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January 25, 2017

L-MT-17-004
10 CFR 50.73

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

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

LER 2016-003, HPCI Declared Inoperable Due to Excessive Water Level in Turbine

Pursuant to 10CFR 50.73(a)(2)(v)(D), Northern States Power Company, a Minnesota Corporation (NSPM), doing business as Xcel Energy, hereby submits the Monticello Nuclear Generating Plant (MNGP) Licensee Event Report (LER) 2016-003.

Summary of Commitments

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

Peter A. Gardner
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

NRC FORM 366 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Monticello Nuclear Generating Plant	05000-263	1 OF 5

4. TITLE

HPCI Declared Inoperable Due to Excessive Water Level in Turbine

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
										05000
11	27	2016	2016	- 003	- 00	01	25	2017	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
100%	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☒ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMER *(Include Area Code)*
Andrew Kouba, Licensing Engineer	(763) 271-7251

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	BJ	LS	M040	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On November 27, 2016, the Monticello Nuclear Generating Plant (MNGP) was operating at 100% power. While troubleshooting was in progress for a minor leak on the High Pressure Coolant Injection System (HPCI) turbine, it was discovered that the HPCI turbine exhaust drain pot level switch was not functioning per design to support removal of condensate from the HPCI turbine. Subsequently, HPCI was declared inoperable at 1447 hours due to excessive water level within the HPCI turbine.

Previously, on November 17, 2016, a steam leak was identified on the packing of the HPCI turbine steam supply valve. Following valve packing maintenance on November 21, 2016, the valve was cycled cold (without steam flow), resulting in seat leakage that slowly admitted steam into the HPCI exhaust piping. The steam condensed to water and accumulation began to form in the HPCI turbine. Subsequent troubleshooting found the HPCI exhaust drain pot level switch electrical rocker assembly off its pivot point due to a manufacturer defect (missing spot weld). With the inability to pivot, the level switch became non-functional and thus failed to alert the control room and provide the automatic function to drain condensate from the HPCI exhaust piping. The HPCI exhaust piping was drained of condensate and a temporary modification replaced level switch. HPCI was restored to operable status at 1726 hours on December 1, 2016.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
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NARRATIVE

UNIT CONDITION PRIOR TO THE EVENT

On November 27, 2016, Monticello Nuclear Generating Plant (MNGP) was at 100% power, Mode 1.

EVENT DESCRIPTION

On November 17, 2016, a steam leak was identified originating from the packing area of the High Pressure Coolant Injection System (HPCI) turbine steam supply valve. However, the valve seat was not leaking by (no condensate forming in HPCI turbine).

On November 21, 2016, the HPCI turbine steam supply valve packing was tightened and post-maintenance testing completed at approximately 1248 hours. The post-maintenance testing cycled the valve cold (without steam flow). This resulted in seat leakage and subsequent accumulation of condensate in the HPCI turbine. With the HPCI turbine exhaust drain pot level switch [LS] not functioning properly to drain the condensate, the exhaust piping partially filled with water.

On November 26, 2016, at approximately 1625 hours, water was noted to be dripping from a temperature element located on the HPCI steam exhaust pipe approximately one foot in elevation above the HPCI turbine exhaust drain pot high level bypass switch actuation set point. Control room operators did not receive the drain pot high level alarm that would notify them of excessive water accumulation thus resulting in sufficient water to make HPCI inoperable upon discovery of the water.

On November 27, 2016, while troubleshooting was in progress, it was discovered that the HPCI turbine exhaust drain pot level switch was not functioning per design to alert the control room and drain condensate from the exhaust piping. Subsequently, HPCI was declared inoperable at 1447 hours. The HPCI turbine was drained of condensate manually and was declared available at 1800 hours.

On November 28, 2016, troubleshooting determined the level switch electrical rocker assembly fell off its pivot-point due to insufficient mechanical strength (missing spot welds) during normal HPCI operating transients. Once off the pivot-point, the rocker assembly stuck in the non-trip (e.g. representative of no condensate) position which is how the switch was found.

On December 1, 2016, a temporary modification replaced the level switch with a different style switch with alarm function only due to the current model being obsolete. HPCI was restored to operable status at 1726 hours. In addition, station procedures were temporarily revised to allow operator control of the exhaust header drain to gland seal condenser valve. Control room hand switch is positioned to OPEN or AUTO allowing condensate to drain until final corrective actions are implemented to replace the level switch and eliminate seat leakage on the HPCI turbine steam supply valve.

EVENT ANALYSIS

The condition is reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(v)(D) as an event or

condition that could have prevented the fulfillment of the safety function of HPCI to mitigate the consequences of an accident. This event is considered a Safety System Functional Failure per NEI 99-02, Revision 7. The condition was reported to the NRC on November 27, 2016, in event notification 52396 in accordance with 10 CFR 50.72(b)(3)(v)(D).

SAFETY SIGNIFICANCE

The function of HPCI is to provide a source of coolant to the reactor core under loss-of-coolant conditions which do NOT result in a rapid depressurization of the pressure vessel, such as a small break in the primary system or a loss of the normal feedwater supply. In addition, the system is relied upon to provide a source of coolant to the reactor core under station blackout conditions. The specific station events when HPCI is necessary include Station Black Out (SBO), Small Break Loss of Coolant Accidents (SBL) and Loss of Feedwater (LOFW). The SBO function of HPCI is not a Technical Specification (TS) required function; however, SBO is a licensing condition in which HPCI is the credited injection source.

The HPCI turbine exhaust drain pot level switch function is designed to alert control room operators and provide an automatic open signal for the exhaust header drain to gland seal condenser valve when condensate accumulates in the HPCI turbine exhaust piping during standby conditions. The HPCI turbine exhaust drain pot level switch is not a safety related component, nor does a single failure affect the safety related function of HPCI. However, failure of the HPCI turbine exhaust drain pot level switch to detect high water level and open the exhaust header drain to gland seal condenser valve could affect HPCI's ability to perform its safety function due to excessive condensate in the HPCI exhaust piping. Operating experience (OE) suggests, if HPCI is started with excessive condensate in the exhaust piping, the exhaust piping rupture discs could rupture, rendering HPCI no longer able to perform its safety function.

From 1248 hours on November 21, 2016, when the turbine steam supply valve was cycled, to 1726 hours on December 1, 2016, when HPCI was returned to service, HPCI was inoperable and would not have been able to perform its safety function. This duration was less than the prescribed TS Limiting Condition of Operation (LCO) required action completion time of 14 days per TS 3.5.1, "ECCS – Operating", Condition I, to restore HPCI System to operable status.

During the period of HPCI inoperability, Core Spray was inoperable for quarterly testing for approximately two hours on November 22, 2016. However, Core Spray was available to restore and maintain the reactor vessel coolant during a loss of coolant accident. Therefore, the safety significance of this evolution was low. This instance of simultaneous inoperability was within the TS LCO required action completion time of 72 hours per TS 3.5.1, "ECCS –Operating", Condition J, to restore either system to operable status.

In addition, during the period of HPCI inoperability, both Low Pressure Coolant Injection System (LPCI) subsystems were declared inoperable for Torus Cooling to support HPCI testing for approximately 2.5 hours on November 30, 2016. MNGP declares both subsystems of LPCI inoperable during operation when Residual Heat Removal is in Torus Cooling mode; however, LPCI remains available to restore and maintain the coolant inventory in the reactor vessel to prevent fuel clad melting following a loss-of-coolant accident. Therefore, the safety significance of this evolution was low. This instance of simultaneous

inoperability was within the TS LCO required action completion time of 72 hours per TS 3.5.1, “ECCS – Operating”, Condition J, to restore either system to operable status and less than the TS LCO required action completion time of 12 hours per TS 3.5.1, “ECCS –Operating”, Condition L, to be in Mode 3.

CAUSE

Two failures were needed to prevent HPCI from performing its safety function including, (1) HPCI turbine exhaust drain pot level switch failure was the primary cause and (2) HPCI turbine steam supply valve seat leakage that slowly admitted steam into the HPCI exhaust piping was the contributing cause.

The failure of the level switch to perform its function was due to a manufacturer defect (missing spot weld) on the electrical rocker assembly. The level switch electrical rocker assembly fell off its pivot point due to insufficient mechanical strength during normal HPCI operating transients. Once off the pivot point, the electrical rocker assembly was stuck in the non-trip (e.g. indicative of no condensate) position, as found during troubleshooting. With the inability to pivot, the level switch became non-functional and thus failed to alert the control room and provide the automatic function to drain condensate from the HPCI exhaust piping.

After the HPCI turbine steam supply valve packing was tightened, post-maintenance testing cycled the valve cold (without steam flow). This resulted in seat leakage and subsequent condensation accumulating in the HPCI exhaust pipe. Internal OE indicates that once the HPCI turbine steam supply valve begins leaking, it may steam cut the seat and thus internals may need to be replaced to fully eliminate seat leakage.

CORRECTIVE ACTION TAKEN

The HPCI turbine was drained of condensate and a temporary modification replaced the level switch with a different style switch with alarm function only due to the current model of level switch being obsolete.

In addition, station procedures were temporarily revised to allow operator control of the exhaust header drain to gland seal condenser valve. Control room hand switch is positioned to OPEN or AUTO allowing condensate to drain until final corrective actions are implemented to replace the level switch and eliminate seat leakage on the HPCI turbine steam supply valve.

CORRECTIVE ACTION PLANNED

The temporary modification will be removed with a permanent modification that installs a level switch to restore automatic drain function of the standby HPCI turbine and remove operator control.

HPCI turbine steam supply valve will be repaired to eliminate seat leakage.

PREVIOUS SIMILAR OCCURRENCES

There are no previous similar licensee event reports in the past three years.