## NRR-PMDAPEm Resource

**From:** Beltz, Terry
**Sent:** Thursday, October 04, 2012 3:02 PM
**To:** 'Fields, John S.'
**Cc:** Eckholt, Gene F.; Loeffler, Richard A.; Huang, Tai; Frankl, Istvan
**Subject:** Monticello Nuclear Generating Plant - Draft Request for Additional Information re: MELLLA+ License Amendment Review (TAC No. ME3145)
**Attachments:** image001.gif; Draft Request for Additional Information re MELLLA+ License Amendment Request (TAC No ME3145).docx

Dear Mr. Fields:

By letter dated January 21, 2010 (Agencywide Documents Access and Management System Accession No. ML100280558), Northern States Power Company-Minnesota (the licensee), submitted a license amendment request (LAR) for the Monticello Nuclear Generating Plant (MNGP) Renewed Operating License and Technical Specifications. The proposed change would allow operation in the expanded Maximum Extended Load line Limit Analysis Plus (MELLLA+) domain. MNGP is currently licensed to operate in the MELLLA domain and with thermal-hydraulic stability Option III.

The U.S. Nuclear Regulatory Commission staff in the Reactor Systems Branch of the Office of Nuclear Reactor Regulation has identified areas where additional information is needed to complete its review of your MELLLA+ LAR. The draft requests for additional information (RAIs) are attached.

You may accept these RAIs as formal Requests for Additional Information and respond to the questions by November 9, 2012. Alternatively, you may request to discuss the contents of these RAIs with the NRC staff in a conference call, including any change to the proposed response date.

Please let me know if you have any questions or concerns.

Sincerely,

*Terry A. Beltz, Senior Project Manager*
*Plant Licensing Branch III-1*
*Division of Operating Reactor Licensing*
*Office of Nuclear Reactor Regulation*
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**From:** Beltz, Terry

**Created By:** Terry.Beltz@nrc.gov

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REQUEST FOR ADDITIONAL INFORMATION

RELATING TO MONTICELLO LICENSING AMENDMENT REQUEST

FOR MAXIMUM LOAD LINE LIMIT ANALYSIS PLUS

NORTHERN STATES POWER COMPANY – MINNESOTA

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

The NRC staff has performed a series of confirmatory calculations for ATWSI (anticipated transients without scram with instability) using the TRACE/PARCS code. These calculations have identified difference between TRACE and TRACG related to the transition to stable film boiling (the "$T_{min}$ correlation").

TRACE uses a $T_{min}$ correlation that predicts significantly lower temperatures for stable film boiling than the correlation used by TRACG. The impact is significant, because the TRACE confirmatory calculations for a generic BWR5 showed failure to rewet followed by fuel failure (Tclad >2200°F), while the TRACG calculations show clad rewet and that fuel integrity is maintained.

The NRC staff needs to review, in more detail, the available data supporting the applicability of the TRACG correlation. Of special interest is the range of applicability. These correlations were developed primarily to support LOCA conditions, where the power generation is minimal (decay heat) and the pressure is low. The staff needs to ensure that the correlation is applicable to power conditions at full pressure. Emphasis must be provided on the availability of data and its range of applicability.

In addition to the $T_{min}$ correlation issue, the NRC staff's confirmatory calculations uncovered a second methodology difference related to the quenching of the vapor film after it forms. The quenching mechanism is by removing heat through axial conduction when the thermal hydraulic conditions of the coolant allow it (e.g., in the down side of the power-flow oscillations). The TRACE quenching model predicts that quenching essentially does not occur while the rods are at power and the vapor film remains stable during the oscillations. The TRACG quenching model, however, predicts that there is sufficient heat conducted axially through the clad to lower the surface temperature, thus eliminating the stable vapor film and increasing the heat transfer. As with the Tmin correlation issue, the NRC staff needs to review the available benchmark data to validate the TRACG quenching models, and the range of applicability of this data.

Based on the results of the NRC staff's confirmatory analyses, areas of concern were identified that require clarification by the Monticello Nuclear Generating Plant licensee.

1. Provide a short description of the GEH $T_{min}$ and quenching methodology. Specifically,

    a. What correlations are used?

    b. What options can be used (e.g., void dependencies…)?

    c. How the quenching is modeled?

2. $T_{min}$ benchmark data

    a. What experimental data supports the $T_{min}$ correlation?

    b. What is the range of applicability?

3. Quenching benchmark data

    a. What experimental data supports the methodology?

    b. Any previous work in the open literature?

    c. What is the range of applicability?