

March 8, 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: MONTICELLO NUCLEAR GENERATING PLANT - FOURTH 10-YEAR  
INSERVICE INSPECTION INTERVAL REQUEST FOR RELIEF TO USE CODE  
CASE N-661 (TAC NO. MC3879)

Dear Mr. Palmisano:

The Nuclear Management Company, LLC's (NMC's) letter of July 28, 2004, proposed an alternative to the requirements of IWA-4221(a) and IWA-4221(b) of Section XI of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code) at Monticello Nuclear Generating Plant (MNGP). Specifically, NMC requested that the U. S. Nuclear Regulatory Commission (NRC) approve the use of ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service." NMC made the request pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a(a)(3)(i) to address replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 2 and 3 carbon steel raw water piping systems.

The NRC staff evaluated NMC's request and concludes that NMC has provided an acceptable alternative to the requirements of IWA-4221(a) and IWA-4221(b) of the ASME Code, Section XI, subject to the following three conditions which must be met when using Code Case N-661:

- The repair is only acceptable for one cycle if the root cause of the degradation has not been determined.
- Weld overlay repair of an area can only be performed once in the same location.
- Weld overlay repair is only acceptable until the next refueling outage when through-wall repairs are made by welding on surfaces that are wet or exposed to water.

The NRC staff has determined that NMC's proposed alternative provide an acceptable level of quality and safety. Therefore, the NRC staff authorizes NMC's proposed alternative, as supplemented by the three conditions listed above, pursuant to 10 CFR 50.55a(a)(3)(i) for the fourth 10-year inservice inspection interval at MNGP, or until Code Case N-661 is approved for general use by reference in Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," and incorporated by reference in 10 CFR 50.55a(b). At that time, if NMC intends to continue using Code Case N-661, it must follow all provisions of Code Case N-661 with conditions as specified in RG 1.147 and

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limitations as specified in Section 50.55a(b)(4), (b)(5), and (b)(6), if any. All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Enclosed is our safety evaluation.

Sincerely,

**/RA/**

L. Raghavan, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-263

Enclosure: Safety Evaluation

cc w/encl: See next page

Mr. T. Palmisano

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Monticello Nuclear Generating Plant

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November 2004

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUEST FOR RELIEF TO USE CODE CASE N-661

NUCLEAR MANAGEMENT COMPANY, LLC

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

The Nuclear Management Company, LLC's (NMC's) letter of July 28, 2004, proposed an alternative to the requirements of IWA-4221(a) and IWA-4221(b) of Section XI of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code) at Monticello Nuclear Generating Plant (MNGP). Specifically, NMC requested that the U.S. Nuclear Regulatory Commission (NRC) approve the use of ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service." NMC made the request pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a(a)(3)(i) to address replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 2 and 3 carbon steel raw water piping systems. NMC stated the primary reason for the request was to provide adequate time for additional examination of adjacent piping so that pipe replacement can be planned to reduce impact on system availability including Maintenance Rule applicability of replacement materials.

2.0 REGULATORY REQUIREMENT

The requirements of 10 CFR 50.55a(g) specifies that inservice inspection (ISI) of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). The requirements of 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The requirements of 10 CFR 50.55a(g)(5)(iii) states that if the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the NRC and submit, as specified in Section 50.4, to support the determinations.

ENCLOSURE

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that ISI of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Code of record for the fourth 10-year ISI at MNGP is the 2001 edition of the ASME Code, Section XI, for repair/replacement activities (IWX-4000) for Class 1, 2, 3 and MC pressure-retaining components and their supports.

### 2.1 ASME Code Components Affected

ASME Section XI, Class 2 and 3 carbon steel piping for raw water services.

### 2.2 Applicable ASME Code Requirement

ASME Section XI, 2001, Edition:

- IWA-4221(a) requires that items used for repair/replacement activities shall meet the applicable Owner's Requirements. IWA-4422.1(a) states that a defect is considered removed when it has been reduced to an acceptable size.
- IWA-4221(b) requires that an item to be used for repair/replacement activities shall meet the Construction Code specified in accordance with (1), (2), or (3) below.
  - (1) When replacing an existing item, the new item shall meet the Construction Code to which the original item was constructed.
  - (2) When adding a new item to an existing system, the Owner shall specify a Construction Code that is no earlier than the earliest Construction Code used for construction of any originally installed item in that system.
  - (3) When adding a new system, the Owner shall specify a Construction Code that is no earlier than the earliest Construction Code used for other systems that perform a similar function.

## 3.0 TECHNICAL EVALUATION

### 3.1 Reason for Request

NMC requested relief from replacement, or weld repair, of wall thinning conditions in Class 2 and 3 carbon steel raw water piping systems. Replacement, or weld repair, would be to the design specification and the original construction code. The wall thinning conditions may be the result of various degradation mechanisms such as erosion, corrosion, cavitation, and pitting. NMC stated the primary reason for the request was to provide adequate time for additional

examination of adjacent piping so that pipe replacement can be planned to reduce impact on system availability including Maintenance Rule applicability of replacement materials.

### 3.2 Proposed Alternative and Basis for Use

NMC proposes to implement the requirements of ASME Code Case N-661 as an alternative to the requirements of the ASME Code under 10 CFR 50.55a(a)(3)(i) for Class 2 and 3 raw water piping system repairs resulting from degradation mechanisms such as erosion, corrosion, cavitation, or pitting. NMC stated that these types of defects are typically identified by small leaks in the piping system or by pre-emptive, non-ASME Code-required examinations performed to monitor the degradation mechanisms. The alternative repair technique described in Code Case N-661 involves applying additional weld metal on the exterior of the piping to restore the wall thickness. NMC stated that it would use the repair technique whenever an engineering evaluation determines that such a repair is suitable for the particular defect or degradation being resolved. NMC also said that provisions for use of this Code Case will be addressed in the Repair/Replacement Program for MNGP.

NMC indicated that these provisions will require that adjacent areas be examined to verify that the repair will encompass the entire flawed area, and that no other unacceptable degraded locations exist within a representative area dependent on the degradation mechanism present. NMC will evaluate the degradation mechanism to determine the re-examination schedule to be performed over the life of the repair. The repair will be considered to have a maximum service life of two fuel cycles unless the re-examinations conducted during each of the two fuel cycles establish the expected life of the repair.

Additionally, NMC said it would place the following restrictions on the use of Code Case N-661, to ensure that the use of the Code Case will provide an acceptable alternative pursuant to 10 CFR 50.55a(a)(3)(i):

- The repair is only acceptable for one cycle if the root cause of the degradation has not been determined.
- Weld overlay repair of an area can only be performed once in the same location.
- Weld overlay repair is only acceptable until the next refueling outage when through-wall repairs are made by welding on surfaces that are wet or exposed to water.

The basis for use of the repair technique described in Code Case N-661 is that the ASME Code subcommittee for Section XI determined that this repair technique provided an acceptable alternative to the requirements of IWA-4000, and provided an acceptable level of quality and safety. Therefore, the subcommittee concluded that the alternative was justified per 10 CFR 50.55a(a)(3)(i). Code Case N-661 was approved by the ASME Section XI Code Committee on July 23, 2002. However, it has not been incorporated into NRC Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI Division 1," and thus is not available for application at nuclear power plants without specific NRC approval. Therefore, NMC is requesting use of the alternative repair technique described via this relief request.

### 3.3 Duration of Proposed Alternative

NMC requested authorization to use Code Case N-661 for MNGP's 10-year ISI interval or until the NRC publishes Code Case N-661 in a future revision of RG 1.147. Upon incorporation into the RG, NMC stated it will review and follow the conditions specified. It also stated that all other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized by the NRC staff will remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

### 3.4 NRC Staff's Evaluation

NMC proposes to use Code Case N-661 to perform an alternative repair of degraded components which involves applying weld metal overlay on the exterior of piping to restore the wall thickness of the component. NMC said that it would use this repair technique whenever engineering evaluations determine that such a repair is suitable for the particular defect or degradation being resolved. Provisions for use of this Code Case will be addressed in NMC's Repair and Replacement Program. NMC stated that those provisions will require that adjacent areas be examined to verify that the entire flawed area will be encompassed by the repair, and that there are no other unacceptable degraded locations within a representative area dependent on the degradation mechanism present. NMC will also evaluate the degradation mechanism to determine the re-examination schedule to be performed over the life of the repair. It stated that the repair will be considered to have a maximum service life of two fuel cycles unless examinations during each of the two fuel cycles are performed to establish the expected life of the repair.

The NRC staff finds that NMC's reasoning in support of its request for relief to be acceptable. This finding is based on the fact that the NRC staff has reviewed Code Case N-661 for inclusion in RG 1.147. The NRC staff's review of Code Case N-661 established three conditions that NMC agreed to place on the use of Code Case N-661 to assure that the Code Case will provide an acceptable alternative pursuant to 10 CFR 50.55a(a)(3)(i). These conditions are:

- The repair is only acceptable for one cycle if the root cause of the degradation has not been determined.
- Weld overlay repair of an area can only be performed once in the same location.
- Weld overlay repair is only acceptable until the next refueling outage when through-wall repairs are made by welding on surfaces that are wet or exposed to water.

The NRC staff established these three conditions based on the following considerations:

- A suitable reinspection frequency cannot be established if the root cause of the degradation has not been determined.
- Weld overlay repair of an area can only be performed once to ensure that ineffective repairs are not being repeatedly made in the same location.
- Performing through-wall weld repairs on surfaces that are wet, or exposed to water, would produce welds that include weld defects such as porosity, lack of fusion, and cracks. It is

highly unlikely that a weld can be made on an open-root joint with water present on the backside of the weld without having several weld defects. These types of weld defects can, and many times do, lead to premature failure of a weld joint.

#### 4.0 CONCLUSION

Based on the information provided in NMC's submittal, the NRC staff concludes that NMC has provided an acceptable alternative to the requirements of IWA-4221(a) and IWA-4221(b) of the 2001 Edition of the ASME Code, Section XI, subject to the following three conditions which must be met when using Code Case N-661:

- The repair is only acceptable for one cycle if the root cause of the degradation has not been determined.
- Weld overlay repair of an area can only be performed once in the same location.
- Weld overlay repair is only acceptable until the next refueling outage when through-wall repairs are made by welding on surfaces that are wet or exposed to water.

The NRC staff concludes that NMC's proposed alternative, as supplemented by the three conditions listed above, provides an acceptable level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the fourth 10-year ISI interval at MNGP, or until Code Case N-661 is approved for general use by reference in RG 1.147, and incorporated by reference in 10 CFR 50.55a(b). At that time, if NMC intends to continue using Code Case N-661, it must follow all provisions of Code Case N-661 with conditions as specified in RG 1.147 and limitations as specified in § 50.55a(b)(4), (b)(5), and (b)(6), if any. All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Eric Reichelt

Date: March 8, 2005