ENCLOSURE

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION UNIT NO. 1

DOCKET NO. 50-220

1.0 INTRODUCTION

The NRC staff issued a Safety Evaluation (SE) for the Nine Mile Point Unit 1 Inservice Testing (IST) program for pumps and valves on March 7, 1991. The Technical Evaluation Report (TER) enclosed in the SE contained ten action items which the licensee was advised to address within a specific time period. The licensee responded to all the action items in the TER with a response dated October 8, 1991. This submittal contained revisions to relief requests CS-RR-1, CTS-RR-2, MS-RR-1, and CTS-RR-1, which were the subject of certain action items in the TER. Relief request CTS-RR-1 was subsequently withdrawn by the licensee in a letter dated May 11, 1992. Relief request EDGCW-RR-1 was submitted by the licensee in a letter dated May 26, 1992. The licensee provided additional information relative to relief requests CTS-RR-2, CS-RR-1, and EDGCW-RR-1 in a letter dated July 21, 1992.

The NRC staff's evaluation of the licensee's responses to the action items and the additional relief request, EDGCW-RR-1, is provided below.

2.0 EVALUATION

2.1 Technical Evaluation Report Items

Item 1:

In TER Section 2.1.1.1 on relief request PG-1, the NRC staff granted relief from the Section XI pump vibration requirements for all pumps in the licensee's IST program, provided the licensee complies with all the vibration criteria of ASME/ANSI OMa-1988, Part 6 (OM-6). The licensee stated in the October 8, 1991, submittal, that vibration testing of pumps is performed in accordance with OM-6 requirements and the relief request would be revised to reflect this in the next IST program revision. No further action on this item is required.

Item 2:

The licensee was granted relief from measuring inlet pressure during testing in relief request PG-2, from measuring inlet pressure prior to starting pump testing in relief request PG-3, and from measuring flow rate in relief requests PR-2 and PR-6, provided the proposed alternate testing methods meet

the accuracy requirements of Table IWP-4110-1. The licensee's responses to the SE and the staff's evaluations of each relief request are presented below.

Relief Request PG-2 (TER Section 2.1.2.1): This relief request covers the following pumps: emergency service water, reactor building closed loop cooling water (RBCLC), core spray, emergency diesel generator cooling water, containment spray, and containment spray raw water pumps. The licensee was granted relief from the requirements of Table IWP-3100-1 to measure inlet pressure provided the determination of inlet pressure meets the accuracy requirements of Table IWP-4110-1.

The licensee indicated in its October 8, 1991, submittal that level instrumentation used to calculate fluid level above the pump suction meets the accuracy requirements of Table IWP-4110-1. The licensee also stated that the RBCLC pumps had been modified to allow temporary installation of inlet pressure gauges to allow direct measurement of pump inlet pressure. Therefore, this pump will be deleted from the relief request at the next program revision. No further action on this relief request is required.

Relief Request PG-3 (TER Section 2.1.2.2): This relief request covers the following pumps: emergency service water, RBCLC, core spray, core spray topping, emergency diesel generator cooling water, emergency diesel generator fuel oil transfer (EDGFOT), spent fuel pool cooling (SFPC), condensate transfer, containment spray, and containment spray raw water pumps. The licensee was granted relief from the requirements of Table IWP-3100-1 to measure inlet pressure before startup for pump testing provided the determination of inlet pressure meets the accuracy requirements of Table IWP-4110-1.

The licensee indicated in its October 8, 1991, submittal that level instrumentation used to calculate fluid level above the pump suction meets the accuracy requirements of Table IWP-4110-1. The licensee also stated that the RBCLC and SFPC pumps had been modified whereby pressure gauges have been installed to allow direct measurement of pump inlet pressure before pump startup and during the testing. Therefore, these pumps will be deleted from the relief request at the next program revision.

The licensee identified the EDGFOT pumps as non-ASME class components at NMP1 and stated that they will be deleted from this relief request. For non-ASME components, the Commission regulations do not require a relief request to be submitted to the NRC staff when provisions of the Code cannot be meet. However, the component should reside in a licensee-developed IST program and documentation that provides assurance of continued operational readiness of the non-Code component should be available at the plant site for review by NRC inspectors. No further action on this relief request is required.

Relief Request PR-2 (TER Section 2.3.1.1): This relief request involves flow rate measurement of the liquid poison pumps. The licensee was granted relief from the requirements of Table IWP-3100-1 provided that the flow rate calculation meets the accuracy requirements of IWP-4110-1. The licensee

stated in its October 8, 1991, submittal, that the testing method accuracy does comply with Table IWP-4110-1 and this will be noted in their IST program at the next revision. No further action on this relief request is required.

Relief Request PR-6 (TER Section 2.5.1.1): This relief request involves flow rate, inlet pressure, and differential pressure measurement of the EDGFOT pumps. The licensee was granted relief from the requirements of IWP-3100 provided the calculated flow rate meets the accuracy requirements of Table IWP-4110-1. The licensee stated in its October 8, 1991, submittal that the method used to determine flow rate does not meet the accuracy requirements of Table IWP-4110-1. The EDGFOT pumps are non-ASME Code class components at NMP1. The licensee withdrew this relief request and stated that relief requests EDGAS-RR-1, EDGFO-RR-1, and IA-RR-1 would also be withdrawn because they were associated with non-ASME Code class components. Applicable table notes will be incorporated into the IST program at the next revision.

For non-ASME components, the Commission regulations do not require a relief request to be submitted to the NRC staff when provisions of the Code cannot be met. However, the NRC staff in Generic Letter 89-04, Position 11, recommended that non-Code pumps and valves reside in a licensee-developed testing program and documentation be available that addresses the adequacy of the testing for demonstrating that these components will perform satisfactorily in service. For reasons stated above, no further action on this relief request is required.

Item 3:

Relief request VG-4, addressed in TER Section 3.1.4.1, covers all power operated valves except those designated as rapid acting valves. In this relief request, the licensee proposed to base corrective actions for these valves upon variations between measured and reference stroke times instead of comparing measured stroke times to the previous stroke time measurement. Relief was granted from the test method requirements of IWV-3417(a) provided the licensee applies the acceptance criteria of IWV-3417(a) for determining acceptability of test results. The licensee stated in their October 8, 1991, submittal, that its testing is evaluated in accordance with IWV-3417(a). No further action on this relief request is required.

Item 4:

Relief request MS-RR-1, addressed in TER Section 3.2.1.1, involves the automatic depressurization system (ADS) valves. Relief was granted from the Code test frequency requirements. Relief was granted on an interim basis from the Code stroke-timing requirements for the licensee to determine a method to monitor the ADS valves for degrading conditions. (Note: IWV-3522 was incorrectly listed in the TER and Table 1 of the March 7, 1991, SE. Additionally, Table 1 of the March 7, 1991, SE should have indicated that relief from the test frequency requirements was granted per 10 CFR 50.55a(a)(3)(i) - see TER Paragraph 3.2.1.1.2). The licensee submitted a

revised relief request with its October 8, 1991, submittal which provides for assessment of valve condition. This relief request is evaluated below:

Relief Request MS-RR-1: The licensee has requested relief from the exercising frequency and stroke time measurement requirements of Section XI, IWV-3411, IWV-3412, and IWV-3413, and from the position indication verification requirements of IWV-3300 for the ADS valves NR108A through NR108F. The licensee is proposing to perform testing and maintenance activities to verify the condition and functioning of the valve every refueling outage.

Licensee's Basis for Requesting Relief: Opening the ADS valves during power operation causes a discharge of steam into the torus. If the valves failed to reclose after testing, the plant would be placed in a loss-of-coolant transient condition. In addition, a recent study (BWR Owners Group Evaluation of NUREG-0737, Item II.K.3.16, Reductions of Challenges and Failures of Relief Valves) recommends that the number of ADS valve openings be reduced as much as possible. Based on this study and the potential for causing a loss-of-coolant transient condition, exercise testing of the ADS valves will be performed on a refuel cycle. Concerning valve stroke timing during exercising, the position indication in the Control Room only indicates ADS Relief Valve pilot position; there is no direct means for detecting the actual position of the valve disk. Actuation of a relief valve is verified by acoustic monitoring of the ERV line discharge to torus. Measuring the time from the initiation signal for the valve and the acoustic monitoring detection provides no meaningful data for predicting valve degradation.

Alternate Testing: In order to assess and ensure the valve's operational readiness, the following test methods and preventive maintenance activities are performed once per refueling outage:

- Pressure switches that actuate the ADS (electromagnetic relief valves) are relief set point tested.
- All ADS valves are exercised with steam above 900 psig operating pressure.
- All ADS pilot valves are refurbished.
- 50% of the ADS valves are refurbished.
- Remote position indication verifications are performed on all ADS pilot valves.

Evaluation: The NRC SE issued March 7, 1991, determined that the licensee's proposed test frequency provides an acceptable alternative to the Code test frequency requirements, and relief was granted (reference Paragraph 3.2.1.1.2 of the TER attached to the SE). Interim relief was granted from the Code requirements for stroke timing of power operated valves. The licensee was to evaluate alternate methods of assessing the operational readiness of these valves. In the revised relief request, the licensee proposes to implement a

disassembly, inspection, and overhaul of 50% of the ADS valves and 100% of the ADS pilot valves each refueling outage in addition to the set point testing and exercising. This revision addresses the request to determine either a method for stroke timing the ADS valves or otherwise assessing the condition of the valves for degradation. However, for relief to be granted it will be necessary that the licensee include a provision in the refurbishment procedure(s) which establishes a threshold of degrading conditions that require inspection and refurbishment of the remaining 50% of the ADS valves if the condition could affect all of the valves. This will ensure that a condition which is causing accelerated degradation of the valves due to operational conditions will be addressed for all the valves upon identification of the condition in any of the valves. Additionally, the licensee is to ensure the valves change position during exercising with steam by using the acoustic monitors installed in the discharge lines.

The licensee has stated that the position indication in the control room only indicates ADS pilot valve position, and that the position indicators for these valves are verified once per refueling outage. It does not appear that relief from the requirements of IWV-3300 is necessary. If the licensee has information that indicates otherwise, a revised relief request should be submitted specifically addressing position indication requirements.

Though maintenance activities are not equivalent to testing in accordance with Code requirements, the proposed method will provide an acceptable level of quality and safety in assessing the operational readiness of these valves and addresses the concerns regarding the inability to stroke time these valves. If the Code requirements were imposed, the licensee would be required to modify the design to include some type of position indicator on each of the ADS valves, which would be burdensome. Relief is, therefore, granted in accordance with 10 CFR 50.55a(a)(3)(i) provided the licensee establishes controls for inspection and refurbishment of all the ADS valves in the event degradation in the 50% inspected and refurbished each refueling outage indicates a condition which could affect the remaining valves, and verifies change of disc position during exercising with steam by use of the acoustic monitors in the discharge lines.

Item 5:

This item involves relief requests: CS-RR-3, CS-RR-1, CS-RR-2, EC-RR-1, CTS-RR-3, CTS-RR-1, and RBCLCW-RR-1. The licensee had requested relief from check valve test frequency and method requirements. The licensee's responses and staff evaluations are discussed below for each relief request.

Relief Request CS-RR-3 (TER Section 3.4.1.1): This relief request covers check valves 93-58 and 93-64 which are located in the inter-tie between the core spray and containment spray raw water systems. The licensee was granted relief from the requirements of IWV-3521 and IWV-3522 provided the licensee performs the check valve inspection in accordance with Generic Letter (GL) 89-04, Position 2, for these valves. The licensee reviewed alternate testing methods for these valves and developed a method to perform the Code-required

testing on a quarterly frequency. Therefore, the licensee withdrew relief request CS-RR-3. No further action on this item is required.

Relief Request CS-RR-1 (TER Section 3.4.2.1): This relief request has been revised by the licensee and is presented below:

Relief Request CS-RR-1: The licensee has requested relief from the exercise procedure requirements of Section XI, IWV-3522, for the core spray inlet check valves 40-03 and 40-13 and the core spray topping pump discharge check valves 81-07, 81-08, 81-27, and 81-28. The licensee is proposing to partial-stroke exercise these valves quarterly with flow, full-stroke exercise valves 40-03, 40-13, 81-08, and 81-28 every refueling outage, and verify full-stroke opening in the forward direction of valves 81-07 and 81-27 by utilization of non-intrusive test methods every refueling outage.

Licensee's Basis for Requesting Relief: These valves are tested quarterly during surveillance tests of the core spray system pumps. The valves have no provision for determining disk position. The required system flow rate is 4152 gpm. In order to minimize system vibration, the test flow rate is limited to approximately 2900 gpm by the size of the test line. From manufacturer's published information, valves 40-03 and 40-13 should be fully open at about 1600 gpm. Valves 81-07, 81-08, 81-27, and 81-28 should be fully open at a flow rate of 2200 gpm. In addition, pressure readings are recorded during the test and compared to acceptance limits of subsection IWP. Full-flow testing during cold shutdowns is impractical due to the need for temporary piping alterations.

Valves 81-07 and 81-27 cannot be supplied with condensate water to permit full-flow testing through the main core spray injection piping. This was the basis for proposing disassembly and inspection on a rotational basis beginning with the 1992 refueling outage after modifications were performed to allow disassembly and inspection. As recommended in the NRC staff's SE dated March 7, 1991, non-intrusive testing has been considered for these valves. Based on the manufacturer's estimation that the valves should be full open at 2200 gpm, non-intrusive testing is an acceptable alternative to disassembly and inspection. Non-intrusive testing is actually more desirable since it would avoid the need to perform modifications starting in the 1993 refueling outage. In addition, as evidenced in the NRC staff's SE dated March 7, 1991, the NRC staff does not endorse disassembly and inspection unless it can be demonstrated that no other alternative exists.

The frequency of performing non-intrusive testing is recommended to be once per refueling outage (every 2 years) for each valve. The justification for this is as follows:

- It is expected that considerable equipment setup time will be required (temporary modification to install transducers) as well as extending the duration of the test to acquire the necessary data.

- Non-intrusive testing is expected to provide additional information about a check valve's overall condition above that obtained through normal full-forward-flow testing. This will provide an added measure of the operational readiness of these valves.

- Quarterly partial-stroke testing is performed at substantial flow (2900 gpm) and is expected to exercise the valve disk to the full-open position based on manufacturer's information. This testing, when combined with the quarterly reverse-flow test and non-intrusive test every refueling outage (2 years), should provide reasonable assurance that the valves are operating properly.

Alternate Testing:

A. As described above, all valves are partially exercised quarterly with 2900 gpm flow.

B. Full-flow testing to the reactor vessel for check valves 40-03, 40-13, 81-08, and 81-28 is performed once per refueling outage (2 years).

C. Non-intrusive testing once per refueling (2 years) for check valves 81-07 and 81-27 will be performed starting in the 1993 refueling outage.

Evaluation: The core spray system is one of the emergency core cooling systems designed to provide coolant to the primary system in the event of a LOCA. The core spray system is a low pressure system designed to cool the reactor core by direct impingement of high-density spray following depressurization of the primary system. The core spray system does not operate under normal conditions, but is automatically actuated in the event of a LOCA. The core spray system consists of two redundant trains which are directly connected to the reactor vessel at two separate nozzles.

The Code requires the core spray inlet check valves and the topping pump discharge check valves to be full-stroke exercised quarterly to verify that the check valves move to their full-open position. Currently, the valves are part-stroke exercised with flow quarterly. The test flow rate is approximately 2900 gpm, compared with the required system flow rate of 4152 gpm. Test flow-rates greater than 2900 gpm quarterly are impractical because of the size of the test line. Full-flow testing during cold shutdowns is impractical because of the need to erect temporary piping alterations. Requiring the licensee to full flow test these valves would be a burden because of the design, fabrication, and installation changes that would have to be made.

The licensee has proposed to continue to part-stroke these valves quarterly. During refueling outages, the licensee will full-stroke the core spray inlet

check valves, 40-03 and 40-13, and the core spray topping pump discharge check valves, 81-08 and 81-28, by lining up the system to take flow from the condensate storage tanks and inject flow directly into the reactor vessel. The proposed alternate method of testing for these valves provides adequate assurance of operational readiness because the valves are partial-flow tested quarterly with 70% of the design flow, which verifies the functioning of the valve, and full-flow tested at refueling outages.

The proposed testing for the core spray inlet check valves, 40-03 and 40-13, and the core spray topping pump discharge check valves, 81-08 and 81-28, provides adequate assurance of operational readiness. Based on the determination that the Section XI, IWV-3522 requirements are impractical for the subject valves, relief is granted, pursuant to 10 CFR 50.55a(g)(6)(i), as requested.

For the core spray topping pump discharge check valves, 81-07 and 81-27, their only source of water is from the torus. Injection of low quality water from the torus to the reactor vessel is impractical because of water chemistry considerations in the reactor vessel. The licensee has proposed to use non-intrusive test methods on a refueling outage frequency to verify that these two valves fully open at a partial design flow rate.

Verification of full-stroke exercising by non-intrusive test methods meets the intent of ASME Section XI, Paragraph IWV-3522. The licensee has proposed to utilize this testing method for check valves 81-07 and 81-27, for which full-flow testing at any frequency is impractical. In a letter dated July 21, 1992, the licensee outlined the following hardships associated with performing non-intrusive testing at a quarterly frequency on these particular check valves at Nine Mile Point Unit 1:

1. Niagara Mohawk has estimated that approximately 25 man-hours would be required to perform non-intrusive testing on each check valve (based on experience to-date using the non-intrusive test equipment).

2. In order to accurately verify full-stroke exercising of the check valve disk, the licensee is required to start and stop the associated pump several times for each valve. Starting and stopping the pump could result in damage to the pump.

3. Due to the cost, Niagara Mohawk has purchased only one (1) non-intrusive testing apparatus for use at both Nine Mile Point Unit 1 and Nine Mile Point Unit 2. If quarterly testing was required and the test apparatus failed, meeting the test frequency would be difficult.

The proposed alternate method of testing provides adequate assurance of the operational readiness of check valves 81-07 and 81-27 with the quarterly partial-flow testing delivering approximately 70% of the design flow through the check valves. Additionally, the use of non-intrusive testing every

refueling outage to verify the full-open position of the disk meets the Code requirements, though at an extended test interval. Requiring the licensee to perform non-intrusive testing quarterly would be a hardship based on the time involved to perform the testing, potential damage to the associated pumps due to frequent starting and stopping, and the potential unavailability of non-intrusive test equipment unless an additional apparatus is purchased.

Based on the determination that compliance with the Code requirements for the core spray topping pump discharge check valves, 81-07 and 81-27, would result in a hardship without a compensating increase in safety, and that the proposed alternate testing provides adequate assurance of operational readiness of the valves, relief from the Code test frequency and exercise procedure requirements is granted, pursuant to 10 CFR 50.55a(a)(3)(ii), as requested.

Relief Request CS-RR-2 (TER Section 3.4.2.2): This relief request covers the core spray topping pump header drain line valves, CS-C-3 (loop #121 & #122) and CS-C-3 (loop #111 & #112). The licensee was granted relief from the requirements of IWV-3521 and IWV-3522 provided the licensee performed the check valve inspection in accordance with GL 89-04, Position 2, for these valves. The licensee examined other techniques for testing these valves but determined that there were no methods available to meet the Code requirements. Therefore, the licensee will revise their IST program to reflect disassembly and inspection of the valves according to GL 89-04, Position 2. No further action on this relief request is required.

Relief Request EC-RR-1 (TER Section 3.5.1.1): This relief request covers the emergency cooling water header to recirculation loop check valves 39-03 and 39-04. The licensee was granted relief from the requirements of IWV-3521 and IWV-3522 provided the licensee performed the check valve inspection in accordance with GL 89-04, Position 2, for these valves. The licensee stated they will revise their IST program to reflect disassembly and inspection of the valves according to GL 89-04, Position 2. No further action on this relief request is required.

Relief Request CTS-RR-3 (TER Section 3.6.1.1): This relief request covers check valves 93-60 and 93-62 which are located in the inter-tie between the containment spray and the containment spray raw water systems. The licensee was granted relief from the requirements of IWV-3521 and IWV-3522 provided the licensee performed the check valve inspection in accordance with GL 89-04, Position 2, for these valves. The licensee reviewed alternate testing methods and developed a method which complies with ASME Section XI requirements for quarterly-forward and reverse-flow testing. Therefore, the licensee withdrew relief request CTS-RR-3. No further action on this relief request is required.

Relief Request CTS-RR-1 (TER Section 3.6.2.1): This relief request covers the following check valves in the containment spray system: 80-17 thru -19, 80-37 thru -39, and 80-65 thru -68. Relief was granted from the requirements of IWV-3521 and IWV-3522 provided the licensee performed the check valve inspection in accordance with GL 89-04, Position 2, for these valves. The

licensee submitted a revised relief request stating that the disassembly and inspection program described in GL 89-04, Position 2, could not be implemented for these valves because they were welded in place and no removable valve bonnet or inspection cover existed on any of the valves. A subsequent investigation by the licensee, documented in a submittal dated May 11, 1992, determined that access could be gained to one of the four 12-inch check valves to conduct a visual inspection and a manual exercising of the valve disk. In addition, one of the six 3-inch check valves will be disassembled and inspected in accordance with GL 89-04, Position 2.

In the May 11, 1992, submittal, the licensee withdrew relief request CTS-RR-1 and stated that testing of these valves would be performed in accordance with GL 89-04, Position 2. The licensee designated the six 3-inch check valves a single group. GL 89-04, Position 2, states that expansion of the group size above four valves should only be considered in cases of extreme hardship. The staff considers this case one of extreme hardship, however, it is expected that the guidance of GL 89-04, Position 2, will be applied to all the valves listed in this relief request.

The licensee stated in relief request CTS-RR-1 that modifications to allow testing of all 10 valves would be performed during the 1995 refueling outage. This commitment was not included in the May 11, 1992, submittal. In addition, the licensee has not addressed if they intend to test the valves in accordance with the Code after the modifications have been completed. The licensee should evaluate the testing requirements for these valves and submit relief requests, if necessary, prior to the 1995 modifications of this system.

Relief Request RBCLCW-RR-1 (TER Section 3.9.1.1): This relief request covers check valves 70-MU-7 and 70-MU-257 which are located in the makeup lines to the reactor building closed-loop cooling water system. The licensee was granted relief from the requirements of IWV-3521 and IWV-3522 provided the licensee performed the check valve inspection in accordance with GL 89-04, Position 2, for valve 70-MU-7. Relief for valve 70-MU-257 was denied. The licensee reviewed alternate testing methods and developed a method which complies with ASME Section XI requirements for quarterly reverse-flow testing for both valves. Therefore, the licensee withdrew relief request RBCLCW-RR-1. No further action on this relief request is required.

Item 6:

This item has been evaluated under action item number 5, above.

Item 7:

This item involves the liquid poison pump discharge check valves, 42-19 and 42-20, identified in relief request LP-RR-3, which are addressed in TER Section 3.7.2.1. Interim relief was granted to conduct reverse-flow closure testing during refueling outages until system modifications could be completed during the next refueling outage which would allow these valves to be tested quarterly. The SE identified that these modifications would take place during

the 1991 outage. Due to extended plant down time, the 1991 refueling outage at Nine Mile Point Unit 1 did not take place and was rescheduled to early 1993. The licensee stated that the system modifications would be completed during the 1993 refueling outage and the relief request would be withdrawn at this time. Therefore, no further action on this item is required.

Item 8:

This item involves the containment spray pump discharge check valves which are addressed in TER Section 3.6.2.2. The licensee was granted relief and advised to investigate the use of non-intrusive test techniques to verify if the partial system flow rate fully opens the valve. A revised relief request was submitted by the licensee on November 5, 1990, because of an increase in the design system flow rate. The licensee was granted interim relief by the staff in a letter dated May 30, 1991, and the licensee was again advised to evaluate alternate methods to verify check valve full-stroke capability. The October 8, 1991, submittal contains the latest version of relief request CTS-RR-2 and is evaluated below:

Relief Request CTS-RR-2: The licensee has requested relief from the exercise procedure requirements of Section XI, IWV-3522, for the containment spray pump discharge check valves 80-05, 80-06, 80-25, and 80-26. The licensee is proposing to exercise the valves quarterly with a partial flow test and verify the valves move to their full open position with this flow by using non-intrusive testing every refueling outage.

Licensee's Basis for Requesting Relief: These valves are the pump discharge 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 pumps. The flow path during the quarterly test 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). From manufacturer's published information, it has been conservatively determined that these valves should be fully opened at a flow rate of about 2200 gpm.

Testing and subsequent analysis performed during late 1989 resulted in a change in the design flow rate from 3000 to 3600 gpm. The required system flow path is from the torus to the containment spray headers, which is not available for inservice testing (e.g., spraying the drywell could damage equipment and require extensive cleanup and testing to be performed).

The only two alternatives regarding the long-term solution for these valves are to either perform modifications to permit disassembly and inspection (currently welded in place) or to perform non-intrusive testing to confirm that the disk is full open at the test flow rate.

Based on the manufacturer's estimation that the valves should be full open at 2200 gpm, and that the test flow rate during quarterly testing is

approximately 2900 gpm, non-intrusive testing is an acceptable alternative to disassembly and inspection. Non-intrusive testing is actually more desirable since it would avoid the need to perform modifications starting in the 1993 refueling outage. In addition, as evidenced in the NRC staff's SE dated March 7, 1991, the NRC staff does not endorse disassembly and inspection unless it can be demonstrated that no other alternative exists.

Non-intrusive testing will, therefore, be selected as the long-term solution for these valves. The frequency of performing non-intrusive testing should be once per operating cycle (every two years) for each valve. The justification for this is as follows:

- It is expected that considerable equipment setup time will be required (temporary modification to install transducers) as well as extending the duration of the test to acquire the necessary data.

- Non-intrusive testing is expected to provide additional information about a check valve's overall condition above that obtained through normal full forward-flow testing. This will provide an added measure of the operational readiness of these valves.

- Quarterly partial-stroke testing is performed at substantial flow (2900 gpm) and is expected to exercise the valve disk to the full open position based on manufacturer's information. This testing, when combined with the non-intrusive test every refueling outage (2 years), should provide reasonable assurance that the valves are operating properly.

Alternate Testing:

A. As described above, all valves are partially exercised quarterly with 2900 gpm flow.

B. Non-intrusive testing will be performed once per refueling (2 years) for all check valves starting in the 1993 refueling outage.

Evaluation: The containment spray system is a mode of the residual heat removal (RHR) system which can be initiated to spray cooled suppression pool water into the drywell and/or suppression chamber atmospheres to control primary containment pressure. The containment spray mode of RHR does not operate under normal conditions, but is initiated by operator action if required during a LOCA. The containment spray mode of the RHR system consists of four trains, two of which spray cooled suppression pool water into the drywell and two others which spray cooled suppression pool water into both the drywell and the suppression pool chamber.

The Code requires the containment spray pump discharge check valves to be full-stroke exercised quarterly to verify that the check valves move to their full-open position. Currently, the valves are exercised with flow quarterly. The test flow rate is approximately 2900 gpm, compared with the required system flow rate of 3600 gpm. Test flow rates greater than 2900 gpm quarterly are impractical because of the size of the test line. Full-flow testing at any frequency is impractical because this will result in spraying the drywell which could damage equipment and require extensive cleanup and testing prior to returning the plant to service.

The licensee has proposed to continue to exercise the containment spray pump discharge check valves with flow quarterly. During refueling outages, the licensee has proposed to use non-intrusive test methods to verify that these valves fully open at the test flow rate.

Verification of full-stroke exercising by non-intrusive test methods meets the intent of ASME Section XI, Paragraph IWV-3522. The licensee has proposed to utilize this testing method for the containment spray pump discharge check valves in which full-flow testing at any frequency is impractical. In a letter dated July 21, 1992, the licensee outlined the following hardships associated with performing non-intrusive testing at a quarterly frequency on these particular check valves at Nine Mile Point, Unit 1:

1. Niagara Mohawk has estimated that approximately 25 man-hours would be required to perform non-intrusive testing on each check valve (based on experience to-date using the non-intrusive test equipment).

2. In order to accurately verify full-stroke exercising of the check valve disk, the licensee is required to start and stop the associated pump several times for each valve. Starting and stopping the pump could result in damage to the pump.

3. Due to the cost, Niagara Mohawk has purchased only one (1) non-intrusive testing apparatus for use at both Nine Mile Point Unit 1 and Nine Mile Point Unit 2. If quarterly testing was required and the test apparatus failed, meeting the test frequency would be difficult.

The proposed alternate method of testing provides adequate assurance of the operational readiness of the subject check valves with the quarterly partial-flow testing delivering approximately 80% of the revised design flow through the check valves. Additionally, the use of non-intrusive testing every refueling outage to verify the full-open position of the disk meets the Code requirements, though at an extended test interval. Requiring the licensee to perform non-intrusive testing quarterly would be a hardship based on the time involved to perform the testing, potential damage to the associated pumps due to frequent starting and stopping, and the potential unavailability of non-intrusive test equipment unless an additional apparatus is purchased.

Based on the determination that compliance with the Code requirements would result in a hardship without a compensating increase in safety, and that the proposed alternate testing provides adequate assurance of operational readiness of the valves, relief from the Code test frequency and exercise procedure requirements is granted, pursuant to 10 CFR 50.55a(a)(3)(ii), as requested.

Item 9:

This item involves valves 70-MU-7 and 70-257 in relief request RBCLCW-RR-1 which are addressed in TER Section 3.9.1.1. The licensee stated in their response to Item 5 that they were withdrawing relief request RBCLCW-RR-1 because a method had been developed which complied with ASME Section XI requirements for quarterly reverse-flow testing. Therefore, no further action on this item is required.

Item 10:

This item involves the emergency service water pump discharge check valves, 72-11 and 72-12, identified in relief request ESW-RR-1 and addressed in TER Section 3.10.1.1. Interim relief was granted to full-stroke exercise these valves with flow during refueling outages until system modifications could be completed during the next refueling outage which would allow these valves to be tested quarterly. The SE identified that these modifications would take place during the 1991 refueling outage. Due to an extended outage, the 1991 refueling outage at Nine Mile Point Unit 1 did not take place and was rescheduled to early 1993. The licensee stated that the system modifications would be completed during this refueling outage and the relief request would be withdrawn at this time. Therefore, no further action on this item is required.

2.2 RELIEF REQUEST EGDCW-RR-1

The licensee submitted this relief request in a letter dated May 26, 1992. Additional information for this relief request, which also applied to relief requests CTS-RR-2 and CS-RR-1, was submitted in a letter dated July 21, 1992. The relief request is evaluated below:

Relief Request EDGCW-RR-1

The licensee has requested relief from the test frequency and exercise procedure requirements of Section XI, Paragraphs IWV-3521 and IWV-3522, for the emergency diesel generator cooling water (EDGCW) pump discharge check valves, 79-59, 79-60, 79-61, and 79-62. The licensee is proposing to quarterly flow test the check valves at a partial flow rate and perform non-intrusive testing every refueling outage to verify full-stroke opening of the check valve disk.

Licensee's Basis for Requesting Relief

Based on an engineering evaluation and calculation, the required design flow of the EDGCW system has increased from 240 gpm to 296 gpm. Accordingly, the design flow rate of the pump discharge and heat exchanger discharge check valves has also increased. These valves are currently tested quarterly during the surveillance test of the diesel generator.

As indicated above, the design flow of the EDGCW system is 296 gpm. However, during normal plant operation, the EDGCW system flow is limited to approximately 250 gpm. Flow is limited due to the effect of service water system back pressure on the EDGCW system (Note - when the diesels are required to be operating, service water back pressure decreases allowing EDGCW system design flow to be reached). Therefore, using design flow to verify full-stroke opening during normal plant operation is not practical.

The only available method to verify full-stroke opening is to utilize a non-intrusive method. Non-intrusive testing requires considerable time for equipment set up as well as data acquisition. The frequency of performing non-intrusive testing is recommended to be once per refueling outage (every two years) for each valve.

Alternate Testing

A. Quarterly partial-flow testing is performed at substantial flow (approximately 250 gpm) and is expected to exercise the valve disk to the full open position. The quarterly partial-flow test combined with the reverse flow test should provide reasonable assurance that the valves are operating properly.

B. Non-intrusive testing is performed once per refueling (two years) at substantial flow (approximately 250 gpm) to verify full-stroke opening. The non-intrusive testing method is in compliance with the NRC staff position stipulated in GL 89-04, Position 1. Non-intrusive testing is expected to provide additional information about a check valve's overall condition above that obtained through flow testing. This testing will provide an added measure of the operational readiness of these valves.

Evaluation

The licensee has requested relief from the Code test frequency and exercise procedure requirements which require check valves to be exercised to the position required to fulfill their function once every 3 months in order to verify the functioning of the valve. The relief request is required because of an engineering evaluation and calculation which increased the system design flow rate from 240 gpm to 296 gpm. Based on the information provided, the licensee had previously been able to full-flow test these check valves quarterly prior to the revised flow rate required by engineering evaluation.

System limitations (service water backpressure) will prevent achieving full flow during testing of the check valves on a quarterly basis. The licensee is proposing to continue quarterly testing at a partial-flow rate of approximately 250 gpm and verify, by using non-intrusive testing techniques, that the disk moves to the full open position at this flow rate once every refueling outage.

In a letter dated July 21, 1992, the licensee outlined the following hardships associated with performing non-intrusive testing at a quarterly frequency on these particular check valves at Nine Mile Point, Unit 1:

1. Niagara Mohawk has estimated that approximately 25 man-hours would be required to perform non-intrusive testing on each check valve (based on experience to-date using the non-intrusive test equipment).

2. In order to accurately verify full-stroke exercising of the check valve disk, the licensee is required to start and stop the associated pump several times for each valve. Starting and stopping the pump could result in damage to the pump.

3. Due to the cost, Niagara Mohawk has purchased only one (1) non-intrusive testing apparatus for use at both Nine Mile Point Unit 1 and Nine Mile Point Unit 2. If quarterly testing was required and the test apparatus failed, meeting the test frequency would be difficult.

The proposed alternate method of testing provides adequate assurance of the operational readiness of the subject check valves with the quarterly partial-flow testing delivering approximately 85% of the revised design flow through the check valves. Additionally, the use of non-intrusive testing every refueling outage to verify the full-open position of the disk meets the Code requirements, though at an extended test interval. Requiring the licensee to perform non-intrusive testing quarterly would be a hardship based on the time involved to perform the testing, potential damage to the associated pumps due to frequent starting and stopping, and the potential unavailability of non-intrusive test equipment unless an additional apparatus is purchased.

Based on the determination that compliance with the Code requirements would result in a hardship without a compensating increase in safety, and that the proposed alternate testing provides adequate assurance of operational readiness of the valves, relief from the Code test frequency and exercise procedure requirements is granted, pursuant to 10 CFR 50.55a(a)(3)(ii), as requested.

3.0 CONCLUSION

Based on the review summarized herein, the staff concludes that the relief granted and the alternative testing imposed through this document provide reasonable assurance of the operational readiness of the valves to perform

their safety-related functions. The staff has determined that granting relief, pursuant to 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), and 10 CFR 50.55a(g)(6)(i), 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 requirements were imposed on the facility.

Principal Contributor:
J. Colaccino

Date: September 22, 1992

For the relief that is being granted, we have 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 requests for relief comply 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 rules 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 TAC Nos. M81833 and M83539.

This requirement affects one respondent and, therefore, is not subject to Office of Management and Budget review under P.L. 96-511.

Sincerely,
Original Signed By:
Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation

cc w/enclosure:
See next page

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