



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

December 15, 2017

L-MT-17-086
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 No. 50-263
Renewed Facility Operating License No. DPR-22

2017 Annual Report of Changes in Emergency Core Cooling System Evaluation Models
Pursuant to 10 CFR 50.46

- References:
- 1) Letter from P. Gardner (NSPM) to NRC, "2016 Annual Report of Changes in Emergency Core Cooling System Evaluation Models Pursuant to 10 CFR 50.46," (L-MT-16-071), dated December 19, 2016
 - 2) Letter from P. Gardner (NSPM) to NRC, "June 2017, Thirty-Day Report of Changes in Emergency Core Cooling System Evaluation Models Pursuant to 10 CFR 50.46," (L-MT-17-045), dated June 22, 2017

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 annual report concerning changes or errors identified in the Emergency Core Cooling System (ECCS) evaluation models for the Monticello Nuclear Generating Plant (MNGP).

Provided within Enclosure 1 is a report concerning any changes or errors identified in the AREVA ECCS evaluation models for MNGP. This report is for the period between July 2016 and July 2017 for the ATRIUM 10XM fuel. During this period there was a notification of changes or errors resulting in a change to the calculated Peak Clad Temperature (PCT) of 51°F and therefore reported in a 30-day report (Reference 2). There have been no additional changes since that report. The previously report PCT of 2085°F for the ATRIUM 10XM fuel since the 30-day report is unchanged.


Provided within Enclosure 2 is a report concerning any changes or errors identified in the General Electric-Hitachi (GEH) ECCS evaluation models for MNGP. This report is for the period between July 2016 and July 2017 for the General Electric (GE) GE14 fuel. During this period no notification of any changes or errors resulting in a change to the calculated PCT were received from GEH. Therefore the PCT of less than 2170°F for the GE14 fuel and the PCT summary provided in the 2016 annual report (Reference 1) is unchanged.

Until all the GE14 fuel is permanently discharged from the MNGP core, the annual ECCS reports will continue to be provided for the associated GEH evaluation models (GE14 fuel) and AREVA evaluation models (ATRIUM 10XM fuel).

Should you have questions regarding this letter, please contact Mr. Stephen Sollom at (763) 295-1611.

Summary of Commitments

This letter proposes no new commitments and does not revise any existing commitments.

 *Kent Scott*
for C. Church.

Christopher R. Church
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosures (2)

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

ENCLOSURE 1

MONTICELLO NUCLEAR GENERATING PLANT

**SUMMARY OF MONTICELLO LOCA CHANGES AND ERRORS INVOLVING
CHANGES IN PEAK CLADDING TEMPERATURE (PCT) FOR ATRIUM 10XM FUEL**

(2 page follows)

TABLE—SUMMARY OF MONTICELLO LOCA CHANGES AND ERRORS INVOLVING CHANGES IN PEAK CLADDING TEMPERATURE (PCT) FOR ATRIUM 10XM FUEL

Applicable Analysis or Error / Change Description	Ref.	Licensing Basis PCT(°F) ATRIUM 10XM
ANP-3558P Revision 0, "Monticello LOCA MAPLHGR Limits for EPU/EFW with ATRIUM 10XM Fuel and Revised ECCS Parameters" ⁽¹⁾	A1	2034
<u>MSIV Closure</u> The impact of this MSIV closure change was estimated for the Monticello LOCA break spectrum and exposure-dependent MAPLHGR analyses.	A2	+51
Sum of absolute value of changes for the current reporting period, which includes all changes since the 10 CFR 50.46 report Reference A1. ⁽²⁾		51
Sum of absolute value of changes since last analysis of record (AOR) (Reference A1).		51
Algebraic sum of changes for the current reporting period, which includes all changes since the 10 CFR 50.46 report in Reference A1. ⁽²⁾		+51
Algebraic sum of changes since last AOR (Reference A1).		+51
Current Adjusted Peak Cladding Temperature		2085

- (1) AREVA report ANP-3558P reflects a new LOCA analysis performed to provide a new baseline for the AREVA ATRIUM 10XM fuel at the MNGP as provided to the NRC in Reference A3.
- (2) Since a new baseline was established during the reporting period, only the changes since the new baseline are required.

References

- A1. AREVA Report ANP-3558P Revision 0, "Monticello LOCA MAPLHGR Limits for EPU/EFW with ATRIUM 10XM Fuel and Revised ECCS Parameters," January 2017.

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- A2. AREVA Report FS1-0032297 Revision 1, "Monticello 10 CFR 50.46 PCT Reporting for ATRIUM 10XM Fuel Through May 2017," May 25, 2017.
- A3. Letter from P. Gardner (NSPM) to NRC, "June 2017, Thirty-Day Report of Changes in Emergency Core Cooling System Evaluations Models Pursuant to 10 CFR 50.46," (L-MT-17-045) dated June 22, 2017.

ENCLOSURE 2

MONTICELLO NUCLEAR GENERATING PLANT

**SUMMARY OF MONTICELLO LOCA CHANGES AND ERRORS INVOLVING
CHANGES IN PEAK CLADDING TEMPERATURE FOR (PCT) FOR GE14 FUEL**

(3 pages follow)

**TABLE–SUMMARY OF MONTICELLO LOCA CHANGES AND ERRORS INVOLVING
CHANGES IN PEAK CLADDING TEMPERATURE (PCT) FOR GE14 FUEL**

Applicable Analysis or Error / Change Description	Ref.	Licensing Basis PCT(°F) GE14
NEDC-33322P, Revision 3, "Safety Analysis Report for Monticello Constant Pressure Power Uprate"	G1 & G2	<2140
<p>PRIME Fuel Properties Implementation for Fuel Rod T/M Performance, replacing GESTR Fuel Properties (10 CFR 50.46 Notification Letter 2012-01, Revision 1)</p> <p>This change is due to the application of an NRC-approved procedure to estimate the change in Peak Clad Temperature (PCT) due to the change in fuel properties from GESTR to PRIME primarily to address inaccuracies in fuel pellet thermal conductivity as a function of exposure.</p>	G3	+10
<p>SAFER04A E4-Maintenance Update Changes (10 CFR 50.46 Notification Letter 2014-01)</p> <p>This change is for a new version (E4) of SAFER04A that resolves several accumulated observations that are code maintenance items. Sensitivity calculations show these items have an insignificant effect on calculated PCT.</p>	G4	+0
<p>SAFER04A E4-Mass Non-Conservatism (10 CFR 50.46 Notification Letter 2014-02)</p> <p>This change is due to a logic error that occurs when upper plenum liquid mass and core spray flow rate are low. System mass is gradually lost due to core spray being discarded, resulting in marginally less ECCS flow credited as reaching the core.</p>	G5	+15
<p>SAFER04A E4-Minimum Core DP Model (10 CFR 50.46 Notification Letter 2014-03)</p> <p>This change is due to the use of a minimum Δp that could be non-conservative offering inappropriate steam cooling benefit above the core two-phase level.</p>	G6	+20

TABLE—SUMMARY OF MONTICELLO LOCA CHANGES AND ERRORS INVOLVING CHANGES IN PEAK CLADDING TEMPERATURE (PCT) FOR GE14 FUEL

Applicable Analysis or Error / Change Description	Ref.	Licensing Basis PCT(°F) GE14
SAFER04A E4-Bundle/Lower Plenum CCFL Head (10 CFR 50.46 Notification Letter 2014-04) This change is due to the counter current flow limitation (CCFL) calculation representing the pressure head slightly different from that of the calculated water level in the bundle.	G7	-15
Sum of absolute value of changes for the current reporting period, which includes all changes since the 10 CFR 50.46 report.		0
Sum of absolute value of changes since last AOR (Reference G1).		60
Algebraic sum of changes for the current reporting period, which includes all changes since the 10 CFR 50.46 report in Reference G8.		+0
Algebraic sum of changes since last AOR (Reference G1).		+30
Current Adjusted Peak Cladding Temperature		<2170

References

- G1. GE Report: NEDC-33322P Revision 3, "Safety Analysis Report for Monticello Constant Pressure Power Uprate," dated October 2008 (Enclosure 5 of NSPM (T. O'Connor) to NRC, "License Amendment Request: Extended Power Uprate (TAC MD9990)," L-MT-08-052, dated November 5, 2008, ADAMS Accession No. ML083230111).
- G2. NSPM (M. Schimmel) to NRC, "Monticello Extended Power Uprate and Maximum Extended Load Line Limit Analysis Plus License Amendment Requests: Supplement for Analytical Methods Used to Address Thermal Conductivity Degradation and Analytical Methods Limitations (TAC Nos. MD9990 and ME3145)," L-MT-13-053, dated July 8, 2013 (ADAMS Accession No. ML13191A568).
- G3. GEH 10 CFR 50.46 Notification Letter 2012-01, Revision 1, "PRIME Fuel Properties Implementation for Fuel Rod T/M Performance, replacing GESTR Fuel Properties," dated July 30, 2013.
- G4. GEH 10 CFR 50.46 Notification Letter 2014-01, "SAFER04A E4-Maintenance Update Changes," dated May 21, 2014.

- G5. GEH 10 CFR 50.46 Notification Letter 2014-02, "SAFER04A E4-Mass Non-Conservatism," dated May 21, 2014.
- G6. GEH 10 CFR 50.46 Notification Letter 2014-03, "SAFER04A E4-Minimum Core DP Model," dated May 21, 2014.
- G7. GEH 10 CFR 50.46 Notification Letter 2014-04, "SAFER04A E4-Bundle/Lower Plenum CCFL Head," dated May 21, 2014.
- G8. L-MT-16-071, letter from P. Gardner (NSPM) to U.S. Nuclear Regulatory Commission, "2016 Annual Report of Changes in Emergency Core Cooling System Evaluation Models Pursuant to 10 CFR 50.46," December 19, 2016.