UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO INSERVICE TESTING PROGRAM RELIEF REQUESTS CTS-RR-2 AND VG-2

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

By letter dated November 5, 1990, Niagara Mohawk Power Corporation (the licensee) submitted Inservice Testing Relief Requests CTS-RR-2 and VG-2 for Nine Mile Point Nuclear Station Unit No. 1.

2. EVALUATION

2.1 Relief Request CTS-RR-2

The licensee requested relief from the check valve full-stroke exercising requirement of the American Society of Mechanical Engineers (ASME) Code, Section XI, paragraph IWV-3522, for containment spray pump discharge valves 80-05, 80-06, 80-25 and 80-26. The licensee proposed to conduct partial flow tests on an interim basis until modifications can be made to the system to permit access for disassembly or use of non-intrusive testing to demonstrate that the check valves will swing to a full open position under partial flow conditions.

2.1.1 Licensee Basis for Requesting Relief

These check valves are the pump discharge check valves. They are split body (flange) tilting disc check valves with the valve-to-pipe joint welded into the discharge line. These valves are tested quarterly during the surveillance test of the containment spray pump. The quarterly pump test flow path uses a downstream branch line that returns flow to the torus. The test flow rate is limited to approximately 2900 gpm (two loops achieve almost 3000 gpm due to the piping configuration of the cross connect header and the single test line to the torus). ASME Section XI requires forward flow opening be verified at full flow conditions.

Testing and subsequent analysis performed during late 1989 and early 1990 determined that an increase of flow rate from 3000 to 3300 gpm is necessary to assure adequate post-accident cooling of the suppression pool (torus) water at elevated lake temperatures (above 76°F). The normal operating system flow path is from the torus to the containment spray headers. This flow path is not available for inservice testing since spraying the drywell could damage equipment and require extensive cleanup and testing to be performed. Therefore, testing is conducted utilizing the test line at a flow rate of 2900 gpm versus the full flow rate of 3300 gpm.

Relief from the ASME Code, Section XI, requirement to perform full flow testing on these check valves is based on the following: 1) the manufacturer has indicated the valves will be fully open at a flow rate of 2200 GPM, and 2) near full flow rate is achieved during the quarterly tests of the containment spray pumps.

2.1.2 Alternate Testing

On an interim basis, the near full flow test (e.g., the quarterly tests of the containment spray pumps) will be used to satisfy the forward flow opening.

By the 1992 refueling outage, an alternate arrangement (e.g., a modification to permit access for disassembly and examination, non-intrusive examination techniques, etc.) will be implemented as the long-term solution for forward flow opening. A followup relief request, if required, will be submitted once an alternate arrangement has been implemented.

2.1.3 Relief Request GTS-RR-2 - Evaluation

These check valves are not equipped with removable bonnets, inspection ports, position indication devices, or other means to verify their full stroke capability. A flow rate of 2900 gpm (approximately 85% of required flow) can be established through these valves by pumping from the torus and returning the water back to the torus during quarterly pump testing. The licensee has indicated a system modification will be performed during the 1992 refueling outage. This modification will allow access to these check valves in order to perform disassembly and inspection, or to permit the use of non-intrusive testing to verify full check valve exercising with partial flow. The licensee has not specified the method to be utilized.

Significant system modifications would be needed to pass the required design-basis flow rate through these valves. Since the required system flow rate of 3300 gpm cannot be passed through these valves with the existing piping configuration, credit cannot be taken for a full-stroke exercise. Passing the minimum flow rate that should fully open the valve disk as indicated by the valve manufacturer is not a valid method of full-stroke exercising valves. The manufacturer's information is based on valves in good condition and does not apply to valves that might be degraded or fouled by foreign materials. If the flow rate achieved through the valve during quarterly testing opens the valve to the back stop or to the position needed to pass the required system flow rate of 3300 gpm, and this can be verified using non-intrusive techniques, such as ultrasonic, magnetic, or acoustic, this would constitute a full-stroke exercise of the valve. If this can be performed, the licensee should ensure that the techniques used are qualified using the guidance described in NRC Generic Letter (GL) 89-04, Position 1.

Disassembly and inspection on a sampling basis may be an acceptable method to assess valve condition when individual exercising of valves cannot be verified with system flow. However, the NRC staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to the exercising produced by fluid flow. This procedure has risks which make its

routine use as a substitute for testing unacceptable when some method of testing is possible. The NRC staff positions regarding valve disassembly and inspection are explained in detail in GL 89-04, Attachment 1, Item 2. The minutes from the public meetings on GL 89-04 regarding Item 2 further stipulate that a partial-stroke exercise test using flow is expected to be performed after disassembly and inspection is completed but before the valve is returned to service.

In order to satisfy the exercise requirement with full flow, the licensee would have to design and install a larger capacity containment spray test line. This requirement would be an excessive burden on the licensee because of the costs involved. Also, this type of system modification would likely decrease the reliability of the containment spray system. The licensee has proposed to use the partial flow test until alternate methods to verify check valve position can be examined. This current testing should adequately demonstrate operational readiness for an interim period of time because a large percentage of the design-basis flow is being passed through the check valves with the partial flow test.

2.1.4 Relief Request CTS-RR-2 - Conclusion

Based on the impracticality of full stroke exercising these valves with the existing piping configuration and test methods, the burden on the licensee if the Code requirements were imposed, and the acceptability of the licensee's proposed alternatives, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for an interim period of one year or until the next refueling outage, whichever is longer. During this interim period, the licensee should evaluate alternate methods to verify check valve full stroke capability. A relief request should be submitted once an alternate testing has been selected.

2.2 General Relief Request VG-2

The licensee requested relief from the trending requirements of ASME Code, Section XI, paragraph IWV-3427(b), for containment isolation valves designated LJ and LA and relief from the leak rate testing requirements of paragraphs IWV-3421 through 3425 as well as the trending requirements of paragraph IWV-3427(b) for pressure isolation valves designated LK. The licensee proposed testing containment isolation valves designated LJ in accordance with 10 CFR Part 50, Appendix J, in lieu of paragraphs IWV-3421 through 3425 and proposed testing pressure isolation valves designated LK in accordance with Nine Mile Point Unit 1 (NMP1) Technical Specification (TS) 3.2.7.1.

2.2.1 Licensee Basis for Requesting Relief

There are three types of leakage tests performed at NMP1. These tests are designated as either LA, LJ, or LK in the test requirement column of the Valve Tables. A description of each test is contained in the following paragraphs.

Containment isolation valves (CIVs) are required to be leakage rate tested in accordance with 10 CFR Part 50, Appendix J. These valves are designated as LJ valves in the test requirement column of the Valve Tables. The leakage rate requirement is based on a total allowable leakage rate for all valves instead of an individual valve leakage rate. Paragraph IWV-2200(a) defines Category A as "valves for which seat leakage is limited to a specific maximum amount in the closed position of fulfillment of their function." Although, leakage rates for containment isolation valves are not limited on an individual basis, they have been determined to be Category A valves. Since containment isolation valves are Category A, the leakage rate testing requirements of paragraph IWV-3420 must be satisfied. The leakage rate testing performed per Appendix J satisfies the intent of paragraphs IWV-3421 through 3425. However, it does not satisfy the individual valve leakage rate analysis and corrective actions specified in paragraphs IWV-3426 and IWV-3427, respectively. In order to prevent duplicate leakage testing of these valves, individual leakage rates will be obtained during Appendix J testing and the requirements of paragraphs IWV-3426 and 3427(a) will be applied via separate procedure.

The second type of leakage tests are valves that have primarily been included in the IST Program as a result of NMP1 10 CFR Part 50, Appendix J, testing commitments. These valves, which are designated as LA valves in the test requirement column of the Valve Tables, are containment isolation valves that are tested with water in accordance with paragraphs IWV-3421 through IWV-3427(a) rather than with air in accordance with 10 CFR Part 50, Appendix J.

The third type of leakage tests are pressure isolation valves. These valves are designated as LK valves in the test requirement column of the Valve Tables. They are leakage tested in accordance with NMP1 TS 3.2.7.1 rather than paragraph IWV-3420. This is permitted by GL 89-04, Position 4, which states that pressure isolation valve testing should be performed in accordance with plant TS and referenced as such in the IST Program.

As outlined in GL 89-04, Position 10, the usefulness of the paragraph IWV-3427 "Corrective Action" part (b) requirement does not justify the burden of compliance with this requirement for valves tested in accordance with 10 CFR Part 50, Appendix J (air leakage tests for CIVs). Relief is requested from the requirements of paragraph IWV-3427(b) for NMP1-LJ valves based on Position 10 of GL 89-04. Similarly, based on a review of NMP1 historical water leakage test results, the usefulness of paragraph IWV-3427(b) does not justify the burden of complying with this requirement for LA and LK valves.

2.2.2 Alternate Testing

The NMP1 leakage test program will be conducted as follows:

1. 10 CFR Part 50, Appendix J containment isolation valves (LJ).

LJ containment isolation valves will be leak rate tested in accordance with the 10 CFR Part 50, Appendix J, testing program. In addition, individual valve leakage rates will be obtained by test or analysis and the requirements of paragraphs IWV-3426 and 3427(a) will be applied via a separate procedure for those valves that are Appendix J, Type C, tested. The trending required by paragraph IWV-3427(b) will not be performed.

2. NMP1/NRC 10 CFR Part 50, Appendix J, commitments (LA).

LA containment isolation valves will be leak rate tested with water in accordance with ASME Code Section XI, paragraph IWV-3420. The trending required by paragraph IWV-3427(b) will not be performed.

3. Pressure Isolation Valves (LK).

LK pressure isolation valves will be leak rate tested and will have corrective action taken in accordance with NMP1 TS 3.2.7.1 versus paragraph IWV-3420. The trending required by paragraph IWV-3427(b) will not be performed.

2.2.3 Relief Request VG-2 for LJ Valves -- Evaluation

LJ Valves: The 10 CFR Part 50, Appendix J, Type C, leak rate testing requirements essentially meet the ASME Code, Section XI, leak rate requirements of paragraphs IWV-3421 through 3425 since the Appendix J requirements incorporate all of the major elements of these paragraphs. The licensee's proposal to comply with the leak test procedures and requirements identified in 10 CFR Part 50, Appendix J, for containment isolation valves in lieu of the requirements of Section XI, paragraphs IWV-3421 through 3425, provides an acceptable level of quality and safety. Further, the licensee will comply with the "Analysis of Leakage Rates" and "Corrective Action" requirements of paragraphs IWV-3426 and 3427(a). Industry experience has demonstrated that the corrective actions of paragraph IWV-3427(b) are not meaningful for containment isolation valves because valve leakage rates vary widely from test to test due primarily to the valves seating differently; therefore, variations in valve leakage rates may not be due to valve degradation and the Code criteria could require corrective actions on valves that are in good condition. Additionally, the licensee's proposal is in accordance with the NRC staff position as stated in GL 89-04, Position 10, which provides a reasonable alternative to the Code requirements.

2.2.4 Relief Request VG-2 for LJ Valves -- Conclusion

Based on the determination that the licensee's proposal provides an acceptable level of safety and is in accordance with GL 89-04, Position 10, relief is granted as requested per 10 CFR 50.55a(a)(3)(i).

2.2.5 Relief Request VG-2 for LA Valves - Evaluation

LA Valves: These containment isolation valves are torus suction check valves and are classified as Category A as defined by paragraph IWV-2200(a). The licensee has proposed testing these valves under paragraph IWV-3520 using water and has requested relief from the requirements of paragraph IWV-3427(b). In a telecon with the licensee on April 17, 1991, representatives of Niagara Mohawk Power Corporation explained that the leak rate acceptance criteria for these valves at NMP1 is ½ gpm per inch of pipe diameter up to 5 gpm. It was also explained that procedures require that if the tested valve leakage exceeds the acceptable criteria, the valve is repaired prior to being returned to service. No trending of leakage rates is performed.

The licensee's leakage criteria for these valves are judged by the NRC staff to be conservative due to the volume of the water in the torus and the plant's capabilities to makeup to the torus. Since repair of valves is performed whenever the acceptance criteria are exceeded, trending per paragraph IWV-3427(b) could result in unnecessary additional testing and is not considered essential.

2.2.6 Relief Request VG-2 for LA Valves - Conclusion

Based on the conclusion that the licensee's alternative testing requirements provide an acceptable level of quality and safety, relief is granted pursuant to 10 CFR 50.55a(a)(3)(i).

2.2.7 Relief Request VG-2 for LK Valves - Evaluation

LK Valves: Paragraph IWV-3427(b) requires that if the valve leakage rate trending shows the valve will exceed the 5 gpm leakage rate limit on the next test, the valve shall be replaced or repaired. Also, if the leakage rate test results reduce the margin between the previously measured leakage and the limiting leakage rate by 50%, the testing frequency shall be doubled. The licensee's proposal to use its plant TS results in testing virtually identical to the requirements of paragraph IWV-3527(b). The only exception is the licensee's TS exclude leakage rates below 1.0 gpm from trending.

2.2.8 Relief Request VG-2 for LK Valves - Conclusion

Based on the conclusion that the licensee's alternative testing is almost the same as the Code requirements and provides an acceptable level of safety, relief is granted pursuant to 10 CFR 50.55a(a)(3)(i).

3.0 CONCLUSION

Based on the review summarized herein, the staff concludes that the relief granted and the alternative examinations imposed through this document provide reasonable assurance that the acceptable level of quality and safety intended by the ASME Code will be satisfied. The staff has determined that pursuant to 10 CFR 50.55a(a)(3)(i) and 10 CFR 50.55a(g)(6)(i) granting relief where the inspection requirements are impractical is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest considering the burden that could result if the ASME Code requirements were imposed on the facility.

Principal Contributor:
J. Colaccino

Date: May 30, 1991

The staff has also concluded that the burdens placed on NMPC by the trending and leak test requirements for containment isolation valves designated LJ and LA and for pressure isolation valves designated LK are unwarranted. NMPC has proposed an alternate testing program which provides an acceptable level of quality and safety for these valves. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), Relief Request VG-2 is granted.

For the relief that is being granted the staff has determined that the Code requirements are impractical and that the relief requests are authorized by law and will not endanger life, property or the common defense and security and are otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The request for relief complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission has made appropriate findings as required by the Act and the Commission's results and regulations in 10 CFR Chapter 1. Accordingly, relief from certain provisions of Section XI of the ASME Boiler and Pressure Vessel Code and the applicable addenda is hereby granted, as described in the enclosed Safety Evaluation.

This completes our efforts in response to your submittal as listed above and its associated TAC No. 79447.

Sincerely,
Orginal signed by:
Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation of Relief Request

cc w/enclosure:
See next page

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