



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

March 31, 2020

Mr. Thomas Conboy
Site Vice President
Monticello Nuclear Generating Plant
Northern States Power Company, Minnesota
2807 West County Road 75
Monticello, MN 55362-9637

**SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT – TRIENNIAL FIRE
PROTECTION INSPECTION REPORT 05000263/2020011**

Dear Mr. Conboy:

On February 27, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Monticello Nuclear Generating Plant and discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at Monticello Nuclear Generating Plant.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Paul J. Zurawski, Acting Chief
Engineering Branch 3
Division of Reactor Safety

Docket No. 05000263
License No. DPR-22

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

Letter to Thomas Conboy from Paul Zurawski dated March 31, 2020.

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT – TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000263/2020011

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number: 05000263

License Number: DPR-22

Report Number: 05000263/2020011

Enterprise Identifier: I-2020-011-0016

Licensee: Northern States Power Company, Minnesota

Facility: Monticello Nuclear Generating Plant

Location: Monticello, MN

Inspection Dates: January 27, 2020 to February 14, 2020

Inspectors: M. Domke, Reactor Inspector
J. Robbins, Acting Sr. Resident Inspector
A. Shaikh, Senior Reactor Inspector

Approved By: Paul J. Zurawski, Acting Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a triennial fire protection inspection at Monticello Nuclear Generating Plant, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Maintain Adequate Fire Protection System Functional Test Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000263/2020011-01 Open/Closed	None (NPP)	71111.21N.05
The inspectors identified a finding of very-low safety significance and associated violation of Technical Specification 5.4.1.d, "Fire Protection Program Implementation", for the licensee's failure to maintain a fire protection program procedure. Specifically, the licensee failed to maintain Procedure 0266, "Fire Pumps Simulated Auto-Actuation and Capability Test" by failure to include acceptance criteria in the procedure that accounted for piping degradation since piping installation that demonstrated fire protection system functionality.			

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21N.05 - Fire Protection Team Inspection (FPTI)

SSC Credited for Fire Prevention, Detection, Suppression, or Post-Fire SSD Review (IP Section 03.01) (4 Samples)

The inspectors verified that components and/or systems will function as required to support the credited functions stated for each sample. Additional inspection considerations are located in the fire hazards analysis (FHA) or safe shutdown analysis (SSA).

- (1) Division II RHR Pumps
- (2) Fire Area 8 (Cable Spreading Room) Fire Dampers and Smoke Detectors
- (3) Fire Suppression System Fire Pumps (Diesel, Electric, and Screenhouse)
- (4) Fire Area 8 (Cable Spreading Room) Post-Fire SSD

Fire Protection Program Administrative Controls (IP Section 03.02) (1 Sample)

The inspectors verified that the selected control or process is implemented in accordance with the licensee's current licensing basis. If applicable, ensure that the licensee's FPP contains adequate procedures to implement the selected administrative control. Verify that the selected administrative control meets the requirements of all committed industry standards.

- (1) Combustible Control Program

Fire Protection Program Changes/Modifications (IP Section 03.03) (1 Sample)

The inspectors verified the following:

- a. Changes to the approved FPP do not constitute an adverse effect on the ability to safely shutdown.
- b. The adequacy of the design modification, if applicable.
- c. Assumptions and performance capability stated in the SSA have not been degraded through changes or modifications.
- d. The FPP documents, such as the Updated Final Safety Analysis Report, fire protection report, FHA, and SSA were updated consistent with the FPP or design change.
- e. Post-fire SSD operating procedures, such as abnormal operating procedures, affected by the modification were updated.

- (1) Generic Letter 86-10 Evaluation for Cable Spreading Room Fire Damper Fire Resistance Rating

INSPECTION RESULTS

Failure to Maintain Adequate Fire Protection System Functional Test Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000263/2020011-01 Open/Closed	None (NPP)	71111.21N.05
<p>The inspectors identified a finding of very-low safety significance and associated violation of Technical Specification 5.4.1.d, "Fire Protection Program Implementation", for the licensee's failure to maintain a fire protection program procedure. Specifically, the licensee failed to maintain Procedure 0266, "Fire Pumps Simulated Auto-Actuation and Capability Test" by failure to include acceptance criteria in the procedure that accounted for piping degradation since piping installation that demonstrated fire protection system functionality.</p>			
<p><u>Description:</u></p> <p>The Monticello Nuclear Generating Plant fire protection program is described in AWI.08.01.00, Rev. 23 "Fire Protection Program Plan", and Section 4.8.5, "Implementing Documents", lists the documents that implement the fire protection program. Ops Manual B.08.05-05, "Fire Protection – System Operation", is listed under Section 4.8.5 of AWI.08.01-00 as an implementing document. Ops Manual B.08.05-05, Rev. 78, Section B, "Fire Suppression Water Supply System", states, in part, that any two of the fire water pumps, including automatic initiation logic, SHALL be capable of delivering sufficient flow and pressure to satisfy the demand (including hose stream) of the most demanding water based suppression system and that the ability to meet this requirement is demonstrated by satisfactory completion of surveillance 0266, "Fire Pumps Simulated Auto-Actuation and Capability Test".</p> <p>During review of the work orders for the last performed fire pump and fire water flow tests, the inspectors identified that the acceptance criteria in the procedure associated with the fire pump test relied on historic data and assumptions. Specifically, procedure 0266, which was performed to satisfy the requirements of Ops Manual B.08.05-05 and ensure the functionality of the fire protection system pumps and auto-initiation logic contained acceptance criteria in step 96 that assumed original plant conditions. Step 96 requires the plotted fire pump curves (flow vs. pressure) to lie above all the fire suppression demand points in order to ensure functionality of the fire protection system pumps to deliver fire suppression water to the most limiting suppression loads at the site. These suppression demand points were predetermined from original plant hydraulic analysis of the fire protection suppression system. In order to obtain a suppression demand point (pump flow at specific required discharge pressure) for a particular fire area, the total frictional losses incurred along sections of piping delivering the fire water from the discharge of the fire pump up to the suppression load sprinkler heads must be calculated and subtracted from the pump's discharge pressure. The methodology for calculating total frictional losses over the length of piping is described in National Fire Protection Association (NFPA) 13, "Standard of Installation of Sprinkler Systems" and uses an equation (Williams-Hazen) that contains a piping roughness factor also known as the coefficient of friction or C-factor. The inspectors determined that the licensee had implemented the coefficient of friction values (C-factors) as described in NFPA 13 for all the</p>			

suppression system demand points and these C-factors assume nominal pipe with some degradation equivalent to a few years of service. However, the inspectors noted that although the C-factor would further degrade over time, the licensee had not changed or adjusted the C-factors over the 50+ years since installation from the values specified in the installation standard NFPA 13. The inspectors questioned the validity of the licensee's assumption that no further degradation has occurred over 50 years since installation. If the C-factor assumed further degradation of piping since installation then the calculated frictional losses would increase along the piping from the pump's discharge up to the suppression load point and hence, the suppression demand points for each fire area would increase since the pump would now have to overcome those frictional pressure losses from its discharge up to the suppression load point. Therefore, the plotted pump curves as determined from procedure 0266 could inadvertently lie below the re-calculated suppression demand points and potentially adversely impact the functionality of the fire pumps to deliver required flow and pressure to the most limiting suppression loads on site. The licensee entered the inspectors' concerns into its corrective action program and leveraged a third-party vendor to perform a hydraulic analysis of its fire suppression system taking into consideration corrosion effects from installation to present. In the report, the licensee calculated the current expected C-factors for each fire area that are used in step 96 of procedure 0266 taking into consideration corrosion effects and compared these expected C-factors to the most limiting C-factor that the fire suppression system can tolerate. The EDG room provided the most limiting C-factor for the site at 92 and the expected calculated C-factor considering corrosion since installation was above 92 but below the NFPA 13 specified value. The inspectors reviewed the vendor's report as provided by the licensee and did not identify any additional questions.

Corrective Actions: The licensee entered the inspectors' concern into its corrective action program (CAP) and implemented immediate corrective actions that included performing a detailed fire protection suppression system hydraulic calculation to determine system margins and limits. Subsequent to this immediate corrective action, the licensee intends to revise procedure 0266 to include appropriate margin and limits as detailed in the hydraulic calculation performed.

Corrective Action References: AR 501000037221 - 2020 FP Insp: Fire Flow Test Concerns

Performance Assessment:

Performance Deficiency: The Inspectors determined that the licensee's failure to maintain procedure 0266, "Fire Pumps Simulated Auto-Actuation and Capability Test", by not including acceptance criteria that accounted for piping degradation since installation of the piping was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to maintain procedure 0266 by not including acceptance criteria that accounted for piping degradation since installation of piping, resulted in a deficient procedure that could have resulted in the acceptance of fire pump performance that would not be able to satisfy the required flow and pressure demand of the most demanding water based suppression system and therefore, adversely impacted the functionality of the fire protection suppression system.

Significance: The inspectors assessed the significance of the finding using Appendix F, "Fire Protection and Post - Fire Safe Shutdown SDP." The inspectors screened the finding using IMC 0609, Appendix F, Attachment 1, "Part 1: Fire Protection SDP Phase 1 Worksheet," dated May 02, 2018. The inspectors answered "YES" to Question 1.4.3.A, "Would adequate fire water capacity (flow at required pressure) still be available for protection of equipment important to safe shutdown in the most limiting location onsite?" Therefore, the inspectors determined that the finding screened as having a very-low safety significance (Green).

Cross-Cutting Aspect: Not Present Performance. No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Technical Specification 5.4.1.d requires, in part, that, written procedures shall be established, implemented, and maintained covering the Fire Protection Program implementation. Document AWI.08.01.00, Rev. 23 "Fire Protection Program Plan", Section 4.8.5, "Implementing Documents", lists the documents that implement the fire protection program onsite at Monticello and includes Ops Manual B.08.05-05, "Fire Protection – System Operation" as an implementing document. Ops Manual B.08.05-05, Rev. 78, Section B, "Fire Suppression Water Supply System", states, in part, that any two of the fire water pumps, including automatic initiation logic, **SHALL** be capable of delivering sufficient flow and pressure to satisfy the demand (including hose stream) of the most demanding water based suppression system and that the ability to meet this requirement is demonstrated by satisfactory completion of surveillance 0266, "Fire Pumps Simulated Auto-Actuation and Capability Test".

Contrary to the above, since April 1978 to June 14, 2018, the licensee failed to maintain procedure 0266 that implemented the Fire Protection Program requirement in the Ops Manual B.08.05-05 to verify that the fire pumps would be capable of delivering sufficient flow and pressure to satisfy the demand of the most demanding water based suppression system. Specifically, procedure 0266 did not contain acceptance criteria that accounted for piping degradation since initial installation to verify that the fire protection water system could satisfactorily complete the flow and pressure requirements in procedure 0266.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On February 27, 2020, the inspectors presented the triennial fire protection inspection results to Mr. T. Conboy, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N.05	Calculations	05-084	Fire Load Calculation Sheet, 1A - RHR "B" and Core Spray Pump Room, Division II	2B
		16-073	4kV Coordination Study	0A
	Corrective Action Documents	033247	Fire Induced MSIV Operation	05/18/2004
		039865	Fire Induced Damage in CSR or CR may Result in Deadheading B RHR Pump	07/13/2005
		500001445615	Fire Panel Fuse Rating Inspection	09/05/2014
		500001530637	2016 FP FSA: CSR Same Fire Area as Admin	08/04/2016
		500001547508	CV-1995 did not Open on a Shutdown of 12 RHR Pump	01/14/2017
		500001549276	Fuse Installed at C-739/FUSE-7 Does Not Match Print	02/01/2017
		501000019560	3rd Party Testing Issues-Obs EQ Project	11/13/2018
		501000032124	Teledyne #13, "A" RHR Room	09/21/2019
	Corrective Action Documents Resulting from Inspection	501000037099	2020 FP Insp: Complex Question Requires > 24 hours	01/29/2020
		501000037221	2020 FP Insp: Fire Flow Test Concerns	01/30/2020
		501000037402	2020 FP Insp: Editorial Error in USAR-J	02/10/2020
		501000037518	Inspection Management Concerns	02/09/2020
		501000037619	2020 FP Insp: Update USAR Reference	02/12/2020
		501000037630	2020 FP Insp: Editorial Error FPEE-19-001	02/12/2020
		501000037730	2020 FP Insp: Surveillance Signature Question	02/13/2020
	Engineering Changes	0000016838	11, 12, 13 & 14 RHR Pump Cable Replacement	05/30/2013
		22245	Replace Agastat EGPD Relays Identified during RFO26	0
		25092	Relay Replacement for EGP Relays Model EGPD004 and EGPI004	0
		601000000328	Upgrade Cable Spreading Room Fire Dampers	0
		6DOCGMO21876	#13 RHR Pump Motor Replacement	04/04/2013
		93Q200	#12 RHR Motor Replacement	0
	Engineering Evaluations	0067-0107-LTR-005	MNGP Fire Protection System Piping Hydraulic Analysis Review - Effect of Fire Main Corrosion on System Capability	0
		FPCR-19-009	B.08.05-05 STRIDE Frequency	09/12/2019
		FPEE-19-001	Cable Spreading Room Fire Damper Fire Resistance	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Rating	
		FPEE-19-002	Addition of Cable Spreading Room to Control Room Fire Area VIII	1
		MT-2018-ASD-13	STRIDE to Extend the Frequency of the Alternate Shutdown System (ASDS) Cycle Functional Test	0
	Miscellaneous	9759	Combustible Control Permit	01/13/2020
		9762	Combustible Control Permit	01/13/2020
		9766	Combustible Control Permit	01/22/2020
		Safety Evaluation by the Office of Nuclear Reactor Regulation	Hot Short Issue Associated with Information Notice 92-18	07/02/1993
	Procedures	0266	Fire Pumps Simulated Auto-Actuation and Capability Test	65
		4 AWI-08.01.01	Fire Prevention Practices	53
		4850-604-PM	152-604, 12 RHR Pump Relay Maintenance, Calibration, and Test Tripping	10
		4850-608-PM	152-608, 12 RHR SW Pump Relay Maintenance, Calibration, and Test Tripping	11
		FP-PE-CC-01	Combustible Control	7
		FP-PE-FP-01	Fire Protection Regulatory Review	1
		Ops Man C.4-C	Shutdown Outside Control Room	51
		OWI-03.07	Time Critical Operator Actions	18
		STI	Monticello Surveillance Test Intervals	5
	Work Orders	00440885	P-202C/MTR, Motor Overhaul	05/09/2014
		00550280	OPS-FIR, 0266 Fire Pumps Simulation Auto-Actuation and Capability Test	12/15/2016
		528620 01	OPS-FIR, 0328 Halon System Functional Test	02/01/2017
		700020731-0010	Cable Spreading Room Halon System	02/02/2018
		700022709-0010	Fire Pumps Simulated Auto-Actuation and Capability Test	06/14/2018
		700032132-0010	Fire Protection System Flow Test	09/13/2018
		700045838-0010	Fire Protection System Flow Test	09/14/2019