September 17, 2001

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, Second Floor
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 2 - AUTHORIZATION OF ALTERNATIVE REGARDING EXCESS FLOW CHECK VALVE TESTING FREQUENCY (TAC NO. MB1491)

Dear Mr. Mueller:

Title 10 of the *Code of Federal Regulations*, 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. For Nine Mile Point Nuclear Station, Unit No. 2 (NMP2), the applicable edition of Section XI of the ASME Code for the second 10-year IST interval is the 1989 Edition. By letter dated March 27, 2001, Niagara Mohawk Power Corporation (NMPC) submitted a valve relief request, GVRR-8, for NMP2. NMPC requests relief for excess flow check valves (EFCVs) from ASME Code inservice tests that are required to be performed every refueling outage, and from the bienniel requirement to verify that the valve position is accurately indicated.

The NRC staff reviewed the March 27, 2001, submittal and finds the proposed relief request GVRR-8, regarding relaxation of EFCV test frequency by allowing a representative sample to be tested every 24 months with all EFCVs being tested at least once every 10 years, to be acceptable. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), relief request GVRR-8 is authorized for use for the duration of the term of the current operating license on the basis that the proposed alternative provides an acceptable level of quality and safety. Details are set forth in the enclosed safety evaluation. Please contact me if you have any questions.

Sincerely,

/RA/

Peter Tam, Acting Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-410

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-410

NIAGARA MOHAWK POWER CORPORATION

RELIEF REQUEST FOR EXCESS FLOW CHECK VALVE TESTING FREQUENCY

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations*, 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 second 10-year interval IST program at Nine Mile Point Nuclear Station, Unit No. 2 (NMP2). Subsection IWV of the 1989 Edition, which gives the requirements for IST of valves, references Part 10 of the American National Standards Institute (ANSI)/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 ANSI/ASME 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 March 27, 2001, Niagara Mohawk Power Corporation (NMPC) submitted a valve relief request, GVRR-8, for NMP2. NMPC requests relief for excess flow check valves (EFCVs) from ASME Code inservice tests that are required to be performed every refueling outage, and

from the bienniel requirement to verify that the valve position is accurately indicated. The NRC staff has completed its review of the relief request and is providing the following evaluation.

2.0 VALVE RELIEF REQUEST GVRR-8

The licensee requests relief for the following EFCVs from the ASME Code inservice tests that are required to be performed every refueling outage as specified in OM-10, Paragraph 4.3.2.2, and from the bienniel requirements (Paragraph 4.1 of OM-10) of verifying that the valve position is accurately indicated. The relief request allows that a representative sample of the affected EFCVs be tested each refueling cycle (approximately 24 months) such that each EFCV will be tested at least once every 10 years.

Excess Flow Check Valves Included in Relief Request GVRR-8

2CSH*EFV3	2ISC*EFV26	2ISC*EFV8	2RCS*EFV46B
2CSL*EFV1	2ISC*EFV27	2MSS*EFV1A	2RCS*EFV47A
2ICS*EFV1	2ISC*EFV28	2MSS*EFV1B	2RCS*EFV47B
2ICS*EFV2	2ISC*EFV29	2MSS*EFV1C	2RCS*EFV48A
2ICS*EFV3	2ISC*EFV3	2MSS*EFV1D	2RCS*EFV48B
2ICS*EFV4	2ISC*EFV30	2MSS*EFV2A	2RCS*EFV52A
2ICS*EFV5	2ISC*EFV31	2MSS*EFV2B	2RCS*EFV52B
2ISC*EFV1	2ISC*EFV32	2MSS*EFV2C	2RCS*EFV53A
2ISC*EFV10	2ISC*EFV33	2MSS*EFV2D	2RCS*EFV53B
2ISC*EFV11	2ISC*EFV34	2MSS*EFV3A	2RCS*EFV62A
2ISC*EFV13	2ISC*EFV35	2MSS*EFV3B	2RCS*EFV62B
2ISC*EFV14	2ISC*EFV36	2MSS*EFV3C	2RCS*EFV63A
2ISC*EFV15	2ISC*EFV37	2MSS*EFV3D	2RCS*EFV63B
2ISC*EFV17	2ISC*EFV38	2MSS*EFV4A	2RHS*EFV5
2ISC*EFV18	2ISC*EFV39	2MSS*EFV4B	2RHS*EFV6
2ISC*EFV2	2ISC*EFV4	2MSS*EFV4C	2RHS*EFV7
2ISC*EFV20	2ISC*EFV40	2MSS*EFV4D	2WCS*EFV221
2ISC*EFV21	2ISC*EFV41	2RCS*EFV44A	2WCS*EFV222
2ISC*EFV22	2ISC*EFV42	2RCS*EFV44B	2WCS*EFV223
2ISC*EFV23	2ISC*EFV5	2RCS*EFV45A	2WCS*EFV224
2ISC*EFV24	2ISC*EFV6	2RCS*EFV45B	2WCS*EFV300
2ISC*EFV25	2ISC*EFV7	2RCS*EFV46A	

2.1 Basis for Relief

The licensee states:

> Pursuant to 10 CFR 50.55a(a)(3)(i), authorization is requested to implement an alternative to the requirements of OM-10, paragraph 4.1 and 4.3.2.2(e), which specify that position indication of valves be verified at least once every two years; and full-stroke exercising of check valves be conducted during each refueling outage, respectively. The proposed alternative is to conduct exercising and valve position verification tests on a representative sample of reactor instrumentation line EFCVs in accordance with the proposed amendment for Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.3.9 submitted in letter NMP2L 1996 dated February 5, 2001. The representative

sample consists of an approximately equal number of EFCVs every refueling outage, such that each EFCV is tested at least once every 5 refueling cycles (nominally 10 years). In addition, the EFCVs in the sample are representative of the various plant configurations, models sizes, and operating environments. The proposed alternative testing is consistent with NRC-approved Technical Specification Task Force change TSTF-334, and GE Nuclear Energy topical report NEDO-32977-A dated June 2000.

An EFCV is basically a spring-loaded ball check valve with a notched disc. Since the system is normally in a static condition, the valve ball is held open by the spring. A sudden increase in flow (i.e., line break) will result in differential pressure across the valve disc, and result in forces that overcome the spring force and close the valve. The valve is designed to allow leakage past the seat in the closed position to equalize pressure across the valve when the excess flow condition is corrected, thus allowing the spring to reopen the valve.

The reactor instrumentation line EFCVs cannot be exercised closed during normal power operation since closing these valves would isolate instrumentation required for power operation. These valves are currently verified to close by testing performed during each refueling outage in accordance with TS [Technical Specifications] SR [Surveillance Requirement] 3.6.1.3.9. Functional testing of valve closure is accomplished by venting the instrument side of the valve while the process side is under pressure and observing the position indicator, and by verifying that the leakage rate slows. Following system restoration, the valve reopens and verification of open indication is performed. The test methods described above are identical for the proposed alternative testing.

EFCVs have been extremely reliable throughout the industry (reference GE Nuclear Energy topical report NEDO-32977-A, “Excess Flow Check Valve Testing Relaxation,” June 2000. At Nine Mile Point Unit 2 (NMP2), 602 as-found surveillance tests over a total aggregate time of 1075 valve years resulted in two as-found failures of EFCVs to close. Based on NMP2's experience to date, the calculated upper limit failure rate for these valves is 6.7E-07/hr. The failure rate demonstrates the high reliability of these valves and that NMP2's experience is comparable to that of 12 BWR [boiling-water reactor] plants upon which the topical report was based. The total plant release frequency for a random break of any of the 87 NMP2 reactor instrumentation lines and a concurrent failure of the line’s EFCV to close to isolate the break has been calculated in accordance with the method described in NEDO-32977-A. The increase in release frequency due to the relaxed frequency of EFCV testing is considered to be insignificant. In addition, the consequences of an unisolable rupture of a reactor instrumentation line have been previously evaluated in NMP2 Updated Safety Analysis Report (USAR) Section 15.6.2 without crediting the EFCV function. The calculated offsite exposures for this event are substantially below the guidelines of 10 CFR Part 100. Therefore, considering the historically high reliability of the EFCVs and their low risk significance and radiological consequences should they fail, the alternative testing of a representative sample, rather than each EFCV, during each refueling outage provides an acceptable level of quality and safety, in accordance with 10CFR50.55a(a)(3)(i).

2.2 Alternative Testing

The licencee states:

> EFCV reverse flow exercising and position indication verification will be conducted by testing a representative sample of reactor instrumentation line EFCVs in accordance with the proposed amendment for TS SR 3.6.1.3.9 submitted in letter NMP2L 1996 dated February 5, 2001. The representative sample consists of an approximately equal number of EFCVs every refueling outage, such that each EFCV is tested at least once every 5 refueling cycles (nominally 10 years).

2.3 Evaluation

EFCVs are installed on BWR instrument lines to limit the release of fluid in the event of an instrument line break. Examples of EFCV installations include reactor pressure vessel level and pressure instrumentation, main steam line flow instrumentation, recirculation pump suction pressure, and reactor core isolation cooling steam line flow instrumentation. EFCVs are not required to close in response to a containment isolation signal and are not required to operate under post loss-of-coolant accident (LOCA) conditions.

The NMP2 TS SR 3.6.1.3.9 requires the EFCVs to be tested for proper operation every 24 months. The NMP2 IST program has deferred the quarterly testing of these valves to refueling outages. The proposed relief request GVRR-8 revises the test frequency by allowing a "representative sample" of EFCVs to be tested every 24 months. The "representative sample" is based on approximately 20 percent of the EFCVs being tested each refueling outage such that each valve is tested at least once every 10 years. By application dated February 5, 2001, as supplemented by letter dated April 19, 2001, the licensee proposed to amend TS SR 3.6.1.3.9 in parallel with relief request GVRR-8.

The proposed alternative described in relief request GVRR-8 is identical to the TS amendment request for SR 3.6.1.3.9 cited in the above paragraph. The licensee's justification for the TS amendment and the relief request is based on General Electric Nuclear Energy (GE) Topical Report NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation" dated June 2000. The topical report provided: (1) an estimate of steam release frequency (into the reactor building) due to a break in an instrument line concurrent with an EFCV failure to close, and (2) an assessment of the radiological consequences of such a release. The staff reviewed the GE topical report and issued its evaluation on March 14, 2000. In its evaluation, the staff agreed that the test interval could be extended up to a maximum of 10 years. In conjunction with this finding, the staff noted that each licensee that adopts the relaxed test interval program for EFCVs must have a failure feedback mechanism and corrective action program to ensure that EFCV performance and reliability continues to be bounded by the topical report results. Also, each licensee is required to perform a plant-specific radiological dose assessment, EFCV failure analysis, and release frequency analysis to confirm that they are bounded by the generic analyses of the topical report.

In response to the application for amendment dated February 5, 2001, the NRC staff issued Amendment No. 96, dated July 12, 2001. In the accompanying safety evaluation, the staff found the proposed change to TS SR 3.6.1.3.9 acceptable on the basis that the licensee has a feedback program to account for potential changes in EFCV failure rates, that the operational

impact of an EFCV failing to close during rupture of an instrument line has been acceptably addressed by existing plant design, and that the radiological consequences of an EFCV failure are bounded by the licensee's previous analysis.

With respect to relief request GVRR-8, the staff also finds that the alternative testing in conjunction with the corrective action plan would provide a high degree of valve reliability and operability. Additionally, a flow-restricting orifice is installed upstream of each of the EFCVs to limit reactor water leakage in the event of rupture. The orifice would limit leakage to a level where the integrity and functional performance of secondary containment and associated safety systems are maintained. Therefore, the staff finds that the licensee's proposed alternative of testing the EFCVs on a sampling basis will continue to provide an acceptable level of quality and safety.

3.0 CONCLUSION

Based on the above evaluation, the staff finds the proposed relief request GVRR-8, regarding relaxation of EFCV test frequency by allowing a representative sample to be tested every 24 months with all EFCVs being tested at least once every 10 years, to be acceptable. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), relief request GVRR-8 is authorized for use for the duration of the term of the current operating license on the basis that the proposed alternative provides an acceptable level of quality and safety.

Principal Contributor: Y. S. Huang

Date: September 17, 2001

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