October 31, 2007

Mr. Michael D. Wadley
Site Vice President
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - RELIEF REQUEST FROM ASME CODE, SECTION XI, INSERVICE INSPECTION PROGRAM RELIEF REQUESTS NOS. 1-RR-4-7 AND 2-RR-4-7 (TAC NOS. MD3809 AND MD3810)

Dear Mr. Wadley:

By letter dated December 14, 2006 (Agencywide Documents Access and Management System Accession No. ML063480521), Nuclear Management Company, LLC, (the licensee), requested Nuclear Regulatory Commission (NRC) approval, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(ii), for relief from a section of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 1998 Edition, with 2000 Addenda. In Relief Request (RR) Nos. 1-RR-4-7 and 2-RR-4-7, the licensee requested relief from performing the ASME Code-required pressure test of the buried portion of cooling water piping by proposing the alternative method of measuring rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

Based on the information provided in RR Nos. 1-RR-4-7 and 2-RR-4-7, the NRC staff concluded, in the enclosed safety evaluation, that the licensee's compliance with the Inservice Inspection (ISI) Code of Record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety and, further, that the licensee's proposed alternative provides reasonable assurance of operational readiness. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the ISI program alternative proposed in RR Nos. 1-RR-4-7 and 2-RR-4-7, for the fourth 10-year ISI interval of the Prairie Island Nuclear Generating Plant, Units 1 and 2.

Sincerely,

/RA/

Cliff G. Munson, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure:
Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM RELIEF REQUESTS 1-RR-4-7 AND 2-RR-4-7

NUCLEAR MANAGEMENT COMPANY, LLC

PRAIRIE ISLAND NUCLEAR GENERATING PLANT (PINGP), UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

1.0 INTRODUCTION

By letter dated December 14, 2006 (Agencywide Documents Access and Management System Accession No. ML063480521), Nuclear Management Company, LLC, (NMC, the licensee), requested Nuclear Regulatory Commission (NRC) approval, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(ii), for relief from a section of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 1998 Edition, with 2000 Addenda. In Relief Request (RR) Nos. 1-RR-4-7 and 2-RR-4-7, the licensee requested relief from performing the ASME Code-required pressure test of the buried portion of cooling water piping by proposing the alternative method of measuring rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

The licensee proposed that the integrity of the buried piping will be verified during quarterly pump testing under the inservice testing (IST) program for pumps and valves. The NRC staff has reviewed the licensee's proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii) since compliance to the ASME Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY REQUIREMENTS

The inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with the ASME Code, Section XI, and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the NRC, if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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 of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components.

ENCLOSURE

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) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of Record for the fourth 10-year inspection interval of the PINGP, Units 1 and 2, is the 1998 Edition with the 2000 Addenda of the ASME Code, Section XI.

3.0 TECHNICAL EVALUATION

System/Component(s) for Which Relief is Requested

Buried Class 3 Cooling Water Supply Lines 30-CL-20 and 30-CL-23

ASME Code Requirements

As applicable to PINGP, Units 1 and 2, the 1998 Edition with the 2000 Addenda of the ASME Code, Section XI, Table IWD-2500-1, Examination Category D-B, Item No. D2.10 requires a system leakage test and a VT-2 visual examination. Subsection IWA-5244(b) states that for buried components where a VT-2 visual examination cannot be performed, the examination requirement is satisfied by the following:

(1) The system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. The acceptable rate of pressure loss or flow shall be established by the Owner.

(2) The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired.

Licensee's Request for Relief

Relief is requested from performing the system pressure test or the system leakage test for buried portions that are isolable by means of valves by determining the rate of pressure loss or the change in flow between the ends of buried components.

Licensee's Basis for Requesting Relief

The buried cooling water piping at PINGP, Units 1 and 2, consists of approximately 200 feet of 30-inch diameter piping supplying to a common ring header that is shared by both units. Each of the cooling water lines that feed into the ring header extend underground from the screen house to the turbine building. Part of this buried piping is also under the administrative building. There are no branch lines that are buried. Each segment of the buried piping has two 18-inch and two 24-inch butterfly valves for the purpose of isolation. The instrumentation upstream of the buried piping consists of pressure indication at the discharge of the cooling water pumps. There is no flow measuring instrument upstream of the supply header.

However, there is a flow meter on the downstream of the supply header in the turbine building. There is no access to the buried sections of piping without excavation. Further, no annulus was provided during original construction that would allow for examination of these buried sections of piping. In order to perform a rate of pressure loss test required under IWA-5244(b)(1), it would be necessary to close several large butterfly valves to isolate the buried portions of piping. These valves are not suitable for performing a pressure isolation function since they were not designed to be leak tight. Extensive maintenance or system modification would be required to conduct a rate of pressure loss test. The alternative test would be to determine the change in flow between the ends of buried components. However, the cooling water supply header was not designed with plant instrumentation and flow orifices on both sides of the buried sections of piping to determine the change in flow rates. Therefore, the configuration of the buried cooling water system will not allow for determining the change in flow between the ends of the buried components.

Licensee's Proposed Alternative

In lieu of performing a system pressure test in accordance with the requirements of IWA-5244(b)(1) for PINGP, Units 1 and 2, NMC proposed an alternative to use the provision of IWA-5244(b)(2) of the 1998 Edition with the 2000 Addenda of the ASME Code, Section XI, to confirm that flow during operation is not impaired in non-isolable buried piping. The unimpaired flow in the buried piping will be verified during cooling water pump testing performed under the IST program. During these tests, the flow and the pressure of the cooling water pumps will be plotted against a test reference value. The pressure will be measured at the discharge of the pump and the flow measurement will be done using the flow meter located downstream of the header in the turbine building. The head developed and the flow rate are interdependent variables which together define the hydraulic performance of the pump. As the pump degrades, the total discharge head will decrease at the reference flow rate. However, due to the location of the flow rate instruments (downstream of the buried piping), a decrease in pump head during testing may also indicate leakage from the cooling water system between the pump discharge and the flow meter in the turbine building. A leak in the underground portion of the cooling water header would result in reduced pump performance on the pump curve. Satisfactory quarterly IST of the cooling water pump will verify the integrity of the buried piping.

If the performance of a cooling water pump drops below the reference range on the performance curve, and the cause of the deviation is not attributed to the test instruments being used, corrective actions will be initiated to evaluate the cause of the reduced performance as required by the PINGP IST program. If the pump performance falls into the action range, the pump would be declared inoperable and further corrective actions (i.e., maintenance on the pump, system walkdown, etc.) would be initiated to restore the pump and/or system to an operable status.

If a pump is declared inoperable and later determined that the pump met applicable criteria, a further investigation into the cause of the apparent reduced performance would be performed. This would include aligning one of the other safeguards pumps to the affected header supply piping. Downstream flow and pump head during performance of these safeguards pumps will be trended as part of the IST program.

4.0 NRC STAFF EVALUATION

The Code of Record requires a system pressure test for the buried portion of the cooling water piping that will determine either a rate of pressure loss or a change in flow at the ends of the buried piping. The buried cooling water piping at PINGP, Units 1 and 2, uses butterfly valves at the ends which were not designed for pressure isolation and, therefore, are unsuitable to determine meaningful rate of pressure loss. One end of buried piping is not instrumented for flow measurement and does not permit measurement of change in flow. Therefore, the ASME Code-required test cannot be performed. The ASME Code, however, allows for non-isolable buried components to confirm that flow during operation is not impaired. The NRC staff agrees with the licensee's approach that unimpaired flow in the buried piping can be qualitatively assessed during quarterly IST surveillance of cooling water pumps. Using the flow instrument downstream from the pump discharge, a reference flow rate could be established which would correspond to a target pump head. A decrease in pump head may indicate increase in flow due to any through-wall leakage in the buried piping. From trending of head loss (pressure drop) during a pump test at the reference flow, an assessment can be made on the integrity of buried piping. An issue related to this mode of testing is that pump head loss may be caused by the deterioration of the pump performance rather than by leakage in the buried pipe. As the performance of the pump deteriorates, the developed head decreases at the reference flow. The licensee has stated that if during an IST surveillance, the minimum flow could not be achieved and the cause of the deviation was not attributed to the test instruments being used, the pump would be declared inoperable and corrective actions would be initiated to evaluate the cause of the reduced performance as required by the PINGP IST program. If the pump performance falls into the action range, the pump would be declared inoperable and further corrective actions (i.e., maintenance on the pump, system walkdown, etc.) would be initiated to restore the pump and/or system to an operable status. The licensee further stated that if a pump is declared inoperable and later determined to have met applicable criteria, a further investigation into the cause of the apparent reduced performance would be performed. This would include aligning one of the other safeguards pumps to the affected header supply piping. Downstream flow and pump head during performance of these safeguards pumps will be trended as part of the IST program.

The NRC staff has determined that the licensee's proposed alternative to test the buried portion of the cooling water piping in conjunction with quarterly testing of cooling water pumps would detect significant through-wall leakage if present in the subject line and would provide reasonable assurance of operational readiness. Compliance with the ASME Code requirement would require installation of additional flow measuring device at the inlet end of buried piping which would result in hardship without a compensating increase in the level of quality and safety.

5.0 CONCLUSION

The NRC staff concludes that for the buried portion of cooling water piping, compliance to the ASME Code requirement to perform a test that determines the rate of pressure loss or the change in flow would result in hardship to the licensee without a compensating increase in the level of quality and safety and, further, that the licensee's proposed alternative would provide reasonable assurance of operational readiness.

The licensee's proposed alternative provides reasonable assurance of detecting any degradation in the buried portion of cooling water piping. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternative in RR Nos. 1-RR-4-7 and 2-RR-4-7, is authorized for the fourth 10-year ISI interval of the PINGP Units 1 and 2.

All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested, remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Pat Patnaik, DCI/CSGB

Date: October 31, 2007

Prairie Island Nuclear Generating Plant,
Units 1 and 2

cc:

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