closure of the "C" Outboard MSIV on November 16, 2018 was due to foreign material in the AVCO solenoid valve. Therefore, the corrective actions from LER 2017-002-00 would not have prevented the silicone based foreign material from being introduced into the "C" Outboard MSIV air control assembly.

ADDITIONAL INFORMATION

The Institute of Electrical and Electronics Engineer codes for equipment are denoted by [XX].