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October 28, 2016

L-MT-16-053
10 CFR 50.4
10 CFR 50.54(f)

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

Spent Fuel Pool Evaluation Supplemental Report, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

References:

1. NRC Letter, "Subject: Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 12, 2012. (ADAMS Accession Number ML12053A340)

2. NRC Letter, "Subject: Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendation 2.1 'Seismic' of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated October 27, 2015. (ADAMS Accession Number ML15194A015)

3. NEI Letter, "Subject: Request for Endorsement of Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation (EPRI 3002007148)," dated February 23, 2016. (ADAMS Accession Number ML16055A017)

4. EPRI 3002007148, "Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation," dated February 2016. (ADAMS Accession Number ML16055A021)

5. NRC Letter, “Subject: Endorsement of Electric Power Research Institute Report 3002007148, ‘Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation,’” dated March 17, 2016. (ADAMS Accession Number ML15350A158)

6. NSPM Letter, “MNGP Seismic Hazard and Screening Report (CEUS Sites), Response to NRC Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident Report,” L-MT-14-045, dated May 14, 2014. (ADAMS Accession Nos. ML14136A285)

7. NRC Letter, “Subject: Monticello Nuclear Generating Plant - Staff Assessment of Information Provided Pursuant to Title 10 of the *Code of Federal Regulations* Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC NO. MF3958),” dated July 8, 2015. (ADAMS Accession Number ML15175A336)

8. EPRI 1025287, “Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details [SPID] for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic,” dated November 2012. (ADAMS Accession Number ML12333A170)

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10CFR 50.54(f) (Reference 1) to all power reactor licensees. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, is to conduct a limited scope Spent Fuel Pool (SFP) Evaluation for the Monticello Nuclear Generating Plant (MNGP). By Reference 3, Nuclear Energy Institute (NEI) submitted an Electric Power Research Institute (EPRI) report entitled, “Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation” (EPRI 3002007148) (Reference 4) for NRC review and endorsement. NRC endorsement was provided by Reference 5.

EPRI 3002007148 provides criteria for evaluating the seismic adequacy of a SFP to the reevaluated ground motion response spectrum (GMRS) hazard levels. The reevaluated GMRS used for the SFP seismic demand are documented in Reference 6 and endorsed by the NRC by Reference 7. EPRI 3002007148 supplements the guidance in the Seismic Evaluation Guidance, Screening, Prioritization and Implementation Details (SPID) (Reference 8), for plants where the GMRS peak spectral acceleration is less than or equal to 0.8g. Section 3.3 of EPRI 3002007148 lists the parameters to be verified to confirm that the results of the report are applicable to MNGP, and that the MNGP SFP is seismically adequate in accordance with NTTF 2.1 seismic evaluation criteria.

The enclosure to this letter provides the data for MNGP that confirms applicability of the EPRI 3002007148 criteria and confirms that the SFP is seismically adequate in accordance with NTTF 2.1 seismic evaluation criteria. The requested information provides the response to Requested Information Item (9) of Reference 1 associated with NTTF Recommendation 2.1 seismic evaluation criteria.

Please contact John Fields, at 763-271-6707, if additional information or clarification is required.

Summary of Commitments

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

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 28, 2016.

Peter A. Gardner
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

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

ENCLOSURE

SPENT FUEL POOL EVALUATION SUPPLEMENTAL REPORT, RESPONSE TO NRC REQUEST FOR INFORMATION PURSUANT TO 10 CFR 50.54(f) REGARDING RECOMMENDATION 2.1 OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

for the

MONTICELLO NUCLEAR GENERATING PLANT

25 pages follow

Document ID:	16Q0391-RPT-006
Document Title:	Spent Fuel Pool Evaluation Supplemental Report, Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident

Document Type:
Criteria ☐ Interface ☐ Report ☒ Specification ☐ Other ☐ Drawing ☐

Project Name: MNGP NTTF R2.1 and NEI 12-06, Appendix H Assessments
Job No.: 16Q0391
Client: Monticello Nuclear Generating Plant

This document has been prepared in accordance with the S&A Quality Assurance Program Manual, Revision 18 and project requirements.

Initial Issue (Rev. 0)	
Prepared by: M. Wodarcyk	Date: 9/26/2016
Reviewed by: K. Dommer	Date: 9/26/2016
Approved by: M. Delaney	Date: 9/28/2016

Revision Record:

Revision No.	Prepared by/ Date	Reviewed by/ Date	Approved by/ Date	Description of Revision
1	M. Wodarcyk 10/11/2016	K. Dommer 10/11/2016	M. Delaney 10/11/2016	See Section 1 of this revision. Revision 1 of this report supersedes all previous revisions of this report in its entirety.

Stevenson & Associates	DOCUMENT APPROVAL SHEET Figure 2.8	PROJECT NO. **16Q0391**

Contents

Attachments

1. Purpose

The purpose of this report is to provide a description of the methods used to evaluate the Monticello Nuclear Generating Plant (MNGP) spent fuel pool (SFP) integrity, provide the results of the evaluation and identify actions required to address vulnerabilities associated with SFP integrity in response to Item (9) of the NRC Request for Information dated March 12, 2012 (Reference 1).

The purpose of Revision 1 of this report is to correct typographical errors in Attachment 2, Section 6.

2. Background

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information per 10CFR 50.54(f) (Reference 1) to all power reactor licensees. By letter dated October 27, 2015 (Reference 2), the NRC transmitted final seismic information request tables which identified that the Monticello Nuclear Generating Plant (MNGP) is to conduct a limited scope Spent Fuel Pool Evaluation. By Reference 3, Nuclear Energy Institute (NEI) submitted an Electric Power Research Institute (EPRI) report entitled, “Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation” (EPRI 3002007148) (Reference 4) for NRC review and endorsement. NRC endorsement was provided by Reference 5.

EPRI 3002007148 provides criteria for evaluating the seismic adequacy of a spent fuel pool (SFP). Section 3.3 of EPRI 3002007148 lists the parameters to be verified to confirm that the results of the report are applicable to MNGP, and that the MNGP SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

This report provides the data for MNGP that confirms applicability of the EPRI 3002007148 criteria and confirms that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

3. Acceptance Criteria

The SFP is seismically adequate using the guidance of EPRI 3002007148 (Reference 4) if all criteria identified in Section 3.3 of Reference 4 are satisfied.

4. Conclusions

The MNGP SFP in its current configuration is seismically adequate because all criteria identified in Section 3.3 of Reference 4 have been satisfied. No vulnerabilities have been identified.

5. References

See Attachment 3 of this report.

6. Evaluation

See Attachments 1 and 2 of this report.

ATTACHMENT 1

Northern States Power Company – Minnesota
(dba Xcel Energy)

Monticello Nuclear Generating Plant

Docket No. 50-263

Renewed Facility Operating License No. DPR-22

Site-Specific Spent Fuel Pool Criteria for MNGP

Table 1.1 below lists the criteria form Section 3.3 of EPRI 3002007148 along with data for Monticello Nuclear Generating Plant (MNGP) that confirms applicability of the EPRI 3002007148 criteria and confirms that the SFP is seismically adequate in accordance with NTTF 2.1 Seismic evaluation criteria.

Table 1.1	
SFP Criteria from EPRI 3002007148	**Site-Specific Data**
Site Parameters	
1. The site-specific GMRS peak spectral acceleration at any frequency should be less than or equal to 0.8g.	The GMRS peak spectral acceleration in Report 14C4229-RPT-001 (Ref. 6), Table 2.4-1 (as accepted by the NRC in a letter to MNGP dated 7/8/2015 (Ref. 7)) is 0.339g, which is less than 0.8g; therefore, this requirement is met.
Structural Parameters	
2. The structure housing the SFP should be designed using an SSE with a peak ground acceleration (PGA) of at least 0.1g.	The SFP is housed in the Reactor Building (per MNGP drawing NF-36388 (Reference 8.2.2.1), which is seismically designed to the site SSE with a PGA of 0.12g in accordance with the criteria in MNGP USAR-12.02 (Reference 8.5.2). The MNGP PGA is greater than 0.1g, therefore, this requirement is met. See Section 2 of Attachment 2 of this report for further discussion of the MNGP Reactor Building; specifically, the steel superstructure above the SFP.
3. The structural load path to the SFP should consist of some combination of reinforced concrete shear wall elements, reinforced concrete frame elements, post-tensioned concrete elements and/or structural steel frame elements.	The structural load path from the foundation to the SFP consists of reinforced concrete shear walls, reinforced concrete frames, and structural steel frame elements in accordance with MNGP drawings (Refs. 8.2.5.1 through 8.2.5.13 and Refs. 8.2.6.1 through 8.2.6.9); therefore, this requirement is met.
4. The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.	The SFP structure (i.e., the Reactor Building) is included in the MNGP Civil Inspection Program in accordance with Engineering Work Instruction EWI-11.01.07 (Ref. 8.3.1) and Procedure 1385 (Ref. 8.4.1), which were generated to support the implementation of MNGP's 10 CFR 50.65 requirements; therefore, this requirement is met.

Table 1.1	
SFP Criteria from EPRI 3002007148	**Site-Specific Data**
Non-Structural Parameters	
5. To confirm applicability of the piping evaluation in Section 3.2 of EPRI 3002007148, piping attached to the SFP up to the first valve should have been evaluated for the SSE.	No piping attached to the MNGP SFP is attached in such a way that would cause a rapid drain-down of the SFP in the event of a postulated piping failure following a seismic event. Therefore, this requirement is met for MNGP. See Section 5 of Attachment 2 of this report for further discussion of piping attached to the SFP.
6. Anti-siphoning devices should be installed on any piping that could lead to siphoning water from the SFP. In addition, for any cases where active anti-siphoning devices are attached to 2-inch or smaller piping and have extremely large extended operators, the valves should be walked down to confirm adequate lateral support.	Check valve PC-20-1 acts as a passive anti-siphoning device in the event that a flow reversal occurs within SFP cooling water discharge line FPW10A-6”-HK following a seismic event. Check valve PC-20-2 acts as a passive anti-siphoning device in the event that a flow reversal occurs within SFP cooling water discharge line FPW10B-6”-HK following a seismic event. No other lines are postulated to siphon inventory from the SFP following a seismic event and thus do not require anti-siphoning devices. As described, no anti-siphoning devices can lead to siphoning, therefore, this requirement is met for MNGP. The check valves described above are not actively-operated, do not have extended operators, and are attached to 6” pipes. As described, no anti-siphoning devices are attached to 2-inch or smaller piping with extremely large extended operators, therefore, this requirement is met for MNGP. See Section 6 of Attachment 2 of this report for further discussion of siphoning via piping attached to the SFP.

Table 1.1	
SFP Criteria from EPRI 3002007148	**Site-Specific Data**
7. To confirm applicability of the sloshing evaluation in Section 3.2 of EPRI 3002007148, the maximum SFP horizontal dimension (length or width) should be less than 125 ft, the SFP depth should be greater than 36 ft, and the GMRS peak Sa should be <0.1g at frequencies equal to or less than 0.3 Hz.	The MNGP SFP has a length of 40 ft (north-south) and a width of 26 ft (east-west) per drawings NF-36388 (Ref. 8.2.2.1) and NH-36256 (Ref. 8.2.3.2). Therefore, this requirement is met. Per Ref. NF-36782 (Ref. 8.2.4.3), the normal water elevation of the SFP is 1026'8", and the elevation of the base of the SFP is 988'11". The normal water depth is 1026'8" – 988'11" = 37'9"; this dimension is greater than 36 ft. In addition, per Emergency Operating Procedure C.5-1300-&-C.5-1400 (Ref. 8.4.4), Operations personnel are to maintain a minimum water depth of 36'7" in an emergency, which is also greater than 36 ft. Therefore, this requirement is met. The MNGP GMRS maximum spectral acceleration in the frequency range less than 0.3 Hz is 0.0193 g (per Report 14C4229-RPT-001 (Ref. 6), Table 2.4-1), which is less than 0.1g; therefore, this requirement is met.
8. To confirm applicability of the evaporation loss evaluation in Section 3.2 of EPRI 3002007148, the SFP surface area should be greater than 500 ft^2 and the licensed reactor core thermal power should be less than 4,000 MWt per unit.	Per drawings NF-36388 (Ref. 8.2.2.1) and NH-36256 (Ref. 8.2.3.2), the MNGP SFP has a surface area of: [40 ft (north-south)]*[26 ft (east-west)] = 1040 ft^2 This dimension is greater than 500 ft^2; therefore, this requirement is met. The licensed reactor thermal power for MNGP is 2004 MWt for its single unit (per USAR-03.01 (Ref. 8.5.1), Table 3.1-1) which is less than 4,000 MWt per unit, therefore, this requirement is met.

ATTACHMENT 2

Northern States Power Company – Minnesota
(dba Xcel Energy)

Monticello Nuclear Generating Plant

Docket No. 50-263

Renewed Facility Operating License No. DPR-22

Additional Notes Regarding Spent Fuel Pool Criteria for MNGP

Further information is presented below (as necessary) to explain how MNGP meets the SFP criteria from EPRI 3002007148 (as described in Attachment 1 of this report).

Site Parameters

1. *The site-specific GMRS peak spectral acceleration at any frequency should be less than or equal to 0.8g.*

   No additional notes.

Structural Parameters

2. *The structure housing the SFP should be designed using an SSE with a peak ground acceleration (PGA) of at least 0.1g.*

   Per the MNGP USAR-12.02 (Ref. 8.5.2), Section 12.2.1.2, the spent fuel storage pool structure and the Reactor Building at EL 1027'8" and below are Class I structures. Per Ref. 8.5.2, Section 12.2.1.4, Class I structures were designed for a design basis earthquake (i.e., safe shutdown earthquake, SSE) with a ground acceleration of 0.12g. This acceleration is greater than 0.10g.

   Per the MNGP USAR-12.02 (Ref. 8.5.2), Section 12.2.1.2, the Reactor Building above EL 1027'8" (i.e., the Reactor Building steel superstructure above the SFP) is not a Class I structure. However, MNGP calculation 05-101 (Ref. 8.1.1) evaluated the Reactor Building steel superstructure for a maximum (design basis) earthquake load of 0.12g, which is greater than 0.10g.

3. *The structural load path to the SFP should consist of some combination of reinforced concrete shear wall elements, reinforced concrete frame elements, post-tensioned concrete elements and/or structural steel frame elements.*

   No additional notes.

4. *The SFP structure should be included in the Civil Inspection Program performed in accordance with Maintenance Rule.*

   No additional notes.

Non-Structural Parameters

5. *To confirm applicability of the piping evaluation in Section 3.2 of EPRI 3002007148, piping attached to the SFP up to the first valve should have been evaluated for the SSE.*

   Drawings (Refs. 8.2.3.2, 8.2.4.1, 8.2.4.2, and 8.2.4.3) pertaining to all piping attached to the MNGP SFP were reviewed to determine line IDs of such pipes, as well as the component IDs of the first valves outside of the SFP.

   All pipes attached to the MNGP SFP, as well as their first valves outside of the SFP, have been noted in Table 2.5.1 below. Note that this table includes all lines identified in Ref. 8.2.3.2 which are closely related to the SFP. However, some of these pipes do not require specific evaluation due to pipe configuration and/or function. All of these pipes (whether requiring specific evaluation or not) will be addressed below.

Table 2.5.1 – Pipes Associated with the SFP, Including 1st Valves Outside of the SFP

Line ID	Begin	End	1st Valve Outside of SFP	1st Valve Name
D103-1”-HB	SFP Liner Sump	PC-41	PC-41	FUEL POOL LINER DRAIN
D104-1”-HB	SFP Liner Sump	PC-42	PC-42	FUEL POOL LINER DRAIN
FPW10A-6”-HK	PC-19-1	FPC Discharge “A” Diffuser	PC-19-1	11 FPCC DIFFUSER ISOLATION
FPW10B-6”-HK	PC-19-2	FPC Discharge “B” Diffuser	PC-19-2	12 FPCC DIFFUSER ISOLATION
FPW17A-3”-HK	(2) Unnamed 2” Scupper Drains	Skimmer Surge Tank T-48A	N/A	N/A
FPW17B-3”-HK	(2) Unnamed 2” Scupper Drains	Skimmer Surge Tank T-48B	N/A	N/A
FPW1-8”-HC	PC-1	PC-2	PC-1	FPCC CROSSTIE TO RHR HX
			PC-2	SKIMMER SURGE TANK OUTLET
(2) 2”-MR	SFP Scupper	FPW17A-3”-HK	N/A	N/A
(2) 2”-MR	SFP Scupper	FPW17B-3”-HK	N/A	N/A
Unnamed 8” Line	Skimmer Surge Tank T-48A	FPW1-8”-HC	N/A	N/A
Unnamed 8” Line	Skimmer Surge Tank T-48B	FPW1-8”-HC	N/A	N/A

Determine which lines require further evaluation of the pipe for an SSE in Table 2.5.2 below.

Table 2.5.2 – SSE Evaluations of Lines Associated with the SFP

Line ID	Description	Requires SSE Evaluation?	Was an SSE Evaluation Performed?	Which Station Document Contains the SSE Evaluation?
D103-1”-HB	Per drawing NF-36782 (Section B-B) (Ref. 8.2.4.3), this line is not attached to the SFP liner itself, but rather to a sump between the SFP liner and the concrete floor beneath the SFP. A failure of this line following a seismic event is therefore not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
D104-1”-HB	Per drawing NF-36782 (Section B-B) (Ref. 8.2.4.3), this line is not attached to the SFP liner itself, but rather to a sump between the SFP liner and the concrete floor beneath the SFP. A failure of this line following a seismic event is therefore not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
FPW10A-6”-HK	Per drawings NH-36256 (Ref. 8.2.3.2) and NF-36782 (Section B-B) (Ref. 8.2.4.3), FPW10A-6”-HK penetrates the SFP and supplies cooling water from the SFP cooling water pumps P-7A and P-7B (via the SFP heat exchangers E-6A and E-6B) to diffusers near the bottom of the pool. Per drawing NF-36782 (Section B-B) (Ref. 8.2.4.3), the pipe penetrates the SFP at a high elevation (1026’11”) relative to the bottom of the SFP; therefore, a failure of this line following a seismic event is not postulated to cause a rapid drain down of the SFP.	NO	N/A	N/A
FPW10B-6”-HK	Per drawing NH-36256 (Ref. 8.2.3.2) and NF-36782 (Section A-A) (Ref. 8.2.4.3), FPW10B-6”-HK penetrates the SFP and supplies cooling water from the SFP cooling water pumps P-7A and P-7B (via the SFP heat exchangers E-6A and E-6B) to diffusers near the bottom of the pool. Per drawing NF-36782 (Section A-A) (Ref. 8.2.4.3), the pipe penetrates the SFP at a high elevation (1025’5”) relative to the bottom of the SFP; therefore, a failure of this line following a seismic event is not postulated to cause a rapid drain down of the SFP.	NO	N/A	N/A

Table 2.5.2 – SSE Evaluations of Lines Associated with the SFP

Line ID	Description	Requires SSE Evaluation?	Was an SSE Evaluation Performed?	Which Station Document Contains the SSE Evaluation?
FPW17A-3”-HK	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), line FPW17A-3”-HK runs from the channel running from the SFP scupper drains to the Skimmer Surge Tank T-48A. Due to the high elevation of this line (at the normal water level 1026’8”) relative to the bottom of the SFP and the associated adjustable weir at this drain, a failure of this line and/or the weir following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
FPW17B-3”-HK	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), line FPW17B-3”-HK runs from the channel running from the SFP scupper drains to the Skimmer Surge Tank T-48B. Due to the high elevation of this line (at the normal water level 1026’8”) relative to the bottom of the SFP and the associated adjustable weir at this drain, a failure of this line and/or the weir following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
FPW1-8”-HC	Per drawing NH-36256 (Ref. 8.2.3.2), line FPW1-8”-HC connects the drains from the two SFP skimmer surge tanks. Per the assessment of the FPW17A-3”-HK and FPW17B-3”-HK lines in this table, failure of the drains from the SFP scupper drains into the skimmer tanks is not postulated to cause a rapid drain-down of the SFP, and therefore a failure of the drains from the skimmer tanks and their associated connector line FPW1-8”-HC is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A

Table 2.5.2 – SSE Evaluations of Lines Associated with the SFP				
Line ID	**Description**	**Requires SSE Evaluation?**	**Was an SSE Evaluation Performed?**	**Which Station Document Contains the SSE Evaluation?**
(2) 2”-MR	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), two of the 2”-MR lines form the wave suppression scuppers near the top of the SFP and drain via line FPW17A-3”-MR into the skimmer surge tank T-48A. Per the discussion of FPW17A-3”-MR in this table, due to the high elevation of the scupper (at the normal water level 1026’8”) relative to the bottom of the SFP and the associated adjustable weir at this drain, a failure of this scupper and/or the weir following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
(2) 2”-MR	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), two of the 2”-MR lines form the wave suppression scuppers near the top of the SFP and drain via line FPW17B-3”-MR into the skimmer surge tank T-48B. Per the discussion of FPW17B-3”-MR in this table, due to the high elevation of the scupper (at the normal water level 1026’8”) relative to the bottom of the SFP and the associated adjustable weir at this drain, a failure of this scupper and/or the weir following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
Unnamed 8” Line	Per drawing NH-36256 (Ref. 8.2.3.2), this 8” line drains the skimmer surge tank T-48A to its connection with line FPW1”-8”-HC. Per the discussion of FPW1”-8”-HC in this table, failure of this 8” drain line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A
Unnamed 8” Line	Per drawing NH-36256 (Ref. 8.2.3.2), this 8” line drains the skimmer surge tank T-48B to its connection with line FPW1”-8”-HC. Per the discussion of FPW1”-8”-HC in this table, failure of this 8” drain line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A

6. *Anti-siphoning devices should be installed on any piping that could lead to siphoning water from the SFP. In addition, for any cases where active anti-siphoning devices are attached to 2-inch or smaller piping and have extremely large extended operators, the valves should be walked down to confirm adequate lateral support.*

   Drawings (Refs. 8.2.3.2, 8.2.4.1, 8.2.4.2, and 8.2.4.3) pertaining to all piping attached to the MNGP SFP were reviewed to determine line IDs of such pipes, as well as the component IDs of the first valves outside of the SFP.

   All pipes attached to the MNGP SFP, as well as their attached anti-siphoning devices (ASD) (if applicable), have been noted in Table 2.6.1 below. Note that this table includes all lines identified in Ref. 8.2.3.2 which are closely related to the SFP. However, some of these pipes do not require anti-siphoning devices due to pipe configuration and/or function. All of these pipes (whether requiring specific evaluation or not) will be addressed below.

Table 2.6.1 – Pipes Associated with the SFP, Including Anti-Siphoning Devices

Line ID	Begin	End	Anti-Siphoning Device	Anti-Siphoning Device Name
D103-1”-HB	SFP Liner Sump	PC-41	N/A	N/A
D104-1”-HB	SFP Liner Sump	PC-42	N/A	N/A
FPW10A-6”-HK	PC-19-1	FPC Discharge “A” Diffuser	PC-20-1	11 FPCC DIFFUSER CKV
FPW10B-6”-HK	PC-19-2	FPC Discharge “B” Diffuser	PC-20-2	12 FPCC DIFFUSER CKV
FPW17A-3”-HK	(2) Unnamed 2” Scupper Drains	Skimmer Surge Tank T-48A	N/A	N/A
FPW17B-3”-HK	(2) Unnamed 2” Scupper Drains	Skimmer Surge Tank T-48B	N/A	N/A
FPW1-8”-HC	PC-1	PC-2	N/A	N/A
			N/A	N/A
(2) 2”-MR	SFP Scupper	FPW17A-3”-HK	N/A	N/A
(2) 2”-MR	SFP Scupper	FPW17B-3”-HK	N/A	N/A
Unnamed 8” Line	Skimmer Surge Tank T-48A	FPW1-8”-HC	N/A	N/A
Unnamed 8” Line	Skimmer Surge Tank T-48B	FPW1-8”-HC	N/A	N/A

Determine which lines require further evaluation of the pipe for anti-siphoning devices (ASD) in Table 2.6.2 below.

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP

Line ID	Description	Requires ASD?	Is ASD Present?	Is ASD Active?	Is ASD Attached to 2" or Smaller Piping?	Does ASD Have an Extended Operator?	Does ASD Have Adequate Support per a Walkdown?
D103-1"-HB	Per drawing NF-36782 (Section B-B) (Ref. 8.2.4.3), this line is not attached to the SFP liner itself, but rather to a sump between the SFP liner and the concrete floor beneath the SFP. This line is a SFP liner sump drain and is not postulated to siphon sufficient SFP inventory to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A
D104-1"-HB	Per drawing NF-36782 (Section B-B) (Ref. 8.2.4.3), this line is not attached to the SFP liner itself, but rather to a sump between the SFP liner and the concrete floor beneath the SFP. This line is a SFP liner sump drain and is not postulated to siphon sufficient SFP inventory to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP							
Line ID	**Description**	**Requires ASD?**	**Is ASD Present?**	**Is ASD Active?**	**Is ASD Attached to 2" or Smaller Piping?**	**Does ASD Have an Extended Operator?**	**Does ASD Have Adequate Support per a Walkdown?**
FPW10A-6"-HK	Per drawings NH-36256 (Ref. 8.2.3.2) and NF-36782 (Section B-B) (Ref. 8.2.4.3), FPW10A-6"-HK penetrates the SFP and supplies cooling water from the SFP cooling water pumps P-7A and P-7B (via the SFP heat exchangers E-6A and E-6B) to diffusers near the bottom of the pool. (See drawing NH-36032 (Ref. 8.2.3.1) for a legend of symbols used in MNGP P&ID drawings.) During normal operation, this line is the discharge line from the SFP cooling pumps. However, in the event of suction (i.e., flow reversal) within this line following a seismic event, check valve PC-20-1 (11 FPCC DIFFUSER CKV) acts as an anti-suction device, as it only permits flow in the discharge direction. Per drawing NX-9063-77-1 (Ref. 8.2.1.1) and VTM NX-9063-77-2 (Ref. 8.6.1), PC-20-1 is not an actively-operated valve, it does not have an extended operator, and it is attached to a 6" pipe. In addition, butterfly valve PC-19-1 (11 FPCC DIFFUSER ISOLATION) (upstream from PC-20-1) is normally locked-open, but, in the event of flow reversal in this line, MNGP Operations personnel could unlock and close the valve in order to provide defense-in-depth against suction in this line. Because of the anti-siphoning device, this line is not postulated to siphon sufficient SFP inventory to cause a rapid drain-down of the SFP.	YES	YES	NO	NO	NO	N/A

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP							
Line ID	**Description**	**Requires ASD?**	**Is ASD Present?**	**Is ASD Active?**	**Is ASD Attached to 2" or Smaller Piping?**	**Does ASD Have an Extended Operator?**	**Does ASD Have Adequate Support per a Walkdown?**
FPW10B-6"-HK	Per drawings NH-36256 (Ref. 8.2.3.2) and NF-36782 (Section A-A) (Ref. 8.2.4.3), FPW10B-6"-HK penetrates the SFP and supplies cooling water from the SFP cooling water pumps P-7A and P-7B (via the SFP heat exchangers E-6A and E-6B) to diffusers near the bottom of the pool. (See drawing NH-36032 (Ref. 8.2.3.1) for a legend of symbols used in MNGP P&ID drawings.) During normal operation, this line is the discharge line from the SFP cooling pumps. However, in the event of suction (i.e., flow reversal) within this line following a seismic event, check valve PC-20-2 (12 FPCC DIFFUSER CKV) acts as an anti-suction device, as it only permits flow in the discharge direction. Per drawing NX-9063-77-1 (Ref. 8.2.1.1) and VTM NX-9063-77-2 (Ref. 8.6.1), PC-20-2 is not an actively-operated valve, it does not have an extended operator, and it is attached to a 6" pipe. In addition, butterfly valve PC-19-2 (12 FPCC DIFFUSER ISOLATION) (upstream from PC-20-2) is normally locked-open, but, in the event of flow reversal in this line, MNGP Operations personnel could unlock and close the valve in order to provide defense-in-depth against suction in this line. Because of the anti-siphoning device, this line is not postulated to siphon sufficient SFP inventory to cause a rapid drain-down of the SFP.	YES	YES	NO	NO	NO	N/A

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP							
Line ID	**Description**	**Requires ASD?**	**Is ASD Present?**	**Is ASD Active?**	**Is ASD Attached to 2" or Smaller Piping?**	**Does ASD Have an Extended Operator?**	**Does ASD Have Adequate Support per a Walkdown?**
FPW17A-3"-HK	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), line FPW17A-3"-HK runs from the channel running from the SFP scupper drains to the Skimmer Surge Tank T-48A. Due to the high elevation of this line (at the normal water level 1026'8") relative to the bottom of the SFP and the associated adjustable weir at this drain, suction in this line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A
FPW17B-3"-HK	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), line FPW17B-3"-HK runs from the channel running from the SFP scupper drains to the Skimmer Surge Tank T-48B. Due to the high elevation of this line (at the normal water level 1026'8") relative to the bottom of the SFP and the associated adjustable weir at this drain, suction in this line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP							
Line ID	**Description**	**Requires ASD?**	**Is ASD Present?**	**Is ASD Active?**	**Is ASD Attached to 2" or Smaller Piping?**	**Does ASD Have an Extended Operator?**	**Does ASD Have Adequate Support per a Walkdown?**
FPW1-8"-HC	Per drawing NH-36256 (Ref. 8.2.3.2), line FPW1-8"-HC connects the drains from the two SFP skimmer surge tanks. Per the assessment of the FPW17A-3"-HK and FPW17B-3"-HK lines in this table, suction in the drains from the SFP scupper drains into the skimmer tanks is not postulated to cause a rapid drain-down of the SFP, and therefore suction in the drains from the skimmer tanks and their associated connector line FPW1-8"-HC is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A
(2) 2"-MR	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), two of the 2"-MR lines form the wave suppression scuppers near the top of the SFP and drain via line FPW17A-3"-MR into the skimmer surge tank T-48A. Per the discussion of FPW17A-3"-MR in this table, due to the high elevation of the scupper (at the normal water level 1026'8") relative to the bottom of the SFP and the associated adjustable weir at this drain, suction in this scupper following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A

Table 2.6.2 – Anti-Siphoning Evaluations of Lines Associated with the SFP							
Line ID	**Description**	**Requires ASD?**	**Is ASD Present?**	**Is ASD Active?**	**Is ASD Attached to 2" or Smaller Piping?**	**Does ASD Have an Extended Operator?**	**Does ASD Have Adequate Support per a Walkdown?**
(2) 2"-MR	Per drawings NF-36502 (Detail 5, Section A) (Ref. 8.2.5.13), NF-36639 (Detail 1 and Elevation E) (Ref. 8.2.6.10), NF-36782 (Section B-B) (Ref. 8.2.4.3), and NH-36256 (Ref. 8.2.3.2), two of the 2"-MR lines form the wave suppression scuppers near the top of the SFP and drain via line FPW17B-3"-MR into the skimmer surge tank T-48B. Per the discussion of FPW17B-3"-MR in this table, due to the high elevation of the scupper (at the normal water level 1026'8") relative to the bottom of the SFP and the associated adjustable weir at this drain, suction in this scupper following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A
Unnamed 8" Line	Per drawing NH-36256 (Ref. 8.2.3.2), this 8" line drains the skimmer surge tank T-48A to its connection with line FPW1"-8"-HC. Per the discussion of FPW1"-8"-HC in this table, suction in this 8" drain line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A
Unnamed 8" Line	Per drawing NH-36256 (Ref. 8.2.3.2), this 8" line drains the skimmer surge tank T-48B to its connection with line FPW1"-8"-HC. Per the discussion of FPW1"-8"-HC in this table, suction in this 8" drain line following a seismic event is not postulated to cause a rapid drain-down of the SFP.	NO	N/A	N/A	N/A	N/A	N/A

7. *To confirm applicability of the sloshing evaluation in Section 3.2 of EPRI 3002007148, the maximum SFP horizontal dimension (length or width) should be less than 125 ft, the SFP depth should be greater than 36 ft, and the GMRS peak Sa should be <0.1g at frequencies equal to or less than 0.3 Hz.*

   No additional notes.

8. *To confirm applicability of the evaporation loss evaluation in Section 3.2 of EPRI 3002007148, the SFP surface area should be greater than 500 ft^2 and the licensed reactor core thermal power should be less than 4,000 MWt per unit.*

   No additional notes.

ATTACHMENT 3

Northern States Power Company – Minnesota
(dba Xcel Energy)

Monticello Nuclear Generating Plant

Docket No. 50-263

Renewed Facility Operating License No. DPR-22

References

1. NRC Letter, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 12, 2012. ADAMS Accession Number ML12053A340.

2. NRC Letter, Final Determination of Licensee Seismic Probabilistic Risk Assessments Under the Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendation 2.1 "Seismic" of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated October 27, 2015, ADAMS Accession Number ML15194A015.

3. NEI Letter, transmits EPRI 3002007148 for NRC endorsement, dated 2/23/2016, ADAMS Accession Number ML16055A017.

4. EPRI 3002007148, Seismic Evaluation Guidance Spent Fuel Pool Integrity Evaluation, dated February 2016.

5. NRC Letter, provides endorsement of EPRI 3002007148, dated 3/17/2016, ADAMS Accession Number ML15350A158.

6. Report 14C4229-RPT-001, Rev. 3. "Monticello Nuclear Generating Plant – Seismic Hazard and Screening Report," dated 5/12/2014, ADAMS Accession Number ML14136A289.

7. NRC Letter, Monticello Nuclear Generating Plant - Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (TAC NO. MF3958), dated 7/8/2015, ADAMS Accession Number ML15175A336."

8. MNGP Station Documents

    8.1. Calculations

        8.1.1. 05-101, Rev. 3 (including Minor Revs. 3A and 3B). "Evaluation of Reactor Steel Superstructure for 105 Ton Reactor Building Crane."

    8.2. Drawings

        8.2.1. Equipment

            8.2.1.1. NX-9063-77-1, Rev. 75. "Rev. A – 6"-376-SP Swing Check Valve 150 lbs. USAS PC20-1, 2."

        8.2.2. Location & Arrangement Diagrams

            8.2.2.1. NF-36388 (C-350), Rev. 4. "Reactor Bldg. Spent Fuel & Dryer Separator Storage Pool – Pool Location Plan."

        8.2.3. P&ID

            8.2.3.1. NH-36032, Rev. 81. "P&ID – Legend."
            8.2.3.2. NH-36256, Rev. 78. "P&ID Fuel Pool Cooling & Clean-Up System."

8.2.4. Piping Plans, Sections, & Details

8.2.4.1. NF-36506, Rev. 77. "Area-3 Piping Drawings Plan Below El. 1001'-2"."

8.2.4.2. NF-36507, Rev. 75. "Rev. B - Area-3 Piping Drawings Plan Below Elev. 1027'-8"."

8.2.4.3. NF-36782, Rev. 5. "Area-3 Piping Drawings Sections A-A, B-B, D-D, & F-F above El. 1001'-2"."

8.2.5. Structural Concrete

8.2.5.1. NF-36019 (C-300), Rev. 76. “Reactor Building Mat Foundation – Plan & Details.”

8.2.5.2. NF-36020 (C-301), Rev. 75. “Rev. C – Reactor Building Mat Foundation – Sections & Details.”

8.2.5.3. NF-36021 (C-303), Rev. 3. “Reactor Building Foundation Wall Elevation and Details Sh. 2.”

8.2.5.4. NF-36022 (C-304), Rev. 77. “Reactor Building Foundation Wall Elevation and Details.”

8.2.5.5. NF-36155 (C-229), Rev. 3. "Standard Concrete Details Sheet 1."

8.2.5.6. NF-36156 (C-230), Rev. 75. "Rev. A - Standard Concrete Details Sheet 2."

8.2.5.7. NF-36165 (C-302), Rev. 3. “Reactor Building Foundation Wall Elevation and Detail, Sheet 1.”

8.2.5.8. NF-36179 (C-321), Rev. 1. “Reactor Bldg. East-West Cross Section Sheet 1.”

8.2.5.9. NF-36180 (C-322), Rev. 1. “Reactor Bldg. North-South Cross Section Sh. 2.”

8.2.5.10. NF-36392 (C-351), Rev. 75. "Rev. A - Reactor Building Spent Fuel & Dryer Separator Storage Pool Shield Plug Detail."

8.2.5.11. NF-36393 (C-352), Rev. 76. "Reactor Building Spent Fuel Pool - Floor Plan and Details."

8.2.5.12. NF-36501 (C-355), Rev. 76. "Reactor Building Spent Fuel and Dryer Separator Storage Pool Sections and Typ. Details Sh. 1."

8.2.5.13. NF-36502 (C-356), Rev. 3. "Reactor Bldg. Spent Fuel and Dryer Separator Storage Pool Sections and Typ. Details Sh. 2."

8.2.6. Structural Steel

8.2.6.1. NF-36024 (C-307), Rev. 76. “Reactor Building Floor Framing Plan – El. 935’-0”.”

8.2.6.2. NF-36025 (C-308), Rev. 75. “Rev. C – Reactor Building Floor Framing Plan El. 935’ Sh. 2.”

8.2.6.3. NF-36026 (C-309), Rev. 10. “Reactor Building Floor Framing Plan EL 962’-6” Sh. 1.”

8.2.6.4. NF-36027 (C-310), Rev. 76. “Reactor Building Floor Framing Plan EL 962’-6”.”

8.2.6.5. NF-36028 (C-311), Rev. 75. "Reactor Building Floor Framing Plan EL 985’-6” Sh. 1."

8.2.6.6. NF-36029 (C-312), Rev. 75. “Rev. B – Reactor Building Floor Framing Plan El. 985’-6” Sh. 2.”

8.2.6.7. NF-36524 (C-313), Rev. 10. "Reactor Building Floor Framing Plan - El. 1001'-2" Sh. 1."

8.2.6.8. NF-36575 (C-315), Rev. 6. "Reactor Building Floor Framing Plan at EL 1027' 8" Sht. 1."

8.2.6.9. NF-36603 (C-314), Rev. 4. “Reactor Building Floor Framing Plan at EL 1001’-2” Sht. 2.”

8.2.6.10. NF-36639 (C-360), Rev. 3. “Reactor Bldg. Spent Fuel Pool Skimmer Surge Tank.”

8.3. Engineering Work Instructions

8.3.1. EWI-11.01.07, Rev. 2. "Structures Monitoring Program."

8.4. Procedures

8.4.1. 1385, Rev. 14. “Periodic Structural Inspection.”

8.4.2. 9210, Rev. 19. “Master RPV Disassembly Procedure.”

8.4.3. 9229, Rev. 17. “Remove Fuel Pool Gates.”

8.4.4. C.5-1300 C.5-1400, Rev. 16. “Secondary Containment Control – Radioactivity Release Control.”

8.5. USAR

8.5.1. USAR-03.01, Rev. 31. “Reactor – General Summary.”

8.5.2. USAR-12.02, Rev. 32. "Plant Structures and Shielding - Plant Principal Structures and Foundations."

8.6. Vendor Technical Manuals (VTM)

8.6.1. NX-9063-77-2, Rev. 2. “Fuel Storage Pool – Check Valves PC20-1, 2.”