Xcel Energy®

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

WITHHOLD ENCLOSURES 5 AND 6 FROM PUBLIC DISCLOSURE UNDER 10 CFR 2.390

February 8, 2011

L-MT-11-009
10 CFR 50.90

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

Response to Requests for Additional Information (RAI) for the License Amendment Request to Revise the Minimum Critical Power Ratio Safety Limit in Reactor Core Safety Limit 2.1.1.2 (TAC No. ME4790)

References:
1) Letter from Northern States Power Company – a Minnesota corporation (NSPM), d/b/a Xcel Energy, to Document Control Desk, "License Amendment Request: Revise the Minimum Critical Power Ratio Safety Limit in Reactor Core Safety Limit 2.1.1.2," L-MT-10-055, dated September 17, 2010, Accession No. ML102650399.

2) Email from P. Tam (NRC) to R. Loeffler and D. Neve dated December 9, 2010 "Monticello – Draft [RAI: Questions 1 through 7]".

Pursuant to 10 CFR 50.90, Northern States Power Company – a Minnesota corporation (NSPM), doing business as Xcel Energy, requested in Reference 1 an amendment to the Monticello Nuclear Generating Plant (MNGP) Technical Specifications (TS) to the Minimum Critical Power Ratio Safety Limit (MCPR Safety Limit) in Reactor Core Safety Limit 2.1.1.2. The change requested was to revise the values for the MCPR Safety Limit for both single and two recirculation loop operation. Additional information was requested by the U.S. Nuclear Regulatory Commission (NRC) by an e-mail dated December 9, 2010 (Reference 2).

The responses to Requests for Additional Information (RAI) Questions 2 through 5 contain proprietary information that was provided by Global Nuclear Fuel-Americas, LLC (GNF) and Studsvik Scandpower. Enclosure 1 provides the redacted non-proprietary responses to RAI Questions 1 through 7. Enclosure 2 provides a non-proprietary Studsvik Scandpower report supplementing the response to NRC RAI Question 3.

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GNF responses to NRC RAI Questions 1, 2, 4, 5, and 6 are included in proprietary Enclosure 5. GNF, as the owner of the proprietary information, executed an affidavit provided in Enclosure 3 that identifies that the enclosed information has to be handled and classified as proprietary. This information is customarily held in confidence, and is required to be withheld from public disclosure. The proprietary information was provided to NSPM in a GNF transmittal utilized to produce Enclosure 1 that was referenced by the affidavit.

The proprietary Studsvik Scandpower report, which supplements the response to NRC RAI Question 3, is provided in Enclosure 6. An affidavit by Studsvik Scandpower attesting to the proprietary nature of this information is provided in Enclosure 4 in accordance with 10 CFR 2.390(b)(1).

NSPM requests that the proprietary information provided by GNF and Studsvik Scandpower (Enclosures 5 and 6), be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4) and 10 CFR 9.17(a)(4).

In accordance with 10 CFR 50.91, a copy of this application, with enclosures, is being provided to the designated Minnesota Official.

Should you have questions regarding this letter, please contact Mr. Kenneth O'Gara at (763) 295-1357 or Mr. Richard Loeffler at (763) 295-1247.

Summary of Commitments

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

I declare under penalty of perjury that the foregoing is true and correct.
Executed on February 8, 2011.

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

Enclosures (6)

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC (w/o Enclosures 5 and 6)
Minnesota Department of Commerce (w/o Enclosures 5 and 6)

ENCLOSURE 1

MONTICELLO NUCLEAR GENERATING PLANT

RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION FOR THE LICENSE AMENDMENT REQUEST TO REVISE THE MINIMUM CRITICAL POWER RATIO SAFETY LIMIT IN REACTOR CORE SAFETY LIMIT 2.1.1.2

ENCLOSURE 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI) FOR THE LICENSE AMENDMENT REQUEST TO REVISE THE MINIMUM CRITICAL POWER RATIO SAFETY LIMIT IN REACTOR CORE SAFETY LIMIT 2.1.1.2

RESPONSES

Pursuant to 10 CFR 50.90, Northern States Power Company – a Minnesota corporation (NSPM), d/b/a Xcel Energy, requested a License Amendment Request (LAR) (Reference 1) to the Monticello Nuclear Generating Plant (MNGP) Technical Specifications (TS) for the Minimum Critical Power Ratio Safety Limit (MCPR Safety Limit, also referred to as SLMCPR) in Reactor Core Safety Limit 2.1.1.2. The LAR proposed to revise the values for the MCPR Safety Limit for both single and two recirculation loop operation.

Additional information was requested by the U.S. Nuclear Regulatory Commission (NRC) on this TS change by an e-mail dated December 9, 2010 (Reference 2). Responses to these NRC e-mail Requests for Additional Information (RAI) are provided below. Portions of Enclosure 1 that have been redacted are indicated by a white space inside open and closed double brackets as shown here [[ ]].

1. Please provide:

(a) a summary table listing MNGP cycle-specific fuel quantity for each fuel type and when the specific fuel types were loaded in the core (i.e., fresh, once, or twice burned) shown in Figures 1 and 2 of Enclosures 4 [sic., 3] and 6 for Cycle 26 and Cycle 25 Reference Core Loading Pattern, respectively.

(b) the details, including the design record file, to determine a final core loading pattern as shown in Figure 1 for EPU and [Maximum Extended Load Line Limit Analysis Plus] MELLLA+ operations including procedure, guideline, criteria, and approved methodologies used for this analysis.

Response

(a) The summaries of the Cycle 26 and Cycle 25 GE14 core designs for Figures 1 and 2 from Enclosures 3 and 6 submitted in the LAR (Reference 1) are as follows:

CYCLE 26

CHANNEL	CYCLE LOADED	QTY.	BUNDLE NAME
A	23	4	GE14-P10DNAB393-17GZ-100T-145-T6-2599
B	23	21	GE14-P10DNAB392-16GZ-100T-145-T6-2824
C	24	104	GE14-P10DNAB392-16GZ-100T-145-T6-2931
D	24	42	GE14-P10DNAB392-17GZ-100T-145-T6-2932
E	25	40	GE14-P10DNAB392-16GZ-100T-145-T6-2931
F	25	16	GE14-P10DNAB424-14GZ-100T-145-T6-3100
G	25	52	GE14-P10DNAB375-16GZ-100T-145-T6-3101
H	25	40	GE14-P10DNAB392-16GZ-100T-145-T6-3102
I	25	16	GE14-P10DNAB391-12GZ-100T-145-T6-3103
J	26	32	GE14-P10DNAB373-16GZ-100T-145-T6-3375
K	26	40	GE14-P10DNAB391-16GZ-100T-145-T6-3376
L	26	32	GE14-P10DNAB391-15GZ-100T-145-T6-3377
M	26	44	GE14-P10DNAB391-12GZ-100T-145-T6-3378
N	24	1	GE14-P10DNAB392-17GZ-100T-145-T6-2932

CYCLE 25

CHANNEL	CYCLE LOADED	QTY.	BUNDLE NAME
A	22	8	GE14-P10DNAB393-17GZ-100T-145-T6-2598
B	22	12	GE14-P10DNAB393-17GZ-100T-145-T6-2599
C	23	32	GE14-P10DNAB393-17GZ-100T-145-T6-2599
D	23	120	GE14-P10DNAB392-16GZ-100T-145-T6-2824
E	24	104	GE14-P10DNAB392-16GZ-100T-145-T6-2931
F	24	43	GE14-P10DNAB392-17GZ-100T-145-T6-2932
G	25	40	GE14-P10DNAB392-16GZ-100T-145-T6-2931
H	25	16	GE14-P10DNAB424-14GZ-100T-145-T6-3100
I	25	52	GE14-P10DNAB375-16GZ-100T-145-T6-3101
J	25	40	GE14-P10DNAB392-16GZ-100T-145-T6-3102
K	25	16	GE14-P10DNAB391-12GZ-100T-145-T6-3103
L	21	1	GE14-P10DNAB391-14GZ-100T-145-T6-2480

(b) The loading pattern is developed collaboratively by Global Nuclear Fuel-Americas, LLC (GNF) and NSPM based on MNGP input. Among the inputs are:

- Cycle energy requirements - fuel bundle design (nuclear) and loading patterns
- Thermal limit margins
- Reactivity margins - minimum shutdown margin, minimum and maximum hot excess reactivity

- Discharge exposure limitations and other limits as established by safety analysis
- Desired control rod patterns - sequences and durations
- Minimize channel distortion

Methods used to analyze the core loading pattern are in accordance with General Electric Standard Application for Reactor Fuel (GESTAR-II). GESTAR-II is the umbrella for all procedures, guidelines, criteria, and approved methodologies used for this analysis. There is no change in approved methodologies. This is a SLMCPR Technical Specifications change within approved methodologies. SLMCPR is not the primary driver in developing the fuel cycle core design. The energy plan, reactivity, and thermal margins are the primary drivers.

Refer to Enclosure 5 for the GNF proprietary response to RAI Question 1.

2. **Please provide information:**

   (a) to confirm that the current cycle loading diagram shown in Figure 1 of Enclosure 6 is used for calculating the MNGP Cycle 26 SLMCPR values of 1.15 for both TLO and for SLO;

   (b) to justify the rationale of why the proposed SLMCPR increment of 0.05 for TLO and 0.03 for SLO based on the proposed loading pattern in Figure 1 of Enclosure 6 is higher than the values calculated from the normal calculation for standard fuel loading with GE14 fuel assemblies.

<u>Response</u>

(a) Yes, Figure 1 of Enclosure 6 in the LAR is the core loading used in calculating the MNGP Cycle 26 SLMCPR values for both Two Loop Operation (TLO) and Single Loop Operation (SLO).

(b) The MELLLA+ Licensing Topical Report (LTR) (Reference 6) (NEDC-33006P-A) Safety Evaluation Report (SER) limitation and condition 12.6 requires the use of the core flow (CF) uncertainty currently applied to the SLO operation in the calculation of the TLO SLMCPR value. These uncertainties result in [[ ]] increase in the TLO SLMCPR value. The Applicability of GE Methods to Expand Operating Domains LTR (Reference 7) (NEDC-33173P-A) SER limitation and condition 5 requires a [[ ]] value added to the cycle-specific SLMCPR value. The effective result of these two conditions is a 0.05 increase in the TLO SLMCPR value. SLO operation is not allowed in

the MELLLA+ region, however the limitation and condition in NEDC-33173P-A (Reference 7) is being applied to both TLO and SLO, resulting in a 0.03 increase in the SLO SLMCPR value.

Refer to Enclosure 5 for the GNF proprietary response to RAI Question 2.

3. The Studsvik Scandpower GARDEL core monitoring software is used as the core monitoring computer system at MNGP. Please provide:

(a) details of the functions performed by the GARDEL core monitoring software during Cycle 26 operation of either EPU or MELLLA+ condition;

(b) justification that the GETAB power distribution methodology uncertainties are applicable to represent the GARDEL core monitoring system uncertainties;

(c) any test data to reflect that GARDEL bundle power uncertainty matches the GETAB value of 4.3 percent and the GARDEL nodal power uncertainty value of 5.7 percent compared to the GETAB value of 8.7 percent; and

(d) summary of the GARDEL contribution to the power distribution uncertainty in terms of the SLMCPR calculation shown in Table 3 of Enclosure 6.

Response

(a) The GARDEL core monitoring software will be used to meet the Average Planar Linear Heat Generation Rate (APLHGR), MCPR, and Linear Heat Generation Rate (LHGR) surveillance requirements in MNGP Technical Specification Section 3.2, Power Distribution Limits, during Cycle 26 Extended Power Uprate (EPU) and MELLLA+ operating conditions.

(b) The GARDEL core monitoring system uncertainties are demonstrated to justify the applicability of General Electric BWR Thermal Analysis Basis (GETAB) power distribution methodology uncertainties in Studsvik Scandpower Report SSP-09/444-C, "GARDEL BWR – Monticello NPP Power Distribution Uncertainties," (Reference 4 and Reference 5, Proprietary and Non-proprietary, respectively).

A non-proprietary version of this report (SSP-09/444-C) is provided in Enclosure 2, and a proprietary version of this report is provided in

Enclosure 6.

(c) This report describes how test data was used to confirm that the GARDEL bundle power and nodal power uncertainties meet or better the GETAB values. These GARDEL uncertainties are based on a 50 day Traversing Incore Probe (TIP) scan interval with an allowance for one TIP machine out of service. Basically, the test data consisted of TIP measurements taken during MNGP Cycles 22 through 24.

(d) GARDEL uncertainties are not used in the MCPR Safety Limit calculation because they are bounded by the uncertainties used. The MNGP MCPR Safety Limit calculation uses the previously NRC approved uncertainties documented in GNF-0000-0092-5692-R1-P and NP, "GNF Additional Information Regarding the Requested Changes to the Technical Specification SLMCPR– Monticello Cycle 26," September 7, 2010 (Reference 3). The GNF report was previously submitted to the NRC in Reference 1, Enclosure 3 (Non-proprietary) and Enclosure 6 (Proprietary). The use of the previously approved uncertainties for the purpose of calculating the MCPR Safety Limit is conservative because the GARDEL core monitoring uncertainties are equal or less than the GETAB uncertainties as indicated in paragraph (b) above.

4. Please provide:

(a) approximation of the correlation for MIP and RIP, including applicable fuel related coefficients and constants leading to the results of TLO SLMCPR estimate using the MIPRIP Correlation shown in Table 3 of Enclosure 6, and

(b) justification that an additional SLMCPR adder of 0.03 is needed for Cycle 26 SLMCPR calculation at MELLLA+ conditions in Table 3 of Enclosure 6.

<u>Response</u>

(a) The equation used to estimate the cycle specific SLMCPR is:
[[ ]]
[[ ]]
The MCPR Importance Parameter (MIP) and R-Factor Importance Parameter (RIP) values are provided in Table 3 of Enclosures 3 and 6 submitted to the NRC in the LAR.

(b) The Applicability of GE Methods to Expand Operating Domains LTR (Reference 7) (NEDC-33173P-A) SER limitation and condition 5

requires a 0.03 value added to the MELLLA+ cycle-specific SLMCPR value.

Refer to Enclosure 5 for the GNF proprietary response to RAI Question 4.

5. **Section 2.1 *Major Contributors to SLMCPR Changes*, states that Table 3 presents estimated impacts on the TLO SLMCPR due to methodology deviations, penalties, and/or uncertainties deviations from approved values. Please provide:**

   (1) calculation details, including methodologies used, to justify results listed in Table 3 are conservative related to methodology deviations, penalties, and/or uncertainties deviations from approved values, especially the rationale that the impacts are R-Factor less than 0.005 for both MELLLA and MELLLA+ condition, core flow rate of 0.20 [sic. 0.020] for MELLLA+ low flow conditions, and no impact on random effective TIP reading and critical power for both MELLLA and MELLLA+ conditions.

   Response

   The methodologies used to calculate the cycle specific SLMCPR are listed in Table 2 of Enclosures 3 and 6 submitted to the NRC in the LAR (Reference 1). The uncertainties used are listed in Tables 4 and 5 of Enclosures 3 and 6 also submitted in the LAR.

   The GEXL R-Factor deviation increases the uncertainty from [[ ]] to account for shadow corrosion-induced channel bow. From Reference 4 of Enclosures 3 and 6 of the LAR, "Compared with the original GNF R-factor Uncertainty of [[ ]], the SLMCPR consequence is determined to be approximately [[ ]]." This is not affected by operation in the MELLLA+ domain.

   General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus (Reference 6) (NEDC-33006P-A) SER limitation and condition 12.6 requires that "the uncertainty must be consistent with the CF uncertainty currently applies to the SLO operation..." The result of using the SLO core flow uncertainty is a [[ ]] increase in the SLMCPR. The random effective TIP reading uncertainty is part of the SLO uncertainty so it was included as part of the effects of the core flow rate in Table 3 of Enclosures 3 and 6 submitted to the NRC in the LAR.

There are no deviations in NRC-Approved uncertainties for the critical power uncertainty. As discussed in NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit MCPR Evaluations", August 1999 (Reference 8), the critical power effects are fuel product specific and are not affected by operation in the MELLLA+ domain.

Refer to Enclosure 5 for the GNF proprietary response to RAI Question 5.

6. **Provide clarification that all affected factors in relation to any fuel-related Part 21 issues, if any, are included in Table 3.**

Response

All factors related to any fuel-related Part 21 issues are included in the SLMCPR calculations.

Refer to Enclosure 5 for the GNF proprietary response to RAI Question 6.

7. **As shown in the submittal, Monticello Cycle 25 Power/Flow Map is good for MELLLA operation, but there is no clear identification for the Cycle 26 operation to be either MELLLA or MELLLA+ condition. Please provide details for the Cycle 26 operation to be under MELLLA or MELLLA+ conditions.**

Response

Cycle 26 could be operated under both MELLLA and MELLLA+ conditions dependent on when NRC approval of the associated LARs is obtained. NRC approval of MNGP's EPU and MELLLA+ LARs, which have been submitted and accepted by the NRC for concurrent review, is required to permit operation under MELLLA+ conditions. NRC approval for EPU/MELLLA+ operation is expected to occur sometime during the cycle following startup of Cycle 26 in May 2011 under MELLLA conditions.

REFERENCES

1) Letter from Northern States Power Company – a Minnesota corporation (NSPM), d/b/a Xcel Energy, to Document Control Desk, "License Amendment Request: Revise the values for the Minimum Critical Power Ratio Safety Limit (MCPR Safety Limit) in Reactor Core Safety Limit 2.1.1.2," L-MT-10-055, dated September 17, 2010, Accession No. ML102650399.

2) Email from P. Tam (NRC) to R. Loeffler and D. Neve dated December 9, 2010 "Monticello – Draft [RAI: Questions 1 through 7]".

3) GNF Report, GNF-0000-0092-5692-R1-P and NP, "GNF Additional Information Regarding the Requested Changes to the Technical Specification SLMCPR, Monticello Cycle 26," dated September 7, 2010.

4) Studsvik Scandpower Report SSP-09/444-C, "GARDEL BWR – Monticello NPP Power Distribution Uncertainties," Rev. 0, July 24, 2009, Proprietary.

5) Studsvik Scandpower Report SSP-09/444-C, "GARDEL BWR – Monticello NPP Power Distribution Uncertainties," Rev. 0, January 10, 2011, Non-Proprietary.

6) Licensing Topical Report NEDC-33006P-A, "General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus", Revision 3, June 2009

7) Licensing Topical Report NEDC-33173P-A, "Applicability of GE Methods to Expanded Operation Domains"

8) NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit MCPR Evaluations", August 1999