September 26, 2000

Mr. John H. Mueller
Chief Nuclear Officer
Niagara Mohawk Power Corporation
Nine Mile Point Nuclear Station
Operations Building, Second Floor
P.O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 - RESPONSE TO GENERIC LETTER 87-02 REGARDING SEISMIC QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT (TAC NO. M69461)

Dear Mr. Mueller:

On February 19, 1987, the NRC issued Generic Letter (GL) 87-02, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46." The GL encouraged licensees to participate in a generic program to resolve the seismic verification issues associated with USI A-46. As a result, the Seismic Qualification Utility Group (SQUG) developed the "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment," Revision 2 (GIP-2).

On May 22, 1992, the NRC issued Supplement 1 to GL 87-02, transmitting its supplemental Safety Evaluation Report No. 2 (SSER-2). Pursuant to the provisions of 10 CFR 50.54(f), all addressees were required to provide either (1) a commitment to use both the SQUG commitments and the implementation guidance described in GIP-2 as supplemented by SSER-2, or (2) an alternative method for responding to GL 87-02. The supplement also required those addressees committing to implement GIP-2 provide an implementation schedule as well as detailed information including the procedures and criteria used to generate the in-structure response spectra to be used for USI A-46.

By letters dated September 18, 1992, and January 22, 1993, Niagara Mohawk Power Corporation (NMPC), responded to Supplement 1 of GL 87-02. NMPC's response included a commitment to implement GIP-2, including the clarifications, interpretations, and exceptions in SSER-2, and a clarification and identification of procedures used in generation of the in-structure response spectra. The staff's evaluation of NMPC's response was issued in letters dated November 17, 1992, and March 24, 1993.

NMPC conducted the USI A-46 program and submitted a summary report on March 11, 1996. The staff reviewed the summary report and supplemental information, and concludes that NMPC's USI A-46 implementation program has, in general, met the purpose and intent of the criteria in the GIP-2, and the staff's SSER-2 for the resolution of USI A-46. The staff determined that NMPC's corrective actions and completed physical modifications for resolution of outliers will result in safety enhancements which, in certain aspects, are beyond the original licensing basis, and as a result, provide sufficient basis to close the USI A-46 review at the facility. The staff also concludes that its findings regarding NMPC's implementation of USI A-46 program do not warrant any further regulatory action under the provisions of 10 CFR 50.54(f). Details of the staff's review are delineated in the enclosed safety evaluation.

Sincerely,

/RA/

Peter S. Tam, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-220

Enclosure: Safety Evaluation on USI A-46 Implementation

cc w/encl: See next page

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*Memo of 6/29/00 was provided and no major changes were made.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO USI A-46 PROGRAM IMPLEMENTATION

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-220

1.0 BACKGROUND

On February 19, 1987, the NRC issued Generic Letter (GL) 87-02, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46." The GL encouraged licensees to participate in a generic program to resolve the seismic verification issues associated with USI A-46. As a result, the Seismic Qualification Utility Group (SQUG) developed the "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Plant Equipment," Revision 2 (GIP-2, Reference 1).

On May 22, 1992, the NRC issued Supplement 1 to GL 87-02, transmitting the staff's Supplemental Safety Evaluation Report No. 2 (SSER-2, Reference 2). Pursuant to the provisions of 10 CFR 50.54(f), all addressees were required to provide either (1) a commitment to use both the SQUG commitments and the implementation guidance described in GIP-2 as supplemented by the staff's SSER-2, or (2) an alternative method for responding to GL 87-02. The supplement also required those addressees committing to implement GIP-2 provide an implementation schedule as well as detailed information including the procedures and criteria used to generate the in-structure response spectra (IRS) to be used for USI A-46.

By letters dated September 18, 1992 (Reference 3) and January 22, 1993 (Reference 4), Niagara Mohawk Power Corporation (NMPC), the licensee of Nine Mile Point Unit 1 (NMP-1), responded to Supplement 1 of GL 87-02. The licensee's response included a commitment to implement GIP-2, including the clarifications, interpretations, and exceptions in SSER-2, and a clarification and identification of procedures used in generation of the in-structure response spectra. The staff's evaluation of NMPC's response was issued in letters dated November 17, 1992 (Reference 5), and March 24, 1993 (Reference 6).

NMPC conducted the USI A-46 program and submitted a summary report on March 11, 1996 (Reference 7). The staff reviewed the summary report and requested additional information (RAI) on June 5, 1997 (Reference 8). NMPC responded to the staff's RAI on July 31, 1997 (Reference 9). In a series of telephone calls between NRC staff and NMPC staff from July 1998 to May 2000, among the issues discussed, was NMPC's use of Method A.1 in its comparisons of seismic capacity to seismic demand. NMPC responded with References 11,12, 13, and 14 to document the unresolved questions and responses, and to provide information that is supplemental to their verbal responses.

The staff notes that in 1988 NMP-1 was selected as one of the pilot plants to use the earlier version of the SQUG GIP for the purpose of trial walkdown review and improvement of the SQUG GIP procedures (Reference 10).

This safety evaluation documents the staff's evaluation of NMPC's USI A-46 implementation program at NMP-1 based on the staff's review of NMPC's summary report (Reference 7), documentation provided by NMPC in response to the staff's RAI, and telephone discussions between the staff and NMPC representatives as stated above.

2.0 DISCUSSION AND EVALUATION

NMPC's summary report (Reference 7) provides its implementation results for the USI A-46 program at NMP-1. The report contains discussions about safe shutdown equipment identification, seismic screening verification and walkdown of mechanical and electrical equipment, seismic adequacy of tanks and heat exchangers, seismic adequacy of cable and conduit raceways, relay seismic functionality review, and outlier identification and resolutions.

2.1 Seismic Demand Determination (Ground Spectra and In-structure Response Spectra)

For the resolution of USI A-46 NMPC used seismic ground response spectra (GRS) developed for NMP-1 in 1984. These GRS are NUREG/CR-0098 spectra with 50th percentile amplification factors and a peak ground acceleration of 0.13g. NMPC stated in References 3 and 7 that the new GRS envelope the original licensing basis safe shutdown earthquake (SSE) GRS.

NMPC developed a set of IRS for the seismic adequacy verification of equipment located in the reactor building (RB) and turbine building (TB). The new IRS were developed using the new GRS as the seismic input at the foundation level of the RB and the TB. Soil-structure interaction was not considered for developing the IRS since the RB and TB are founded on bedrock. The method for developing IRS presented in Reference 3 was evaluated and approved, for use in the implementation of the USI A-46 program, by the staff and documented in Reference 6.

2.2 Seismic Evaluation Personnel

NMP-1 was the boiling water reactor (BWR) pilot plant for use of SQUG's GIP in a trial review. The reviews of the seismic adequacy of some mechanical and electrical equipment items on the NMP-1 Safe Shutdown Equipment List (SSEL) were originally conducted during the SQUG pilot plant walkdowns in February 1988 (Reference 10).

Seismic Review Teams (SRT) consisting of NMPC and other utility personnel and contractors performed the walkdowns. In April 1989, three of the Seismic Capability Engineers (SCE) involved in the pilot walkdown performed a supplementary walkdown.

In accordance with NMPC's commitment to use GIP-2 (Reference 1), it conducted walkdowns in 1993, 1994, and 1995. An SRT consisting of C. Agosta (NMPC) and W. Djordjevic (Stevenson & Associates), both of whom are SCEs and licensed professional engineers, conducted the majority of these "final" walkdowns. C. Agosta and C. Schlaseman (MPR Associates), who is also an SCE and licensed professional engineer, and C. Agosta and two

other NMPC SCE, A. Patwa and M. F. Alvi, both of whom are SCE and licensed professional engineers, performed additional “final” walkdowns.

Dr. Robert P. Kennedy of Structural Mechanics Consulting, Inc., serving as the Third-Party Auditor for the “final” walkdowns, conducted the audit in accordance with GIP-2. Dr. Kennedy was Chairman of the Senior Seismic Review and Advisory Panel (SSRAP), and he advised both nuclear power utilities and the U.S. NRC on issues relating to seismic ruggedness of existing nuclear power plants. He is a consultant on seismic evaluation and design for more than 50 nuclear facilities throughout the world.

The staff finds that NMPC’s seismic evaluation personnel qualifications meet the provisions of GIP-2 and the staff’s SSER-2, and are, therefore, acceptable for use in the resolution of USI A-46 at NMP-1.

2.3 Safe-Shutdown Path

GL 87-02 specifies that the licensee should be able to bring the plant to, and maintain it in a hot shutdown condition during the first 72 hours following an SSE. To meet this provision, in its submittal of March 11, 1996 (Reference 7), NMPC addressed the following plant safety functions: reactor reactivity control, pressure control, inventory control, and decay heat removal. It identified primary and alternate safe shutdown success paths with their support systems and instrumentation for each of these safety functions to ensure that the plant is capable of being brought to, and maintained in a hot shutdown condition for 72 hours following an SSE. Appendix C of Reference 7 provides the SSEL.

The reactor decay heat removal function is accomplished by relieving steam from the reactor via the electromatic relief valves (ERV) into the suppression pool. The reactor coolant system (RCS) inventory is controlled by injecting water into the reactor by the low-pressure core spray system which takes suction from the suppression pool. The decay heat removal is achieved by the containment spray system which takes suction from the suppression pool via a heat exchanger and returns back to the suppression pool through the main spray line or a bypass test line. The containment spray raw water (CSRW) system takes suction from the intake tunnel and provides the cooling water to the containment spray heat exchanger. The emergency cooling system is also available as an optional safe shutdown path.

The plant operations department reviewed the safe shutdown success paths and concluded that the plant operating procedures and operator training were adequate to establish and maintain the plant in a safe shutdown condition using the equipment identified in Appendix C of Reference 7.

The staff concludes that the approach to achieve and maintain safe shutdown for 72 hours following a seismic event is acceptable for the resolution of USI A-46 at NMP-1 since it meets the provisions of GIP-2.

2.4 Seismic Screening Verification and Walkdown of Mechanical and Electrical Equipment

NMPC conducted the reviews of the seismic adequacy of some mechanical and electrical equipment items on the NMP-1 SSEL during the original SQUG pilot plant walkdown in February 1988 and subsequent supplementary walkdowns in April 1989, using the earlier

version of the GIP. It performed further “final” walkdowns in accordance with NMPC’s commitment to use GIP-2 (Reference 1) in 1993, 1994, and1995. Signed Screening Verification Data Sheets (SVDS) for each SSEL equipment item are contained in Appendix D of the summary report (Reference 7).

2.4.1 Equipment Seismic Capacity Compared to Seismic Demand

GIP-2 provides five methods for comparing equipment seismic capacity to the seismic demand. Method A.1 compares the SQUG bounding spectrum (BS) to the SSE GRS. Method A.2 compares the generic equipment ruggedness spectrum (GERS) to 1.5 times 1.5 (i.e, 2.25) times the SSE GRS. Method B.1 compares 1.5 times the BS (reference spectrum) to the conservative design SSE IRS or to the realistic median-centered SSE IRS. Method B.2 compares the GERS to conservative design SSE IRS. Method B.3 compares the GERS to 1.5 times the median-centered SSE IRS. NMPC used Method A.1, Method B.1, Method B.3, and also compared the seismic design of equipment to the seismic demand as represented by the IRS. The criteria and limitations for use of Method A.1 are: the equipment should be mounted below about 40-feet above the effective plant grade, the equipment’s natural frequency should be greater than 8 Hz, and the amplification factor between the free-field GRS and the IRS will not be more than about 1.5. Method B may be used for equipment at any elevation and for equipment with any natural frequency.

During its review of the summary report (Reference 7) the staff found that NMPC had used Method A.1 for the comparison of seismic demand to seismic capacity at locations where the amplification factor between the free-field GRS and the IRS, at frequencies above 8 Hz are significantly more than the factor of 1.5 permitted by GIP-2. In a series of telephone calls between NRC staff and NMPC staff from July 1998 to May 2000, NMPC was asked to justify the use of Method A.1 at locations where the amplification factor between free-field GRS and the IRS is significantly more than the factor of 1.5 permitted by GIP-2. NMPC’s responses are contained in References 11,12, 13, and 14.

NMPC stated that the maximum amplification factors between the IRS and the GRS at NMP-1 for the locations where Method A.1 was used range from 1.25 to 5.91. Most values are higher than the 1.5 maximum amplification factor allowed for the use of Method A.1. NMPC states that these amplifications are reasonable considering the conservatisms involved in the design basis analyses. NMPC states that EQE International and SQUG have assembled generic information on the amplification factors calculated for five typical reinforced concrete nuclear plant structures at four plants using conservative response generation techniques as well as more median-centered response techniques and that the results of these studies were presented to the NRC in NMPC letter NMP1L 1454 (Reference 12). A reduction factor of 3.77 was estimated from these studies based on the average of the ratio of the conservative IRS to the more median-centered IRS for the five structures, which reflects the differences between median-centered and conservative response calculations. In Reference 14, Table 1 shows the reduced amplification factors for relevant NMP-1 elevations based on dividing the amplification factors by the 3.77 reduction factor.

NMPC states that the structures in which the components for which Method A.1 was used are typical nuclear power plant reinforced concrete structures and that no unusual or plant-specific situations were identified which would cause the amplification factors for these buildings to be greater than those in typical nuclear power plant structures. Therefore, NMPC used the value of

3.77 to estimate the amplification factor between the GRS and the IRS at locations where Method A.1 was used if median-centered IRS were developed for these structures at NMP-1. The resulting modified amplification factors range between a maximum of 1.57 and a minimum of 0.33. NMPC concluded that a realistic median-centered assessment for the seven subject elevations at NMP-1 would result in an amplification factor of about 1.5. The NRC staff has accepted similar assessments used in the resolution of USI A-46 at other plants. The staff concludes that the procedures used by NMPC to define seismic capacities and demands and to assure that seismic capacities of SSEL items are greater than their demands are consistent with the provisions of GIP-2 and therefore, adequate for the resolution of USI A-46 at NMP-1.

2.4.2 Assessment of Equipment "Caveats"

In order to apply the experience-based approach and to use the equipment item's seismic capacity as characterized in GIP-2, the plant-specific equipment must meet some restrictions or caveats described in GIP-2. GIP-2 also allows engineers to verify whether the plant equipment conditions satisfy the caveats specified for a particular equipment class by judging whether these conditions meet the "intent of the caveats" although they do not necessarily meet the exact wording of the caveats.

NMPC identified four items of equipment that meet the intent of caveats, but not the letter of the caveats. These are summarized in Table 5-2 of the summary report (Reference 7). Equipment items that did not meet the caveats were indicated in Column 13 of Appendix D (SVDS) of the summary report, and were included in the equipment outlier list presented in Table 5-3 of the summary report. The staff finds NMPC's approach for assessing the equipment "caveats," to be acceptable for use in the resolution of USI A-46 at NMP-1 since it meets the provisions of GIP-2.

2.4.3 Equipment Anchorage

NMPC checked the seismic adequacy of equipment anchorage during the walkdowns and documented the acceptability of equipment on the SVDS as shown in Appendix D of Reference 7.

NMPC states, in Reference 7, that the seismic adequacy of equipment anchorages was verified in accordance with GIP-2 guidelines. During the walkdowns, the SRT inspected the seismic adequacy of anchorage installations and their connections to the base of the equipment and determined the allowable capacity of anchorages used to secure the equipment. The inspection consisted of visual checks, measurements, review of plant documentation and drawings, and anchor bolt tightness and embedment checks for concrete expansion anchors.

The SRT identified, as outliers, anchorages that did not have enough capacity compared to the demand and anchorages that are not covered in the GIP-2 guidelines (i.e., cinch anchors). Table 5-3 of the summary report (Reference 7) contains the list of equipment anchorage outliers identified during the USI A-46 walkdowns at NMP-1.

Table 5-3 of the summary report (Reference 7) also contains the outlier resolutions. NMPC resolved the outlier issues by adding base anchorage and end braces, installing additional anchors, welding the equipment base to the embedded channel, performing detailed calculations and tightening anchor bolts. With respect to the calculations to resolve cinch

anchor outlier issues, NMPC used experimental testing data for determining the capacity of the anchors. NMPC provided justifications in Reference 11 for using the testing data for the calculations. The staff concluded that the use of the testing data is reasonable to meet the purpose and intent of GIP-2 for the resolution of the USI A-46 program at NMP-1.

Table 8-1 of the summary report (Reference 7) shows a list of unresolved outliers. NMPC had committed to resolve all of the outlier issues by the conclusion of the refueling outage in 1999 (i.e., RFO-15). In a letter dated August 18, 1999 (Reference 12) NMPC stated it had completed the resolution of GIP-2 outliers related to USI A-46 during RFO-15. The staff considers NMPC's actions acceptable for resolution of the equipment anchorage issues related to the USI A-46 program implementation at NMP-1 because they meet the provisions of GIP-2.

2.4.4 Seismic Spatial Interaction Evaluation

NMPC stated in the summary report that, during the equipment walkdowns, it made evaluations of potential seismic interaction, including the control room ceiling, in accordance with Section II.4.5 and Appendix D of GIP-2. NMPC had indicated that it performed the walkdowns considering the following concerns: (1) proximity effects, (2) structural failure and falling, (3) flexibility of attached lines and cables, and (4) any other possible interactions. In general, NMPC found that adjacent items are adequately spaced, and overhead items are adequately supported, to preclude impacts. However, it identified some seismic interaction concerns for specific equipment items, and classified them as outliers. Most of the outlier issues were related to: (1) the potential for fluorescent tubes falling and impacting cabinets containing essential relays and (2) seismic interactions with unanchored adjacent cabinets. NMPC resolved the outliers by installing additional restraints for the vulnerable equipment items.

The staff finds NMPC's seismic spatial interaction evaluation acceptable for the resolution of USI A-46 at NMP-1 because it meets GIP-2 provisions.

2.5 Tanks and Heat Exchangers

NMPC stated that it reviewed the tanks and heat exchangers at NMP-1 in accordance with the rules and procedures described in Section 7 of GIP-2. NMPC identified 18 tanks as outliers. It did not identify any outlier heat exchangers. Among the 18 tanks, it declared 10 tanks as outliers due to the use of cinch anchors, 4 tanks as outliers due to the deficiency of their anchorage capacity, and, 2 tanks as outliers due to potential seismic interaction with laundry barrels. It declared the remaining 2 tanks as outliers since they are underground tanks and GIP-2 does not address underground tanks. Table 6-1 of the summary report (Reference 7) contains descriptions of the outlier tanks and a summary of the outlier resolutions. NMPC completely resolved all tank outlier issues by performing detailed analyses and/or bolt tightness checks and a plant modification.

The staff finds NMPC's actions with respect to tanks and heat exchangers acceptable for the resolution of USI A-46 at NMP-1 because they meet the provisions of GIP-2.

2.6 Cable and Conduit Raceway Supports

NMPC stated that it had followed the guidelines and inclusion rules provided in Section 8 of GIP-2 for the assessment of cable and conduit raceway supports. Based on the walkdown

results, NMPC identified four raceway outliers. The outlier issues included: (1) cut rods, (2) span lengths greater than the GIP maximum of 10 feet, (3) short rod supports and (4) cast iron inserts for threaded rods. NMPC resolved two outlier issues by modifying the support systems and performing detailed evaluations to meet the requirements as set forth in Section 8 of GIP-2. Table 7-1 of the summary report (Reference 7) contains the outlier description and resolution summary for cable and conduit raceway supports. Table 8-1 of the summary report shows a list of the identified unresolved outlier issues. NMPC had committed to resolving all of the outlier issues by the conclusion of the refueling outage in 1999 (i.e., RFO-15). In a letter dated August 18, 1999 (Reference 12), NMPC stated that it had completed resolution of GIP-2 outliers related to USI A-46 during RFO-15. The staff considers NMPC's actions acceptable for resolution of the outliers for cable and conduit raceway supports. The staff finds that NMPC's approach in verifying the seismic adequacy of cable and conduit raceway systems acceptable for the resolution of USI A-46 at NMP-1 because it meets GIP-2 provisions.

2.7 Essential Relays

NMPC stated in the summary report (Reference 7) that it performed the seismic functionality review of relays affecting USI A-46 SSEL items according to the methodology and procedures of GIP-2, the NRC's SSER-2 on GIP-2, and EPRI Report NP-7148-SL and its addendum.

NMPC found three hundred seventy nine SSEL items requiring a relay review, and performed relay reviews for each of these items. The majority of the relay (contact) devices associated with the 379 equipment items are non-essential relays and NMPC screened them out (i.e., eliminated from further review) on the basis that contact chatter is acceptable or that the contacts are not vulnerable to chatter (e.g., a mechanically actuated limits switch on a valve motor operator). In addition to those non-essential relays, NMPC identified 386 essential relays or relay sets.

NMPC states in the summary report that it performed seismic capacity versus seismic demand evaluations for each of the essential relays. Where available, NMPC established seismic capacity of contact devices and equipment using formal seismic equipment qualification test results for specific NMP-1 equipment items and relays. NMPC established the seismic capacity of the remaining essential relays using the generic equipment ruggedness spectra (GERS) developed under an EPRI program. GERS data used are documented in EPRI Report NP-7174-SL, Volume 2, Addendum 21, and EPRI Report NP-5223-SL.

Of the 386 essential relays identified and evaluated, NMPC confirmed the seismic adequacy of 333 relays. Of the 53 outlier relays initially identified in the summary report (Reference 7), NMPC found that for 19 of the items, the seismic demand exceeded the relay seismic capacity, for 28 of the items, NMPC does not have relay capacity data available, and that six of the outlier relays have low seismic ruggedness. The resolution of these relay outliers is discussed in Section 2.9 of this safety evaluation.

NMPC states that the results of the relay walkdowns indicate that the relays and other contact devices were mounted adequately and in accordance with manufacturers' recommendations. NMPC's comparisons between the relay type and labeling data collected during the walkdown and corresponding data on the electrical drawings indicated that the as-built installations match the design documentation used in the relays evaluations.

NMPC found that essential relays at NMP-1 are mounted properly. It found the socket type relays to be firmly installed with many having spring clips or straps. Spot checks of manual operated control switches indicated that they meet the criteria of mechanically actuated switches and are considered inherently rugged.

The staff finds NMPC's approach in verifying seismic adequacy of essential relays at NMP-1 acceptable for the resolution of USI A-46 program at NMP-1 since it meets the provisions of GIP-2.

2.8 Human Factors Aspect

NMPC provided information which outlined the use of the "desk-top," plant walkdown and simulator evaluation methods by the plant operations to verify that existing normal, abnormal and emergency operating procedures were adequate to mitigate the postulated transient, and that operators could place and maintain the plant in a safe shutdown condition. As a result of the evaluation, NMPC developed a revised seismic event procedure which specifically addresses resetting SSEL equipment affected by seismically induced relay chatter.

The staff verified that NMPC had considered its operator training programs and verified that the training was sufficient to ensure that those actions specified in the procedures could be accomplished by the operating crews. In addition, the staff requested verification that NMPC had adequately evaluated potential challenges to operators, such as lost or diminished lighting, harsh environmental conditions, potential for damaged equipment interfering with the operators' tasks, and the potential for placing an operator in unfamiliar or inhospitable surroundings. NMPC provided information regarding its evaluations to substantiate that operator actions could be accomplished in a time frame required to mitigate the transient. NMPC verified that the equipment which would need to be manipulated in the event of an SSE are accessible from within the control room or in local plant areas in proximity to and accessible from the control room. NMPC verified that equipment in these local areas were inherently rugged and not susceptible to damage at USI A-46 level seismic events. NMPC determined that lighting levels and ambient environmental conditions would be adequate to ensure habitability of the areas during transient response. NMPC performed seismic interaction reviews which eliminated any concerns with the plant components and structures located in the immediate vicinity of the components which had to be manipulated. Therefore, the potential for physical barriers resulting from equipment or structural earthquake damage which could inhibit operator ability to access plant equipment was considered, and eliminated as a potential barrier to successful operator performance. NMPC has provided the staff with sufficient information to demonstrate conformance with the NRC-approved review methodology outlined in GIP-2 and is, therefore, acceptable.

2.9 Outlier Identification and Resolutions

NMPC reported a total of 114 outliers for NMP-1 SSEL mechanical and electrical equipment items and provided descriptions of the equipment outliers and their resolutions in Table 5-3 of the summary report (Reference 7). Table 8-1 of the same report provides a list of unresolved

outlier issues. By a letter dated August 31, 1998 (Reference 11), NMPC updated the status of the unresolved outlier issues as follows:

1. Among the 114 outliers reported in Table 5-3 of Reference 7, NMPC resolved fifty-seven (57) by further evaluation and analysis. NMPC resolved forty-seven (47) outliers by performing plant modifications. It determined that the remaining ten (10) component outliers require a plant modification for resolution. NMPC had committed to resolving all of the outlier issues by the conclusion of the refueling outage RFO-15 in 1999.

2. NMPC resolved all seventeen (17) tank and heat exchanger outliers reported in Table 6-1, and the necessary modifications have been completed.

3. Of the four (4) outliers reported in Table 7-1, NMPC resolved two (2) by further evaluation and analysis. It resolved one (1) by performing a plant modification. This modification is complete. NMPC had indicated that the remaining outlier would be completed by the conclusion of RFO-15 in 1999.

4. NMPC identified fifty-three (53) essential relay outliers in the summary report (Reference 7). In Reference 11, NMPC stated that the final count for relay outliers was fifty-seven (57) and that one relay passed the seismic qualification test without experiencing relay chatter. NMPC stated it would complete the resolution of remaining relay outliers by the conclusion of RFO-15 in 1999.

In a letter dated August 18, 1999 (Reference 12), NMPC stated it had completed resolution of GIP-2 outliers related to USI A-46 during RFO-15. The staff finds that NMPC's approach in resolving the outliers is acceptable for the resolution of USI A-46 at NMP-1 because it meets GIP-2 provisions.

3.0 SUMMARY OF MAJOR STAFF FINDINGS

The staff's review of NMPC's USI A-46 implementation program, as provided for each area discussed above, did not identify any significant or programmatic deviation from GIP-2 regarding the walkdown and the seismic adequacy evaluation at NMP-1.

4.0 CONCLUSION

NMPC's USI A-46 program at NMP-1 was established in response to Supplement 1 to GL 87-02 per the requirements of 10 CFR 50.54(f). NMPC conducted the USI A-46 implementation in accordance with GIP-2 and the staff's SSER-2. NMPC identified approximately 114 components as outliers. By letter dated August 31, 1998 (Reference 11), NMPC stated that the necessary actions to resolve the majority of outliers have been completed and that some outliers remained to be resolved at a later date. NMPC's summary report did not identify any instance where the operability of a particular system or component was questionable. NMPC had committed to resolve all of the outlier issues by the conclusion of the refueling outage (RFO-15) in 1999. In a letter dated August 18, 1999 (Reference 12) NMPC stated it had completed resolution of GIP-2 outliers related to USI A-46 during RFO-15.

The staff concludes that NMPC's USI A-46 implementation program has, in general, met the purpose and intent of the criteria in GIP-2 and the staff's SSER-2 on GIP-2 for the resolution of USI A-46. The staff has determined that NMPC's corrective actions and completed physical

modifications for resolution of outliers will result in safety enhancements which, in certain aspects, are beyond the original licensing basis. As a result, NMPC's actions provide sufficient basis to close the USI A-46 review at the facility. The staff also concludes that its findings regarding NMPC's implementation of USI A-46 do not warrant any further regulatory action under the provisions of 10 CFR 50.54(f). NMPC's activities related to the USI A-46 implementation may be subject to NRC inspection.

Regarding future use of GIP-2 in licensed activities, NMPC may revise its licensing basis in accordance with the guidance in Section I.2.3 of the staff's SSER-2 on SQUG/GIP-2 (Reference 2), and the staff's letter to SQUG's Chairman, Mr. Neil Smith on June 19, 1998. Where plants have specific commitments in the licensing basis with respect to seismic qualification, these commitments should be carefully considered. The overall cumulative effect of the incorporation of the GIP-2 methodology, considered as a whole, should be assessed in making a determination under 10 CFR 50.59. An overall conclusion that no unreviewed safety question is involved is acceptable so long as any changes in specific commitments in the licensing basis have been thoroughly evaluated in reaching the overall conclusion. If the overall cumulative assessment leads NMPC to conclude that an unreviewed safety question is involved, incorporation of GIP-2 methodology into the licensing basis would require NMPC to seek an amendment under the provisions of 10 CFR 50.90.

5.0 REFERENCES

1. "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Power Plant Equipment," Revision 2, corrected February 14, 1992, Seismic Qualification Utility Group.

2. NRC "Supplement No. 1 to Generic Letter 87-02 Including Supplemental Safety Evaluation Report No. 2 on Seismic Qualification Utility Group's Generic Implementation Procedure, Revision 2, corrected February 14, 1992," dated May 22, 1992.

3. Niagara Mohawk Power Corporation Letter (C. D. Terry) to USNRC, NMP1L 0695, "Response to Supplement 1 to Generic Letter 87-02 dated May 22, 1992," dated September 18, 1992.

4. Niagara Mohawk Power Corporation Letter (C. D. Terry) to USNRC, NMP1L 0728, "Response to NRC Request for Additional Information (RAI)," dated January 22, 1993.

5. U. S. Nuclear Regulatory Commission Letter (D. S. Brinkman) to NMPC (B. R. Sylvia), "Safety Evaluation and Request for Additional Information Regarding Licensee's September 18, 1992, Response," dated November 17, 1992.

6. U. S. Nuclear Regulatory Commission Letter (D. S. Brinkman) to NMPC (B. R. Sylvia), "Evaluation of Licensee's Response to NRC RAI dated November 17, 1992," dated March 24, 1993.

7. Niagara Mohawk Power Corporation Letter (C. D. Terry) to USNRC, NMP1L 1044, "Summary Report for Resolution of USI A-46," dated March 11, 1996.

8. U. S. Nuclear Regulatory Commission Letter (D. S. Hood) to NMPC (B. R. Sylvia), "Supplemental Request for Additional Information Regarding Verification of Seismic

Adequacy of Mechanical and Electrical Equipment, Nine Mile Point Nuclear Station, Unit No. 1," dated June 5, 1997.

9. Niagara Mohawk Power Corporation Letter (J. T. Conway) to USNRC, NMP1L 1238, "Response to Supplemental Request for Additional Information Regarding Verification of Seismic Adequacy of Mechanical and Electrical Equipment," dated July 31, 1997.

10. MPR Associates, Inc., "Results of BWR Trial Plant Review, Nine Mile Point Unit 1," prepared for Seismic Qualification Utility Group (SQUG)," April 1988.

11. Niagara Mohawk Power Corporation Letter (R. B. Abbott) to USNRC, NMP1L 1354, "Response to Staff Questions Regarding Verification of Seismic Adequacy of Mechanical and Electrical Equipment (Unresolved Safety Issue A-46)," dated August 31, 1998.

12. Niagara Mohawk Power Corporation Letter (R. B. Abbott) to USNRC, NMP1L 1454, "Generic Implementation Procedure (GIP) Method A for Resolution of USI A-46," dated August 18, 1999.

13. Niagara Mohawk Power Corporation Letter (R. B. Abbott) to USNRC, NMP1L 1470, "USI A-46, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors," dated September 17, 1999.

14. Niagara Mohawk Power Corporation Letter (R. B. Abbott) to USNRC, NMP1L 1520, "Generic Implementation Procedure (GIP) Method A for Resolution of Unresolved Safety Issue (USI) A-46," dated June 19, 2000.

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