Xcel Energy®

November 6, 2008

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10 CFR 50.90

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

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

Response to September 26, 2008, Request for Additional Information for License Amendment Request: Revision to the Allowable Value and Channel Calibration Surveillance Interval for the Recirculation Riser Differential Pressure – High Function (TAC No. MD6864)

On September 25, 2007, the Nuclear Management Company, LLC a predecessor license holder to the Northern States Power Company, a Minnesota corporation (NSPM),[1] submitted a request to revise the allowable value and channel calibration surveillance interval for the Recirculation Riser Differential Pressure – High function (Function 2.j in Technical Specification Table 3.3.5.1-1 (Enclosure 1, Reference 1). This change is based on a reanalysis of the small break Loss of Coolant Accident which determined a new minimum detectable break area for the Low Pressure Coolant Injection loop select logic.

As part of the license amendment request, NSPM proposed to re-zero the licensing basis Peak Cladding Temperature (PCT) for the General Electric 14 fuel at the new value of 1990°F determined by the reanalysis. The NSPM withdraws the portion of this license amendment request (LAR) concerned with re-zeroing the Licensing Basis PCT, considering that a new Licensing Basis PCT will be established in conjunction with the Extended Power Uprate. There are no other changes to the Technical Specifications or other portions of the LAR or associated RAI responses.

Summary of Commitments

No new commitments or changes to any existing commitments are proposed by this letter.

1. Northern States Power Company – Minnesota (NSPM) is incorporated as a wholly owned subsidiary of Xcel Energy, Inc. Transfer of operating authority from the Nuclear Management Company, LLC to NSPM occurred on September 22, 2008.

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In accordance with 10 CFR 50.91, a copy of this response, with the enclosure, is being provided to the designated Minnesota official.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 6, 2008.

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

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC
Minnesota Department of Commerce

ENCLOSURE 1

RESPONSE TO SEPTEMBER 26, 2008, REQUEST FOR ADDITIONAL INFORMATION FOR THE NEW MINIMUM DETECTABLE BREAK AREA FOR THE LPCI LOOP SELECT LOGIC

On September 25, 2007, (Reference 1) the Nuclear Management Company, LLC a predecessor license holder to the Northern States Power Company, a Minnesota corporation (NSPM),[1] submitted a request to revise the allowable value and channel calibration surveillance interval for the Recirculation Riser Differential Pressure – High (Break Detection) function (Function 2.j in Technical Specification (TS) Table 3.3.5.1-1) in Specification 3.3.5.1. This change is based on a reanalysis of the small break Loss of Coolant Accident (LOCA) which determined a new minimum detectable break area for the Low Pressure Coolant Injection (LPCI) loop select logic.

The reanalysis was performed for General Electric (GE) 14 fuel and reflected a methodology change which considered the potential for a change in axial power shape to influence the overall design basis accident results. This methodology change resulted in a change in the licensing basis accident with the highest Peak Cladding Temperature (PCT). As a result, a small break rather than the large recirculation line break LOCA has become the limiting accident with respect to PCT. As part of the license amendment request, NSPM proposed to re-zero the licensing basis PCT for the GE14 fuel at the new value of 1990°F determined by the reanalysis.

On September 8, 2008, the NSPM submitted a letter (Reference 2) in response to several U.S. Nuclear Regulatory Commission (NRC) requests for additional information (RAIs). On September 26, 2008, the NSPM received a second round of RAI questions (Reference 3) concerning the results of a failure of the LPCI loop select logic and the determination of the limiting PCT. On October 14, 2008, a telephone call between the NRC and NSPM was held to clarify a second round of RAI questions and NRC expectations. Answers to each of these RAIs, consistent with the level of detail customarily provided by GE – Hitachi in regards to the application of the SAFER/GESTR methodology for determination of licensing basis PCTs are provided below. The NSPM, with due consideration that a new Licensing Basis PCT will most likely be established in conjunction with the Extended Power Uprate (EPU) has decided to withdraw the portion of the license amendment request (LAR) concerned with the re-zeroing the Licensing Basis PCT.

The NSPM response to each NRC request (shown in bold print) immediately follows each request.

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(1) The scenario in question is not directly addressed in response to RAI question (1) [in your September 8, 2008 response], i.e., complete loss of LPCI flow due to a problem in the loop-selection function. Is the licensee implying that the complete loss of LPCI due to a failure of loop-select logic is bounded by LPCI IV [injection valve] failure case?

Yes. Loss of Low Pressure Coolant Injection (LPCI) flow to the vessel caused by a failure of the LPCI loop select logic to correctly pick the unbroken recirculation loop is bounded by LPCI injection valve failure. The consequence of the LPCI injection valve failure is that no LPCI flow will be injected into the vessel, i.e., no flow path is available. The consequences of the LPCI loop select logic selecting the broken loop is that some portion of the LPCI flow is diverted out of the break and does not reach the vessel (see Section 3.1 of Reference 4, provided as Enclosure 4 in the LAR).

(2) The sensitivity analysis in the RAI question (4) response [in your September 8, 2008 letter] results in a higher PCT. If the licensee is proposing to re-zero the licensing basis PCT, should it be based on the limiting PCT? Also, what is the impact on UB PCT for the corresponding limiting case?

This response will address the question in parts, first the sensitivity analysis provided in the September 8, 2008, RAI Question (4) response, second the proposed re-zeroing of the Licensing Basis PCT, and finally the Upper Bound PCT for the corresponding limiting case will be discussed.

The sensitivity analysis results provided in the September 8, 2008, NSPM letter in response to RAI Question (4) were provided for illustrative purposes only. The "higher PCT" shown in the response is not part of the current icensing analysis basis. These PCT comparisons were extracted from a different calculation prepared in support of the MNGP EPU to isolate the effect on sensitivity and quantitatively illustrate the principle as relating to the flow and power shape pursuant to the inquiry. These sensitivity analysis results were presented to illustrate the relative effect on PCT[(2)] and do not represent the expected PCT values for this LAR.

When proposing to re-zero the Licensing Basis PCT, the limiting PCT is required to be identified for the licensing action under consideration. With the LPCI Loop Select Logic system change, the application to re-zero the Licensing Basis PCT stems from the analysis of Reference 4. That analysis identified that the limiting

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2. Note that the sensitivity analysis was performed at the higher EPU power level of 2004 MW-thermal, reflecting EPU conditions.

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2. Note that the sensitivity analysis was performed at the higher EPU power level of 2004 MW-thermal, reflecting EPU conditions.

PCT was for a small break LOCA with a top-peaked power shape. The limiting PCT identified in Reference 4 supersedes the previously identified Licensing Basis PCT from Reference 5 because it includes the PCT impacts identified in Notification Letters 2003-01 and 2006-01 (References 6 and 7, respectively), and the PCT was explicitly calculated. The action of the license amendment request was to demonstrate the acceptability of the increased break area that must be capable of detection, and a revised, or re-zeroed, Licensing Basis PCT was also indicated since a new limiting PCT was identified by the analysis.

Note, that while the above discussion reflects the NSPM answer to the question, NSPM has decided to withdraw the portion of the LAR concerned with the re-zeroing the Licensing Basis PCT since that will occur in conjunction with the EPU.

Compliance with the acceptance criteria of 10 CFR 50.46 is demonstrated by the calculation of an Upper Bound PCT and a Licensing Basis PCT following the SAFER/GESTR methodology as approved by the NRC. The analysis of Reference 6, identified the limiting, Licensing Basis PCT, was for a small break LOCA with a top-peaked power shape. The resulting Upper Bound PCT for this case was reported in Section 5.6.2 of Reference 4, and is in compliance with the 1600°F acceptance criterion on the Upper Bound PCT imposed as part of the SAFER/GESTR methodology.

(3) How can we be certain that limiting PCT was determined for the Appendix K top-peaked cases without calculating the areas from 0.05 ft^2 to 0.07 ft^2?

The second double-starred (**) footnote to Table 4, "Small Break ECCS-LOCA Results – Break Area Sensitivity," in Reference 4 addresses this question. For a given break size, the vessel blow down will be essentially constant, regardless of the core initial condition. The change from a mid-peaked power shape to a top-peaked power shape in the core is viewed as a single effect. The sensitivity of the power shape, across the spectrum of break sizes, would be expected to be similar. As can be seen from the results in Table 4, this change in power shape would result in PCT differences on the order of about 100°F to 160°F. The difference in blowdown because of the change in break area, assuming a top-peaked power shape consistently, would be expected to result in a PCT difference on the order of 50°F. The change in power shape dominates. The number of break sizes, to confirm the peak, and the concave downward nature of the trend is sufficient to demonstrate the effect.

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(4) How can we be certain that the discharge break would not be more challenging when considering the failure of the loop select logic? Wouldn't a break in the discharge pipe maximize the LPCI flow lost through the crack?

For the BWR/3 reactor design, the LPCI flow injects into the recirculation line on the discharge side of the Recirculation Pump, or recirculation discharge line as it is called. A crack in this location, however, does not maximize the loss of inventory from the reactor vessel as a consequence of the blowdown. Between the reactor vessel and the location of the recirculation discharge line break, the jet pump and nozzle serve as effective impediments, reducing lost vessel inventory and lengthening the time to and reducing the extent of core uncovery. Core level reduction from lost vessel inventory has a larger PCT effect than recovery flow. Regarding the bounding break location, the Generic Studies presented in Reference 8, which form the basis for the MNGP ECCS analysis, addressed this question and consistently demonstrated that the recirculation suction line break (with maximum loss of reactor vessel inventory) would result in the limiting for ECCS-LOCA PCT determination for the BWR/3 design. This would be the limiting break location regardless of the fraction of LPCI flow that would be delivered, or diverted. The relative merit of the LPCI System owing to the single failure or LPCI Loop Select System effectiveness becomes significant as to the relative increase or decrease of PCT due to flow and core water level recovery from this base suction line break case.

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REFERENCES

1. NMC letter to NRC, "License Amendment Request: Revision to the Allowable Value and Channel Calibration Surveillance Interval for the Recirculation Riser Differential Pressure – High Function," (L-MT-07-055), dated September 25, 2007.

2. NMC letter to NRC, "Response to Requests for Additional Information for License Amendment Request: Revision to the Allowable Value and Channel Calibration Surveillance Interval for the Recirculation Riser Differential Pressure – High Function (TAC No. MD6864)," (L-MT-08-045), dated September 8, 2008.

3. Email from P. Tam (NRC) to R. Loeffler (NMC) dated September 26, 2008, "Monticello – Recirculation Riser Amendment - Draft Second-Round RAI (TAC MD6864)."

4. General Electric Report GE-NE-0000-0052-3113-R0, "Monticello Nuclear Generating Plant SAFER/GESTR ECCS-LOCA Analysis – LPCI Loop Selection Detectable Break Area," dated September 2006.

5. General Electric Report GE-NE-J1103878-09-02P, "Monticello ECCS-LOCA Evaluation for GE14," dated August 2001.

6. 10 CFR 50.46 Notification Letter 2003-01, "Impact of SAFER Level/Volume Table on the Peak Cladding Temperature (PCT)," May 6, 2003.

7. 10 CFR 50.46 Notification Letter 2006-01, "Impact of Top Peaked Power Shape for Small Break LOCA Analysis," July 28, 2006.

8. General Electric Licensing Topical Report "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident, Volume III, SAFERJGESTR Application Methodology", NEDC-23785P-A, General Electric Company, Revision 1, dated October 1984.