May 27, 2005

Mr. Thomas J. Palmisano
Site Vice President
Monticello Nuclear Generating Plant
Nuclear Management Company, LLC
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) FOR MONTICELLO NUCLEAR GENERATING PLANT (TAC NO. MC6441)

Dear Mr. Palmisano:

The U.S. Nuclear Regulatory Commission staff (the staff) has reviewed the SAMA analysis submitted by Nuclear Management Company, LLC, in support of its application for license renewal for the Monticello Nuclear Generating Plant (Monticello), and has identified areas where additional information is needed to complete its review. Enclosed is the staff's request for additional information.

We request that you provide your responses to these RAIs within 60 days of the date of this letter, in order to support the license renewal review schedule. If you have any questions, please contact me at 301-415-3835 or via email at JXD10@nrc.gov.

Sincerely,
/RA/
Jennifer A. Davis, Project Manager
Environmental Section
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-263

Enclosure: As stated

cc w/encl: See next page

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Request for Additional Information Regarding the Analysis of SAMAs for the Monticello Nuclear Generating Plant

1. The SAMA analysis is said to be based on a slight modification (referred to as the SAMA model) of the most recent version of the Monticello probabilistic safety assessment (PSA) (the 2003 model). Provide the following information regarding these PSA models:

   a. Explain why the core damage frequency (CDF) from station blackout (SBO) in Table F.2-1 is only 1.5E-6 per year, when the fire protection system line break in TB-931W, which appears to result in SBO, has a much higher CDF.

   b. An April 2002 NMC request for an integrated leak rate test interval extension gives the CDF as 1.57E-05 per year. This is somewhat different from the value quoted for the 1999 update of 1.44E-05 per year. Please explain.

   c. Clarify whether the importance analyses results given in Tables F.5-1 and F.5-2 are based on the 2003 model or the SAMA model. If the former, confirm that none of the changes made (between the 2003 model and the SAMA model) significantly affect the risk profile or importance ranking. Describe whether any additional SAMAs were suggested by the dose-risk importance list review.

   d. Describe the evolution of the current Level 2 PSA (including the supporting Modular Accident Analysis Program (MAAP) calculations) relative to that described in the Monticello individual plant examination (IPE). Clarify whether the Level 2 model changes identified in Section F.2.4.3 are the only changes to the Level 2 model.

   e. Provide a matrix or other documentation that relates the accident classes of Table F.2.1 to the release frequencies of Table F.2.3, and a characterization of the accident sequences that are the dominant contributor to the various release categories. Clarify how the MAAP cases were selected to represent each release category.

   f. Although it is stated that the SAMA evaluation is based on a modification to the 2003 model (i.e., the SAMA model), the Level 3 results provided in Table F.3-4 are based on the frequency results given in Table F.2-3, which are from the 2003 model. If the SAMA benefit calculations are based on the SAMA model and the baseline frequencies used in the Phase II evaluations are based on the 2003 model, there would appear to be an unaccounted-for difference that could bias the results. Discuss how the results of the SAMA model were incorporated into the SAMA evaluation, and the impact of any unaccounted-for differences.

2. Provide the following with regard to the treatment of external events in the SAMA analysis:

   a. The contribution to fire risk for the cable spreading room is given in the environmental report as 11.5 percent. This corresponds to a CDF of 8.98E-07 per year using the total fire CDF of 7.81E-06 per year as quoted in the U.S. Nuclear Regulatory Commission's IPE for external events (IPEEE) safety

evaluation report (SER). This is different from the cable spreading room fire CDF of 1.45E-06 per year given in the SER. Provide a brief explanation for this apparent discrepancy.

b. The Monticello IPEEE submittal for internal fire identifies three insights or improvements that were to be considered further: (1) two out of three success criteria for the service water pumps, (2) credit for control rod drive injection after bypassing the load shed logic, and (3) elimination of the AC power dependency on the safety/relief valves. It is stated that the last has been implemented. Confirm this and provide the status of the other two items.

3. Provide the following information concerning the MACCS (MELCOR Accident Consequences Code System Version 2) analyses:

a. The MACCS2 analysis for Monticello is based on a reference boiling-water reactor (BWR) core inventory at end-of-cycle, scaled by the power level for Monticello. The calculations were based on a 3-year fuel cycle (12-month reload) with an average power density for the assembly groups ranging from 24 to 30 MW/MTU. Current BWR fuel management practices use longer fuel cycles (time between refueling) and result in significantly higher fuel burnups. The use of the reference BWR core instead of a plant-specific cycle could significantly underestimate the inventory of long-lived radionuclides important to population dose (such as Sr-90, Cs-134, and Cs-137), and thus impact the SAMA evaluation. Justify the adequacy of the SAMA identification and screening given the fuel enrichment and burnup expected at Monticello during the renewal period.

b. The MACCS analysis assumes all releases occur at ground level and have a thermal content the same as ambient. These assumptions could be non-conservative when estimating offsite consequences. Provide an assessment of the impact that alternative assumptions might have on the estimated offsite consequences (doses to the population within 50 miles) and the conclusions of the SAMA evaluation.

c. Annual meteorology data from the year 2000 were used in the MACCS2 analyses. Provide a brief statement regarding the acceptability of use of this year's data rather than a different year's data.

d. The off-site economic cost risk at Monticello is larger than estimated at other sites having similar CDF and population dose. Identify and briefly discuss the key MACCS2 input assumptions or other factors that may contribute to this larger value at Monticello, e.g., per diem cost for relocated individuals, the costs to relocate an individual, and the value of farm and non-farm wealth.

4. Provide the following with regard to the SAMA identification and screening processes:

a. The IPE identified a number of plant, procedure, and training modifications that have either been implemented or were under consideration. It is stated in Section F.5.1.4 that all of these have been considered in the Phase 1 SAMA list. Please indicate which SAMAs include:

i. modification to assure faster operation of condensate demineralizer, bypass valve on loss of air (stated as completed in the IPE)
ii. operator training on recovery of the failed residual heat removal (RHR) (stated as being considered in the IPE), and
iii. testing of the boron injection hose (stated as under consideration in the IPE).

b. SAMA 36, Divert Water from Turbine Building 931-foot Elevation East, is indicated in Table F.5-1 to be applicable for the largest CDF contributor, IEF-FS-TB931W, which involves a flood in the turbine building 931-foot elevation east area. Clarify whether this SAMA will mitigate a flood in the west area or the east area of the 931-foot elevation. Discuss whether there could be similar SAMAs for the other floods (e.g., IEF-SW-TB911, IEF-SW-RHR1, IEF-SW-RHR2, IEF-SW-RB896).

c. SAMA 7, Rupture Disk Bypass Line, is indicated in Table F.5-3 to be subsumed by SAMA 16. Based on Table F.5-1, SAMA 7 addresses event MVR4543XXN, which is failure of the rupture disk to open. SAMA 16 appears to involve a change in vent valves so that they “fail open” on loss of support, while maintaining the rupture disk. Explain how SAMA 16 reduces the importance of the rupture disk failing to open, and why it is a reasonable alternative to SAMA 7.

d. In Table F.5-1, events ASMY83XXXL and ASMY85XXXL each have risk reduction worth of 1.005. Explain why no SAMAs have been identified for these events.

5. Provide the following with regard to the Phase II cost-benefit evaluations:

a. The discussion of SAMA 12 in Section F.6.7 indicates that the benefit of the SAMA (which involves implementation of a procedure to direct the pressurization of the fire service water system using a fire truck) was estimated by assuming an improved diesel fire pump in addition to the use of a fire pumper truck. It is not clear why an improved fire pump was credited, and this credit appears inconsistent with the cost estimate. Please explain.

b. Discuss in more detail the reasons why SAMA 37 results in an 81.7 percent increase in dose risk if implemented individually, whereas when implemented along with the other five recommended SAMAs, there is a 79.6 percent net reduction in dose risk. Also discuss the rationale for including SAMA 28 within the set of recommended SAMAs given the negative net value for this SAMA if implemented individually, and the rationale for excluding SAMA 16 from the set of recommended SAMAs given the positive net value for this SAMA if implemented individually.

c. While SAMA 40 was specifically identified from the results of the fire IPEEE and the analysis of the benefit for reducing fire risk appears conservative, it would appear that this SAMA would also impact the risk from internal events. It is noted, however, that the lack of hot well inventory is not in the importance lists

for Tables F.5-1 and F.5-2. This may be due to assumptions of the PSA model rather than an indication of the low importance. Provide an assessment of the potential impact of this SAMA on internal events, and if appropriate, a revised cost-benefit analysis for this SAMA that includes consideration of the additional risk reduction and averted cost risk for internal events.

6. In Section F.6.16.2, NMC provides the net values for the remaining SAMAs given implementation of the six recommended SAMAs (see table on page F-68). These values are based on a 7 percent real discount rate. Provide the net value results based on a 3 percent real discount rate. Discuss how inclusion of SAMA 16 within the set of recommended SAMAs would impact these values.

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