Richard B. Abbott
Vice President
Nuclear Engineering

Phone: 315.349.1812
Fax: 315.349.4417

June 19, 2000
NMP1L 1520

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

RE: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Subject: ***Generic Implementation Procedure (GIP) Method A for Resolution of*** **Unresolved Safety Issue *(USI) A-46***

Gentlemen:

By letter dated August 18, 1999, Niagara Mohawk Power Corporation (NMPC) provided additional information requested by the NRC staff concerning USI A-46, "Seismic Qualification of Equipment in Operating Plants." This additional information related to the application of "Method A" at Nine Mile Point Unit 1 (NMP1), as directed in Revision 2 of the GIP and other documents identified in NMPC's August 18, 1999, letter.

On April 28, 2000, a conference call was held with the NRC staff to discuss their remaining questions regarding the use of "Method A." The staff indicated that NMPC's formal response to these questions was necessary to close out USI A-46 for NMP1. The Attachment to this letter summarizes each question as discussed on April 28, 2000, and provides NMPC's response.

Sincerely,

Richard B. Abbott

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Vice President Nuclear Engineering

RBA/IAA/tmk
Attachment

xc: Mr. H. J. Miller, NRC Regional Administrator, Region I
Ms. M. K. Gamberoni, Acting Section Chief PD-I, Section 1, NRR (letter only)
Mr. G. K. Hunegs, NRC Senior Resident Inspector
Mr. P. S. Tam, Senior Project Manager, NRR
Records Management

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ATTACHMENT
Responses to NRC Questions

1. **NRC Question:**

Provide additional technical justification on the use of Method A in Table 4-1 of Revision 2 of the Generic Implementation Procedure (GIP-2) for components in locations where the amplification factors between the free-field ground response spectrum and the in-structure response spectra (ISRS) are more than 1.5. Justify how this restriction, as stated on p. 4-16 of GIP-2, is satisfied for Nine Mile Point Unit 1 (NMP1).

Niagara Mohawk Power Corporation (NMPC) Response:

The components for which Method A of GIP-2 was used during the implementation of the Unresolved Safety Issue (USI) A-46 program at NMP1 and the locations of these components were listed in NMPC's USI A-46 summary report submittal (Reference 1). A justification for the use of Method A was provided in NMPC's response dated August 18, 1999 (Reference 2).

The maximum Amplification Ratios between the Peak Spectral Acceleration (PSA) and the Ground Response Spectrum (GRS) at NMP1 for the locations where Method A was used are provided in Table 1 (attached). As can be seen from the Amplification Ratio column in the table, the maximum applications range from 1.25 to 5.91. Most values are higher than the 1.5 amplification factor (ratio) identified with Method A, but these amplifications are reasonable considering the conservatisms involved in the design basis analyses. References 1 and 2 contain descriptions of the original design basis floor spectra (which were used for the USI A-46 program) together with identifications of the conservatisms involved. EQE International and the Seismic Qualification Utility Group (SQUG) have assembled generic information on the amplification factors calculated for five nuclear plant structures using conservative response generation techniques as well as more median-centered response techniques. The results of these studies were presented to the NRC in Reference 2. A reduction factor of 3.77 was estimated from these studies (average for five structures), which reflects the differences between median-centered and conservative response calculations. Table 1 shows the reduced Amplification Ratios for relevant NMP1 elevations based on dividing the Amplification Ratios by the 3.77 reduction factor.

Table 2 (attached) provides a brief description of the construction of the NMP1 structures. The structures in which the Method A components are mounted are typical nuclear power plant structures, as defined in the Senior Seismic Review and Advisory Panel (SSRAP) report. 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.

The above discussion leads to the conclusion that there are significant inherent conservatisms in the methods utilized at NMP1 to calculate design basis ISRS. These conservatisms are difficult to quantify without conducting costly analyses. However, the generic information presented in Reference 2 shows that the mean margin between median-centered and design basis analysis for the five selected nuclear plant structures is 3.77. (Reference 2 contains the basis for concluding that the NMP1 structures are similar to these five structures). Therefore, the value of 3.77 can be used to estimate the appropriate realistic amplification factor for the NMP1 building structures. Table 1 stipulates a modified (reduced) amplification level for each of the seven elevations where Method A was used at NMP1. The resulting modified amplification factors range between a maximum of 1.57 and a minimum of 0.33. These modified amplification factors are much closer to a median-centered type value. Based on the conservatism in the development of design basis spectra discussed above, NMP1 has concluded that a realistic median-centered assessment for the seven subject elevations at NMP1 would result in an amplification factor of about 1.5. It is noted that the NRC has accepted a similar assessment of margins for the R.E. Ginna Nuclear Plant located near Rochester, New York.

Based on the above discussion, it is concluded that the intent of GIP-2 requirements and restrictions for the use of Method A is met for the associated equipment evaluated at NMP1.

2. <u>NRC Question</u>:

Explain why some Screening Verification Data Sheets (SVDS) line items compared the realistic median-centered response spectrum (RRS) to the GIP bounding spectrum (BS) for elevations greater than 40 feet. Why are upper elevations acceptable in terms of amplification factor while lower elevations are not?

<u>NMPC Response</u>:

The Safe Shutdown Equipment Manager (SSEM) program file generated the SVDS. Due to the limited column character spacing of the SSEM program file, the SVDS capacity spectrum column reports BS, which is understood to mean 1.5 x BS. A comparison between the 1.5 x BS spectrum and the RRS is documented in the screening evaluation work sheets for equipment located on building floor elevations greater than 40 feet above effective grade. This is consistent with the GIP, Table 4.1 when using the 1.5 x BS as a capacity spectrum and the RRS as a demand spectrum.

References:

1. Summary Report for Resolution of USI A-46, NMPC letter NMP1L 1044, dated March 11, 1996

2. Generic Implementation Procedure (GIP) Method A for Resolution of USI A-46, NMPC letter NMP1L 1454, dated August 18, 1999

TABLE 1

AMPLIFICATION RATIOS FOR METHOD A LOCATIONS

Structure	Elevation (ft)	Direction	A Peak Spectral Acceleration in the ISRS (g)[1]	Frequency Range (hz)	B Amplification Ratio[2]	C Reduced Amplification Ratio[3]
Reactor Building	281	east-west north-south	1.1 1.2	5.5–7.5 5.5–7.2	3.93 4.29	1.04 1.14
	261	east-west north-south	0.75 0.8	5.5–7.5 5.5–7.1	2.68 2.86	0.71 0.76
	237	east-west north-south	0.5 0.51	5.5–7 5–7	1.79 1.82	0.47 0.48
	198	east-west north-south	.35 .38	2-9 2-9	1.25 1.36	0.33 0.36
Turbine Building	277	east-west north-south	0.55 0.65	10-14 10-14	5.00 5.91	1.33 1.57
	261	east-west north-south	0.4 0.65	15-19 15-20	3.64 5.91	0.97 1.57
	250	east-west north-south	0.4 0.6	15-19 15-20	3.64 5.45	0.97 1.45

Reactor Building

$$B = \frac{A}{.28_g *} \qquad C = \frac{B}{3.77}$$

* 0.28_g Peak GRS at frequencies of about 3 to 8 HZ

Turbine Building

$$B = \frac{A}{.11_g **} \qquad C = \frac{B}{3.77}$$

**0.11_g ZPA is a conservatively taken value for frequencies greater than the GRS peak of about 3 to 8 HZ.

[1] ISRS at 5% Damping, Safe Shutdown Earthquake
[2] PSA/GRS accelerations at the same frequency
[3] Reduced by a factor of 3.77, which accounts for the conservatisms based on specific examples from the five nuclear structures researched by SQUG (Reference 2)

TABLE 2

DESCRIPTION OF BUILDING CONSTRUCTION WHERE METHOD A WAS USED

Building Name	Description of Building Construction
Reactor Building	The NMP1 Reactor Building and internal structure are typical of Mark 1 reactor designs and consist of a cast-in-place reinforced concrete substructure and reinforced concrete/structural steel superstructure. The concrete substructure, which is founded on firm Oswego sandstone, begins 68 feet below grade and extends upward 147 feet to the operating floor at Elevation 340'–0". The reinforced concrete walls vary in thickness from 1'-4 ¾" to 4'-0". The reinforced concrete surrounding the drywell extends from Elevation 212'–0" to Elevation 340'–0" and varies in thickness from 4'–9 ½" to 7'–0". The reinforced concrete surrounding the drywell is integrally connected to the Reactor Building slabs at Elevations 237'–0", 261'-0", 281'-0", 318'-0", and 340'-0". The reactor pedestal is a 5'-0" thick cylindrical reinforced concrete structure which is tied into the massive reinforced concrete foundation surrounding the drywell.
Turbine Building	The NMP1 Turbine Building is a poured-in-place reinforced concrete building substructure founded on firm Oswego sandstone 15 feet to 25 feet below grade and extends upward 64 feet to the Turbine Generator operating floor. The Turbine Building superstructure consists of an enclosed structural steel braced frame. The lower 24 feet of the building is covered with 8-inch thick insulated precast concrete wall panels. From the 24-foot level to the roof, the building is enclosed with insulated metal wall panels.