

Monticello Nuclear Generating Plant 2807 W County Road 75 Monticello, MN 55362

February 28, 2012

L-MT-12-009 10 CFR 50.73

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

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

# LER 2011-006-01, "Intake Structure Fire Suppression System Blockage"

A revision to the Licensee Event Report 2011-006 is attached.

### Summary of Commitments

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

Timothy/J. O'Connor Site Vice-President Monticello Nuclear Generating Plant Northern States Power Company-Minnesota

Enclosure

cc: Regional Administrator, Region III, USNRC Project Manager, Monticello Nuclear Generating Plant, USNRC Resident Inspector, Monticello Nuclear Generating Plant, USNRC

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSI (10-2010)						ION	N APPROVED BY OMB NO. 3150-0104 EXPIRES: 10/31/2013 Estimated burden per response to comply with this mandatory collection								
							request: 80 hours. Reported lessons learned are incorporated into the licensing								
								the Records and FOIA/Privacy Service 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							
LICENSEE EVENT REPORT (LER)								and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and							
(See reverse for required number of									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						
digits/characters for each block)								not conduct or sponsor, and a person is not required to respond to, the information collection.							
1. FACILIT	Y NAME								2.	DOCKET NUMBER 3. PAGE					
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4. TITLE															
Intake Structure Fire Suppression System Blockage															
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14. SUPPLEMENTAL REPORT EXPECTED							15. EXPECTED SUBMISSION DATE		MONTH	H DAY	YEAR				
O YES (If yes, complete 15. EXPECTED SUBMISSION DATE). <ul> <li>O NO</li> </ul>						N/A			N/A	N/A					
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)															

On September 2, 2011, at approximately 1600, Mechanical Maintenance personnel informed Operations that portions of the Intake Structure sprinkler system piping were found to be partially blocked and incapable of passing flow. The Intake Structure sprinkler system is relied upon in part to satisfy an approved exemption to 10 CFR 50 Appendix R, Section III.G.2.b concerning separation of components in the Intake Structure.

Installation of the Intake Structure sprinkler system in 1983 did not comply with design requirements for providing required pipe slope to ensure proper draining. This condition allowed excessive water to remain in the system which then contributed to accelerated internal corrosion and accumulation of corrosion byproducts in the piping system.

Immediate corrective actions taken included flushing the sprinkler system and performing internal inspections to confirm removal of blockage before returning the system to service.

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NRC FORM 366A (10-2010)	LICENSEE EVENT REPORT (LER)					U.S. NUCLEAR REGULATORY COMMISSION			
CONTINUATION SHEET									
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# **EVENT DESCRIPTION**

On August 26, 2011, with the plant operating in Mode 1 at 100% power, it was determined during the performance of Surveillance Test Procedure 0323-01, Fire Protection System Sprinkler Functional Test, that blockage existed at valve FP-171-10, Sprinkler Inspectors Test Valve. At this time Operations declared the fire suppression system [KP] non-functional. A 14-day fire protection system impairment and continuous compensatory fire watch, with backup suppression, had been previously established at the commencement of Procedure 0323-01 and remained in effect. Follow-up maintenance activities confirmed the valve was plugged and removed the blockage.

When Surveillance Test Procedure 0323-01 was re-performed on August 28, 2011 as the postmaintenance test, it was determined that additional blockage was present in the piping. Further maintenance activities on September 2, 2011, identified significant blockage in the fire sprinkler line upstream of valve FP-171-10 as well as in three vertical risers going to sprinkler heads.

At approximately 1600 hours, following additional inspections of the Intake Structure fire system piping, Maintenance informed Operations that additional portions of the sprinkler suppression piping were blocked. The fire suppression system is relied upon, in part, to satisfy an approved exemption for the plant to 10 CFR 50 Appendix R, Section III.G.2.b concerning separation of components in the Intake Structure.

### **EVENT ANALYSIS**

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(ii)(B) – Degraded or Unanalyzed Condition.

Radiography was performed at various locations throughout the Intake Structure sprinkler system to determine the extent of blockage. The most remote portion of the sprinkler system was found to be blocked due to an accumulation of what was later determined to be corrosion products.

System design documentation indicates the piping should be sloped downward from the branches to the cross main and continuing back to the sprinkler control valve main drain. Investigation showed that portions of the system were not installed per the design such that the slope did not promote complete draining of the system. Incomplete draining contributed to the overall accumulation of corrosion products.

During system tests or actuations, water surged through the system which both loosened fixed corrosion products and transported existing corrosion products further into remote parts of the system. The corrosion byproducts were further broken down as a function of time, reducing them to fine particles which took on the form of a reddish, brownish, clay-like mud.

Samples of the "mud" were taken at various locations within the system and sent to an independent lab for analysis to determine the makeup/origin of the blockage. The results indicated the blockage was primarily made up of iron related corrosion products.

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# SAFETY SIGNIFICANCE

The Monticello risk assessment group reviewed the event for risk impact. A quantitative bounding PRA analysis was performed by assuming failure of all equipment residing in the Intake Structure, given a fire occurs in the room. The risk associated with degradation of the automatic fire suppression system in the Intake Structure is conservatively below the thresholds of what is considered to be low significance with regard to core damage frequency (< 1.0 E-06), and with regard to large early release frequency (<1.0E-07).

Although the sprinkler system was assumed to have failed in the PRA analysis, alternative methods were functional and available to mitigate a fire in the Intake Structure.

### CAUSE

Installation of the Intake Structure fire sprinkler system in 1983 did not comply with design requirements for providing required pipe slope to ensure proper draining. This condition allowed excessive water to remain in the system which then contributed to accelerated internal corrosion and accumulation of corrosion byproducts.

### CORRECTIVE ACTION

The Intake Structure sprinkler system was flushed and returned to service following radiographic and boroscopic inspections to confirm removal of the blockage. Planned long term actions include:

- Restore portions of the Intake Structure fire sprinkler system piping not meeting design requirements for slope to compliance with the design requirements.
- Perform periodic internal inspections and periodic testing of the Intake Structure fire sprinkler piping to validate that the sprinklers will perform their intended function.

Corrective actions are being tracked under the Monticello Corrective Action Program.

#### PREVIOUS SIMILAR EVENTS

An extent of condition evaluation for a 2007 Emergency Diesel Generator sprinkler piping blockage identified a potential for this to occur in the Intake Structure, but while identified, flushing of the sprinkler system had not been performed prior to the 2011 event.

During post maintenance testing in 2009, following reinstallation of the Intake Structure sprinkler piping, no flow was observed in the inspector test valve orifice. Pipe scale was observed in the inspector test valve orifice. At that time, blockage was assumed to be local. Since there were no sprinkler heads downstream of FP-171-10, it was concluded that the system remained functional. It has since been determined that this conclusion was incorrect.

There have been no similar licensee event reports in the last three years.