2807 West County Road 75
Monticello, MN 55362

800.895.4999
xcelenergy.com

Xcel Energy®
RESPONSIBLE BY NATURE®

May 25, 2017

L-MT-17-035
10 CFR 50.73

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 2016-001-02, "High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak"

Enclosed, is the Monticello Nuclear Generating Plant (MNGP) Licensee Event Report (LER) 2016-001-02 regarding a High Pressure Coolant Injection System cracked pipe nipple that caused an oil leak. This condition is reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(v)(D) and 10 CFR 50.73(a)(2)(i)(B), as an event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident and as an operation or condition prohibited by Technical Specification.

Summary of Commitments

This letter contains 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: Regional Administrator, Region III, USNRC
Project Manager, MNGP, USNRC
Resident Inspector, MNGP, USNRC
Department of Commerce, State of Minnesota

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 4

4. TITLE

High Pressure Coolant Injection System Cracked Pipe Nipple Caused Oil Leak

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
03	22	2016	2016	- 001	- 02	05	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)*
Stephen Sollom, Licensing Engineer	763-295-1611

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
X	BJ	NA	NA	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)*

The High Pressure Coolant Injection (HPCI) system was inoperable during a pre-planned maintenance activity when a significant oil leak in HPCI system oil piping occurred because of a cracked oil pipe nipple. The leak was of sufficient size that if it occurred outside the pre-planned maintenance, HPCI would have been declared inoperable. The equipment failure analysis concluded that the most likely cause was that HPCI pipe nipple was exposed to significant loads, sufficient to initiate a crack, likely from applied wrench torques during oil leak repair activities in 2005. With the presence of the crack and crack propagation mechanism, the engineering evaluation determined that HPCI was inoperable from January 9 through March 24, 2016, i.e. 75 days. The organizational root cause was that management and individuals were tolerant of leaks on the HPCI system. As a result, station personnel did not effectively advocate prompt repair of the HPCI oil leak.

The cracked HPCI oil pipe nipple was replaced. Results of the extent of condition review identified two other pipe nipples and two elbows with thread leakage (no crack present). The pipe nipples were replaced and the elbows were reused. The HPCI system was tested successfully after the repairs.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Monticello Nuclear Generating Plant	05000-263	2016	- 001	- 02

NARRATIVE

UNIT CONDITION PRIOR TO THE EVENT

On March 21, 2016, Monticello Nuclear Generating Plant was at 100% power, Mode 1. High Pressure Coolant Injection (HPCI) System [EIIS: BJ] was declared inoperable for pre-planned maintenance and testing. There were no other structures, systems or components out of service that contributed to this event on March 22, 2016.

EVENT DESCRIPTION

As part of a pre-planned maintenance and testing activities, the HPCI system was declared inoperable on March 21, 2016 at 0400 hours. Following maintenance the HPCI system dynamic flow test was initiated on Monday, March 21, 2016 at approximately 2348 hours. At approximately 0047 hours on March 22, the HPCI turbine was removed from service per procedure. The HPCI turbine was started again at approximately 0050 hours and removed from service at approximately 0056 hours as prescribed by the testing procedure.

Shortly after the second HPCI turbine run, the operator noticed an excessive amount of oil on the front standard that was not present during the first run of HPCI turbine. However, there was no active leak at the time. A decision was made to start the HPCI Auxiliary Oil Pump (Aux Oil Pump) to help identify the leak location.

Following the start of the Aux Oil Pump at approximately 0104 hours, a pencil-sized stream of oil could be seen leaking from the oil pipe nipple located between pilot cylinder port D and a pipe elbow. After the leak location was identified, the Aux Oil Pump was secured. At the time of discovery, HPCI was still inoperable because of the pre-planned maintenance and testing activities. The size of the leak required repair prior to declaring the HPCI system operable.

The cracked pipe nipple was replaced. An extent of condition was completed for all known leaks for the HPCI oil pipe system. Results of the extent of condition review identified two other pipe nipples and two elbows with thread leakage (no crack present). The pipe nipples were replaced and elbows were reused and HPCI was declared operable on March 24, 2016 following repairs and successful surveillance run.

On July 7, 2016, an engineering evaluation determined that between January 9 and March 24, 2016, i.e. 75 days, the HPCI system was inoperable. During this period, HPCI was not capable of operating for the entire design basis mission time. However, the evaluation also determined that HPCI had the capability to 1) operate continuously for at least 90 minutes during this period, or 2) could have supported intermittent operation to provide core cooling for the 4 hour station blackout event coping period.

EVENT ANALYSIS

This event resulted in a condition that at the time of discovery, March 22, 2016 at 0104 hours, could have prevented the fulfillment of the HPCI system safety function. The 8-hour NRC ENS notification (#51812) required by 10 CFR 50.72 (b)(3)(v)(D) was completed on March 22, 2016 at 0538 hours. This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(v)(D) and 10 CFR 50.73(a)(2)(i)(B). This

event is classified as a safety system functional failure. This event is also being reported as an operation or condition prohibited by Technical Specification.

SAFETY SIGNIFICANCE

On July 7, 2016, an engineering evaluation of past operability determined that HPCI had been inoperable for 75 days between January 9 and March 24, 2016. Technical Specification 3.5.1, Emergency Core Cooling System Required Action I, allows continued operation with HPCI inoperable for only 14 days. Therefore, this was a condition prohibited by the plant's Technical Specification. During this period, the evaluation determined that HPCI had the capability to 1) operate continuously for at least 90 minutes during this period, or 2) could have supported intermittent operation to provide core cooling for the 4 hour station blackout event coping period.

Analysis of the HPCI inoperability period identified that the Reactor Core Isolation Cooling system (RCIC) had been inoperable for approximately 48 hours and 16 minutes and was unavailable for approximately 37 hours of those hours between February 15-17, 2016. Technical Specification 3.5.1 Required Action I and 3.5.3, Emergency Core Cooling System and Reactor Core Isolation Cooling System, Required Action A would require the plant to be in Mode 3 within 12 hours if HPCI and RCIC are simultaneously inoperable. Therefore, this was a condition prohibited by Technical Specification. During the period of RCIC unavailability, if high pressure injection capability was needed, the site's emergency operating procedures would direct operations to use Feed Water, Control Rod Drive Hydraulic System, and Standby Liquid Control as high pressure injection sources. However, Automatic Depressurization System (ADS) was operable at all times between January 9 and March 24, 2016, providing the ability to depressurize, if required, allowing for several low pressure injection sources to be used to maintain reactor level.

The potential safety consequence of this event is a loss of HPCI system injection capability during a design basis accident if the oil leak was of sufficient magnitude or if the pipe would have broken when the system was required to mitigate the consequences of an accident. The risk associated with HPCI unavailability beyond 90 minutes, results in an increased vulnerability in scenarios where redundant high pressure injection systems fail and depressurization is not successful (as stated above the ability to depressurize was available during this time period). In the Probabilistic Risk Assessment (PRA) model for station blackout events that are longer than the 4 hour licensing basis coping time, mitigation capability was degraded due to loss of long term HPCI function. Station abnormal operating procedures contain strategies for extended station blackout conditions.

CAUSE

The direct cause of the HPCI oil leak was a cracked pipe nipple. The equipment failure analysis concluded that the most likely cause was the HPCI pipe nipple was exposed to significant loads, sufficient to initiate a crack, likely from applied wrench torques during oil leak repair activities in 2005.

Once initiated, the crack initially grew due to short duration, large magnitude loads such as those seen during HPCI pump shut downs or rapid manual speed changes that occurred during surveillance testing over the years. Steady state operation did not initially propagate the crack due to the stresses being relatively low. Once the crack grew sufficiently large, further crack growth due to high cycle, low loads

during steady pump operation likely became possible. At some point, the crack length propagated to a point where steady state operation vibration loads become a primary driver of rapid crack propagation. The crack propagated as such during the March 21-22 HPCI turbine run to a point as to where the leak was identified on March 22, 2016.

An organizational root cause evaluation was completed to address the assessment and prioritization of repair of known oil leaks on the HPCI system. The root cause determined that management and individuals were tolerant of leaks on the HPCI system. As a result, station personnel did not effectively advocate prompt repair of the HPCI oil leak.

CORRECTIVE ACTION COMPLETED

The cracked pipe nipple was replaced. An extent of condition was completed for all known leaks for the HPCI oil pipe system. Results of the extent of condition review identified two other pipe nipples and two elbows with thread leakage (no crack present). The pipe nipples were replaced and elbows were reused and HPCI was declared operable on March 24, 2016 following repairs and successful surveillance run. The equipment failure analysis for the cracked HPCI oil pipe has been completed. The fluid leak management process has been implemented at the facility.

PREVIOUS SIMILAR OCCURRENCES

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

ADDITIONAL INFORMATION

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