October 26, 2001

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, Second Floor
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SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 - INSERVICE TESTING RELIEF REQUEST PMP-RR-1 (TAC NO. MB2168)

Dear Mr. Mueller:

By letter dated June 18, 2001, Niagara Mohawk Power Corporation (NMPC) submitted a revised valve relief request (PMP-RR-1) for Nine Mile Point Nuclear Station, Unit No. 1. NMPC requested relief from the requirements of quarterly differential pressure and flow rate measurements for certain reactor building closed loop cooling (RBCLC) pumps, and quarterly differential pressure measurements for certain emergency service water (ESW) pumps. The relief request has also been reformatted to differentiate between the reliefs requested for the RBCLC and ESW pumps.

As set forth in the safety evaluation enclosed, the staff concludes that the proposed alternatives provide reasonable assurance of operational readiness for the subject pumps and that compliance with the Code test requirements cannot be achieved without major system modifications. Pursuant to 10 CFR 50.55a(a)(3)(ii), relief request PMP-RR-1 (Revision 1) is therefore authorized for use for the third 10-year interval inservice testing program on the basis that the imposition of Code requirements would result in a hardship without a compensating increase in the level of quality and safety.

This completes the NRC staff's efforts on relief request PMP-RR-1.

Sincerely,

/RA by P. Tam for/

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

Docket No. 50-220

Enclosure: Safety Evaluation

cc w/encl: See next page

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*safety evaluation in memo of 9/12/01 used essentially as-is **PTam concurred for Raghavan

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST PMP-RR-1

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BOILER AND PRESSURE VESSEL CODE

NINE MILE POINT NUCLEAR STATION, UNIT NO. 1

NIAGARA MOHAWK POWER CORPORATION

DOCKET NO. 50-220

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations*, Section 50.55a (10 CFR 50.55a), requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME *Boiler and Pressure Vessel Code* (the Code) and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of IST programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995. Also see NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements."

The 1989 Edition of the ASME Code is the applicable Code of record for the third 10-year interval IST program at Nine Mile Point Nuclear Station, Unit 1 No. 1 (NMP1). Subsection IWV of the 1989 Edition, which gives the requirements for IST of valves, references Part 10 of the American National Standards Institute/ASME *Operations and Maintenance Standards* (OM-10) as the rules for IST of valves. OM-10 replaces specific requirements in previous editions of Section XI, Subsection IWV, of the ASME Code. Subsection IWP of the 1989 Edition, which gives the requirements for IST of pumps, references Part 6 of the American National Standards Institute/ASME *Operations and Maintenance Standards* (OM-6) as the rules for IST of pumps. OM-6 replaces specific requirements in previous editions of Section XI, Subsection IWP, of the ASME Code.

By letter dated June 18, 2001, Niagra Mohawk Power Corporation (NMPC, the licensee) submitted a revised valve relief request (PMP-RR-1) for NMP1. NMPC requested relief from the requirements of quarterly differential pressure and flow rate measurements for certain reactor building closed loop cooling (RBCLC) pumps, and quarterly differential pressure measurements for certain emergency service water (ESW) pumps. The relief request has also been reformatted to differentiate between the reliefs requested for the RBCLC and ESW pumps. The staff has completed its review of the relief request and is providing the following evaluation.

2.0 LICENSEE'S PUMP RELIEF REQUEST PPMP-RR-1 (REVISION 1)

The licensee requested relief for RBCLC pumps (PMP-70-01, -02, and -03) and ESW pumps (PMP-72-03, and -04) from the ASME Code inservice tests that are required to be performed quarterly as specified in Paragraph 5.1 of OM-6 Code, and from the test requirements (Paragraph 4.4 of OM-6 Code) when determining the effect of pump replacement, repair, and maintenance on reference values.

2.1 Basis for Relief

The licensee stated:

> In accordance with 10 CFR50.55a(f)(6)(i), relief is requested from the requirements of ASME/ANSI OMa-1988 Part 6, Sections 4.4 and 5.1 based on impracticality as described below. Similar relief requests were approved for the second Ten-Year Program Plan per the staff's Safety Evaluation Reports of March 7, 1991 (TAC No. 60450), and January 10, 1995 (TAC No. 90927).
>
> A. The Reactor Building Closed Loop Cooling (RBCLC) and Emergency Service Water (ESW) systems are not fixed resistance systems.
>
> For the RBCLC system, no pump test loops or individual pump flow instrumentation is installed. The system flow rate and differential pressure are a function of the number of pumps running and system heat loads. During normal plant operations, system heat loads prevent removing the RBCLC system from service. Operating conditions do not permit single pump operation at repeatable test conditions for individual pump parameters (i.e., flow rate and differential pressure) to be measured.
>
> For the ESW system, the installed test line piping configuration does not allow for temporary or permanent flow instrumentation to be installed (i.e., not enough straight runs of piping). Flow instrumentation can be utilized on the service water system inter-tie piping to test the ESW pumps. However, the ESW pumps operate at a lower pressure than the service water system. During normal plant operations, system heat loads prevent removing a service water header from service or depressurizing a header.
>
> Therefore, during normal plant operation, flow rate and differential pressure measurement for the RBCLC pumps and flow rate measurement for the ESW pumps is not practical.

Testing can be performed during cold shutdown conditions. In most cold shutdown scenarios, it is possible to operate the RBCLC and ESW systems

with a single pump and align the systems to achieve OM test conditions without adversely affecting cold shutdown plant operations.

B. In order to permit rework/repair/replacement of a[n] RBCLC or an ESW pump while the plant remains operating at power, the determination of new reference values for all parameters, prior to returning the pumps to an operable condition, is not practical.

The basis for relief of the frequency of flow rate (Q) and differential pressure ($\triangle$P) measurement of an RBCLC pump and the frequency of flow (Q) measurement of an ESW pump, is applicable to the post rework/repair/replacement. If new reference values must be determined prior to returning the pumps to an operable condition, placing the plant into a cold shutdown condition is required.

2.2 Alternative Testing

The licensee stated:

A. Quarterly, vibration (V) shall be measured for each RBCLC pump. During cold shutdowns, flowrate (Q), vibration (V), and differential pressure ($\triangle$P) shall be measured for each RBCLC pump.

Quarterly, vibration (V) and pump differential pressure ($\triangle$P) shall be measured for each ESW pump. During cold shutdowns, flowrate (Q), vibration (V), and differential pressure ($\triangle$P) shall be measured for each ESW pump.

B. Pump rework/repair/replacement will be performed in accordance with vendor specifications and maintenance procedures. The post maintenance test results will be evaluated to ensure the pump will meet its safety related function. Quarterly, until new reference values can be established at the next cold shutdown, vibration (V) for the RBCLC pumps and vibration and pressure differential ($\triangle$P) for the ESW pumps shall be measured and evaluated.

At the next cold shutdown, new reference values will be established for pump differential pressure ($\triangle$P), flow (Q), and vibration (V).

3.0 NRC STAFF EVALUATION

3.1 RBCLC Pumps

There are no test loops or individual flow instrumentation for the RBCLC system pumps. Individual pump flow can only be determined by measuring system flow rate. The system flow rate and differential pressure are a function of the number of pumps running and the system heat loads. Therefore, the operating conditions, when two or more pumps are running, do not permit repeatable test conditions for individual pump parameters to be measured. At NMP1, normal system heat loads require operation of more than one RBCLC pump, and operation of a single RBCLC pump for pump testing may result in plant shutdown. Imposing the Code

requirements would necessitate system redesign and modification such as installation of a test loop and flow instrumentation, which would be costly and burdensome on the licensee. As such, the licensee proposes to perform the quarterly pump test by only measuring the vibration, and to defer the Code-specified test to cold shutdown using the normal system flow path. Evaluation of the results from Code-specified tests at cold shutdown, as well as the results from the pump vibration tests quarterly, should allow an adequate determination of pump operational readiness and permit the detection of degradation.

Based on the above discussion, the staff finds that compliance with the Code test frequency requirements cannot be achieved without major system modifications and would result in hardship on the licensee. The staff also finds that the alternative described in the licensee's proposal provides reasonable assurance of pump operational readiness.

3.2 ESW Pumps

There are two flow paths that can be used to test the ESW pumps. One flow path is the ESW pump test loop, and the other is service water system (SWS) using the inter-tie piping. For the ESW system, the test line piping configuration does not allow for temporary or permanent flow instrumentation to be installed (i.e., not enough straight runs of piping), so that flow rate cannot be measured during the quarterly tests. Imposing the Code requirements would require test loop piping modification and installation of on-line flow instrumentation, which would be costly and burdensome on the licensee. Flow instrumentation may be used on the SWS inter-tie piping to test the ESW pumps. However, the ESW pumps operate at a lower pressure than the SWS, and at NMP1, system heat loads prevent removing a service water header from service or depressurizing a header. Therefore, testing ESW pumps using SWS flow instrumentation can only be performed during cold shutdown conditions. In most cold shutdown scenarios, it is possible to operate the ESW systems with a single pump to achieve Code-required test conditions without adversely affecting cold shutdown plant operations. As such, the licensee proposed to perform the quarterly pump test using ESW test loop without flow measurements and perform the Code-specified test during cold shutdown using SWS flow path with flow measurements. Evaluation of the results from the Code-specified test at cold shutdown as well as the results from the differential pressure measurements and pump vibration tests quarterly should allow an adequate determination of pump operational readiness and permit the detection of degradation.

Based on the above discussion, the staff finds that compliance with the Code test frequency requirements cannot be achieved without major system modifications and would result in hardship on the licensee. The staff also finds that the alternative described in the licensee's proposal would provide reasonable assurance of pump operational readiness.

3.3 Pump New Reference Values

Paragraph 4.4 of OM-6 requires that when a reference value or set of values have been affected by repair, replacement, or routine servicing of a pump, a new reference value or set of values shall be determined or previous value reconfirmed by an inservice test run prior to declaring the pump operable. The licensee states that in order to permit rework, repair, or replacement of an RBCLC or an ESW pump while the plant remains operating at power, the determination of new reference value for all parameters, prior to returning the pumps to an operable condition, is unreasonable. If new reference values must be determined prior to returning the pumps to an operable condition, placing the plant into a cold shutdown condition is

required. Therefore, in lieu of shutting the plant down immediately following maintenance works, the licensee proposed to perform the rework/repair/replacement in accordance with vendor specifications and maintenance procedures, evaluate the post-maintenance test results to ensure the pump will meet its safety-related function, and establish the new reference values at the next cold shutdown.

The NRC staff has reviewed the operation of RBCLC and ESW systems and finds that to perform the Code-required test to determine new reference values for the affected pumps requires placing the plant into a cold shutdown condition. Imposing the Code requirements would require system redesign and plant modifications, which are costly and burdensome on the licensee. The licensee's proposal of performing the rework/repair/replacement in accordance with vendor specifications and maintenance procedures and evaluating the post-maintenance test results to ensure the pump will meet its safety-related function will provide an adequate determination of pump operational readiness and permit the detection of degradation.

Based on the above discussion, the NRC staff finds that compliance with the Code test requirements cannot be achieved without major system modifications and would result in hardship on the licensee. The staff also finds that the alternative described in the licensee's proposal provides reasonable assurance of pump operational readiness.

4.0 CONCLUSION

Based on the above evaluation, the NRC staff concludes that the proposed alternatives provide reasonable assurance of operational readiness for the subject pumps and that compliance with the Code test requirements cannot be achieved without major system modifications. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), relief request PMP-RR-1 (Revision1) is authorized for use for the third 10-year interval inservice testing program on the basis that the imposition of Code requirements would result in a hardship without a compensating increase in the level of quality and safety.

Principal Contributor: Y. S. Huang

Date: October 26, 2001