February 1, 2006

Mr. Paul A. Harden
Site Vice President
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT — REQUEST FOR ADDITIONAL INFORMATION RELATED TO REQUEST FOR RELIEF FROM ASME SECTION XI CODE REQUIREMENTS FOR REPAIR OF REACTOR PRESSURE VESSEL HEAD PENETRATIONS (TAC NOS. MC8603 and MC8604)

Dear Mr. Harden:

Your letter of October 11, 2005, requested relief from certain sections of the 1989 Edition of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code*, Section XI, in the event a reactor vessel head penetration nozzle was in need of a repair at the Palisades Nuclear Plant.

We are reviewing your request, and find that we need additional information as shown in the enclosed request for additional information (RAI). We discussed this RAI with Ms. Amy Hazelhoff of your organization on January 19, 2006, and she agreed to respond by February 20, 2006. Please contact me at (301) 415-1423 if you have questions.

Sincerely,

/RA/

L. Mark Padovan, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure: RAI

cc w/encl: See next page

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Palisades Plant

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REQUEST FOR ADDITIONAL INFORMATION (RAI)

RELATED TO REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL

ENGINEERS (ASME) SECTION XI CODE REQUIREMENTS

FOR REPAIR OF REACTOR PRESSURE VESSEL HEAD PENETRATIONS

PALISADES NUCLEAR PLANT

DOCKET NO. 50-255

Nuclear Management Company's (NMC's) letter of October 11, 2005, requested relief from certain sections of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME) Code, Section XI, in the event a reactor vessel (RV) head penetration nozzle was in need of a repair at the Palisades Nuclear Plant. To complete its review of the submittal, the staff requests the following additional information.

1. Enclosure 1, page 1. NMC said that an analysis of a non-abrasive water jet machining (non-AWJM) conditioned repair showed that a crack in the nozzle will not grow to 75 percent through-wall in 5.04 effective full power years (EFPY) for a repaired control rod drive (CRD) nozzle, and 5.13 EFPY for a repaired incore instrumentation nozzle. These periods are beyond the duration for the relief request, which will conclude on December 12, 2006. Therefore, NMC determined that AWJM conditioning was unnecessary in the repair process. Explain why AWJM conditioning is not needed if the periods for a 75 percent through-wall crack are beyond the duration of the relief request. Will NMC examine the nozzles periodically to assure that cracks will not develop, and the inspection frequency will be shorter than 5.04 and 5.13 EFPY?

2. Enclosure 2, page 1. NMC said that extensive radiological dose was received during the nozzle repair due to the chamfering process. Provide the dose measurement.

3. Enclosure 2, page 3, Item 4. NMC proposed to use the 2005 Addenda of ASME Section XI, 2004 Edition, where the code allows the ratio of the maximum applied stress intensity factor and the available fracture toughness based on crack initiation (K_{IC}) for the corresponding crack tip temperature be less than / 2 at a temperature of RT_{NDT} [reference temperature]. The proposed criterion is not the same as the requirements in ASME Section XI, IWB-3613(a), which require that for conditions < 20 percent of design pressure, the ratio of the maximum applied stress intensity factor and the available fracture toughness based on crack arrest (K_{Ia}) for the corresponding crack tip temperature be < / 2 at a temperature of RT_{NDT} + 60 EF.

   (a) The Nuclear Regulatory Commission (NRC) has not accepted the 2004 Edition and 2005 Addenda in Title 10, *Code of Federal Regulations,* Part 50 (10 CFR 50.55a).

   The NRC staff has not completed its review of the 2004 Edition of the Code as part of

ENCLOSURE

updating 10 CFR 50.55a. Therefore, NMC needs to reference documents other than the 2004 Edition and 2005 Addenda of ASME Section XI to support its technical basis in Item 4.

(b) Show why the postulated flaw in the remnant J-groove weld could not meet the requirements in IWB-3613(a) of the 1989 edition of the ASME Code, Section XI, which is the code of record, to establish the basis for the relief.

(c) Demonstrate that your proposed criterion provides sufficient safety margin such that the structural integrity of the RV head will not be compromised. Confirm that the proposed criterion applies only to the RV head, not to the nozzles.

4. Enclosure 2, page 4, 3rd paragraph. Discuss whether hydrostatic pressure was applied to the crack face, and whether a plastic zone correction factor was included in the flaw evaluation of the remnant J-groove weld.

5. Enclosure 3, page 3. Reference 7, AREVA Proprietary Document 32-5059512-00, "Palisades CEDM [control element drive mechanism] and ICI [in-core instrumentation] Nozzle IDTB [inner-diameter temper bead] Repair PWSCC [primary-water stress corrosion cracking] Life Evaluation," March 2005, contains flaw evaluations of non-AWJM to the nozzles. Provide Reference 7 to the NRC.

6. Enclosure 3, page 4. In the 2nd paragraph, NMC said ". . . postulated flaws in the CRDM [control rod drive mechanism] J-groove weld and butter are acceptable for 27 years of operations . . . ." In the 3rd paragraph, NMC said ". . . the results showed that the postulated radial crack in the Alloy 182 J-groove weld and butter would be acceptable for 5 years of operation for an ICI nozzle . . . ."

(a) Discuss why there is a large difference in periods of acceptability between the CRDM nozzle and ICI nozzle.

(b) The NRC staff understands that in NMC's flaw evaluations, the remnant J-groove weld was assumed to be cracked in its entirety, and the tip of the initial crack was assumed to be located at the boundary between the weld and the RV head. The crack was assumed to propagate into the RV head, and the goal was to determine the structural integrity of the RV head. Therefore, it is not clear whether the acceptable periods of operation discussed in the above statement refer to the remnant J-groove welds or the RV head. Clarify the above statements.

7. NMC's RV head penetration nozzle relief request of August 2, 2004, said "if the IDTB weld repair is not abrasive water jet machining (AWJM) remediated, the life expectancy relative to PWSCC is conservatively estimated at 1.3 effective full power years (EFPY) for a CRD nozzle and 1.5 EFPY for an ICI nozzle. If AWJM is used, the life expectancy relative to PWSCC is conservatively estimated at 53 EFPY for CRD and ICI nozzles." NMC's relief request of October 11, 2005, said "the life expectancy of the non-AWJM conditioned IDTB weld repair relative to PWSCC is conservatively estimated at 5.04 effective full power years (EFPY) for a CRD nozzle and 5.13 EFPY for an ICI nozzle." Explain the change in the current method used to analyze the life expectancy of non-AWJM versus the method used in the previous relief request.

8. On Page 8 of 16 of Enclosure 1 to its October 11, 2005, submittal, NMC lists the differences between its alternative and the requirements of Code Case N–638, “Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW [Gas Tungsten Arc Welding] Temper Bead Technique.” In paragraph d) on this page, NMC discusses its impact-property testing. NMC indicates that the RT_{NDT} is 30 degrees F, but in the next sentence states that the RT_{NDT} + 60 degrees F is 30 degrees F. Explain this inconsistency.

9. In the same paragraph d) as discussed above, NMC said that it did not meet the requirements of N–638 2.1 (j), but it conducted additional testing, as permitted by NB-4335.2, "Impact Tests of Heat Affected Zone," of the 1989 edition of the ASME Code, Section III Code, Division 1 - NB, because the mils lateral expansion results were not acceptable. Confirm that all requirements for impact testing of the heat affected zone as described in NB-4335.2 have been met.