



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

May 24, 2016

L-MT-16-027
10 CFR 50.46(a)(3)(ii)

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

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

Annual Report of Changes in AREVA Emergency Core Cooling System Evaluation
Models Pursuant to 10 CFR 50.46

- References:
- 1) NRC (Terry A. Beltz) letter to NSPM (Peter A. Gardner), "Monticello Nuclear Generating Plant – Issuance of Amendment to Transition to AREVA ATRIUM 10XM Fuel and AREVA Safety Analysis Methods (TAC No. MF2479)," dated June 5, 2015 (ADAMS Accession No. ML15072A141)
 - 2) NSPM (Karen D. Fili) letter to NRC Document Control Desk, "License Amendment Request for AREVA Extended Flow Window," dated October 3, 2014 (ADAMS Accession No. ML14283A119)
 - 3) NSPM (Peter A. Gardner) letter to NRC Document Control Desk, "2015 Annual Report of Changes in Emergency Core Cooling System Evaluation Models Pursuant to 10 CFR 50.46", dated December 22, 2015 (ADAMS Accession No. ML15356A275)

Pursuant to 10 CFR 50.46(a)(3)(ii), the Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, is providing this report concerning changes or errors identified in the AREVA Emergency Core Cooling System (ECCS) evaluation models for the Monticello Nuclear Generating Plant (MNGP). This report is for the period between June 2015 and March 2016.

Please note that this report is associated only with the AREVA ECCS evaluation models of the AREVA ATRIUM 10XM fuel type that will not be loaded into an MNGP core until the startup for Cycle 29 in 2017. This report does not relate in any way to the annual report provided by Reference 3. Until all GE14 fuel is permanently discharged from the MNGP core, such reports will continue to be provided for the associated General Electric - Hitachi (GEH) evaluation models, pursuant to 10 CFR 50.46. When both GE14 and ATRIUM 10XM fuel are in the core, NSPM intends to provide an annual report to include both the GEH and AREVA changes.

The MNGP Loss of Coolant Accident (LOCA) licensing analyses-of-record (AOR) for the pending AREVA fuel transition are contained in the AREVA reports submitted for the Fuel Transition license amendment (Amendment 188, issued with Reference 1) and the pending Extended Flow Window (EFW) license amendment (submitted as Reference 2). One AREVA fuel type has been used in these analyses - the ATRIUM 10XM. As noted above, ECCS modeling of the co-resident GE fuel will be analyzed by GEH and reported in a GEH report.

During this reporting period, AREVA made one notification of a change/error resulting in a 5 °F change to the calculated Peak Cladding Temperature (PCT). The total of all changes since the AOR is less than 50 °F, so no 30-day report was required.

The current adjusted licensing basis PCT for the fuel type in the MNGP licensing analyses during the period covered by this report is:

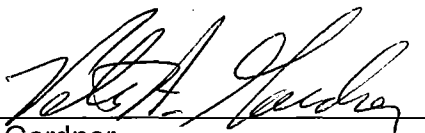
<u>Fuel Type</u>	<u>Licensing Basis PCT (°F)</u>
AREVA ATRIUM 10XM	< 2083

The enclosure provides an updated summary table of the applicable changes and errors in the LOCA analyses from when the last analyses of record were performed.

Summary of Commitments

This letter makes no new commitments or changes any existing commitments.

If you have any questions please contact Mr. Stephen Sollom, at 763-295-1611.



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

Applicable Analysis or Error/Change Description	Ref.	Licensing Basis PCT (°F) ATRIUM 10XM
Initial calculated PCT	1	< 2088
Implementation of ACE in RELAX. The approved interpolation scheme required by Licensing Topical Report (LTR) EMF-2361 (Section 3.2.2) was not employed when the ACE Critical Heat Flux (CHF) correlations were implemented in RELAX.	2	0
Error in Modified Analysis Approach. Extraneous messages written in RELAX minor edits can impact the modified analysis approach.	2	0
Error in Modified Analysis Approach. An error in a logic script associated with the modified analysis approach causes the analysis to be overly conservative.	2	0
Error in Modified Analysis Approach. An error in a logic script that improperly implemented a limitation in the modified analysis approach could cause incorrect reporting in the calculation documentation.	2	0
Low Pressure Coolant Injection (LPCI) Loop Selection Logic. Relates to an input error when modeling breaks smaller than 0.4 ft ² . MNGP has instrumentation and logic to detect which recirculation line contains a break. When a break is detected, the logic injects all Low Pressure Coolant Injection (LPCI) flow into the recirculation line that does not contain the break and closes the discharge isolation valve in that same recirculation line. If a break is not detected, the LPCI flow is injected and the discharge isolation valve is closed in a predefined recirculation line. LOCA analyses for breaks smaller than 0.4 ft ² conservatively assumed the break was in the recirculation line that was predefined to receive the LPCI flow and should have closed the discharge isolation valve in the same recirculation line. Instead, the discharge isolation valve was modeled as closing in the intact recirculation line.	2	0
End of Blowdown Assumption. A modeling assumption was made that could result in an error in the time when rated Low Pressure Core Spray (LPCS) is reached. The time when rated LPCS flow is reached is used in two parts of the LOCA calculation and it relates to the use of the modified analysis approach. This error did cause a small change in the time when the heat transfer coefficients in the heatup calculation change from the calculated values to the values specified in 10 CFR 50 Appendix K.	2	-5

Enclosure – Table 1, Summary of Monticello LOCA Changes and Errors Involving Changes in Peak Cladding Temperature (PCT)

Modeling Assumption for Time of Bypass Reflood. A modeling assumption could result in an error in the time of bypass reflood. The time of bypass reflood is the time the heat transfer coefficient beneath the bypass mixture level is set to 25 Btu/hr-ft ² -°F.	2	0
Using End-of-Blowdown (EOB) Time for Selecting HUXY Boundary Conditions. At the EOB (which is the time of rated core spray), the hottest axial slab in the RELAX hot channel calculation is identified. This establishes the boundary conditions that are passed into the HUXY calculation. While this is appropriate under some conditions when the slabs continue to heat up after EOB, it may not be appropriate for other conditions when the EOB time is much later and the nodes have cooled down.	2	0
Sum of absolute value of changes for the current reporting period, which includes all changes since the previous 10 CFR 50.46 annual report.		N/A
Sum of absolute value of changes since the last Analysis of Record (AOR) in Reference 1.		5
Arithmetic sum of changes for the current reporting period, which includes all changes since the previous 10 CFR 50.46 annual report.		N/A
Arithmetic sum of changes since the last AOR in Reference 1.		-5
Calculated Adjusted PCT		< 2083

References:

1. ANP-3212(P) Revision 0, Monticello EPU LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM™ 10XM Fuel, AREVA NP, May 2013 (Enclosure 20 to Xcel Energy Letter to NRC, L-MT-13-055, dated July 15, 2013, ADAMS Accession No. ML13200A185)
2. AREVA Report FS1-0026440 Revision 1, Monticello 10 CFR 50.46 PCT Reporting Estimates for ATRIUM 10XM Fuel, approved May 13, 2016