UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR USI A-46 PROGRAM IMPLEMENTATION

AT MONTICELLO NUCLEAR GENERATING PLANT

OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

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." In the generic letter, the NRC staff set forth the process for resolution of USI A-46, and encouraged the affected nuclear power plant 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, Ref. 1).

On May 22, 1992, the NRC issued Supplement 1 to GL 87-02 including the staff's supplemental safety evaluation report No. 2 (SSER-2, Ref. 2), pursuant to the provisions of 10 CFR 50.54(f), which required that all addressees 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 that those addressees committing to implement GIP-2 provide an implementation schedule and detailed information on the procedures and criteria used to generate the in-structure response spectra (IRS) to be used for USI A-46.

By letter dated September 21, 1992 (Ref. 3), Northern States Power Company (NSP, or the licensee), provided its response to Supplement 1 to GL 87-02 for the Monticello Nuclear Generating Plant (MNGP). In its response, NSP committed to follow the SQUG commitments set forth in GIP-2, including the clarifications, interpretations, and exceptions identified in SSER-2. The staff issued its evaluation of the licensee's response by letter dated December 10, 1992 (Ref. 4).

By letter dated November 20, 1995 (Ref. 5), as supplemented by letter dated February 19, 1996 (Ref. 6), NSP submitted a summary report containing the results of the USI A-46 program implementation at MNGP. By letters dated April 29, 1997 (Ref. 7), January 15, 1998 (Ref. 8), February 11, 1998 (Ref. 9), and April 15, 1998 (Ref. 10), NSP provided supplemental information and clarification in response to the staff's requests for additional information (RAIs) dated January 29, 1997 (Ref. 11), October 8, 1997 (Ref. 12), November 12, 1997 (Ref. 13), and February 27, 1998 (Ref. 14), respectively.

This report provides the staff's evaluation of the licensee's USI A-46 implementation program. The evaluation is based on the staff's review of the summary report and of the supplemental information, clarification, and documentation provided by the licensee in response to the staff's RAIs.

2.0 DISCUSSION AND EVALUATION

The summary report (Ref. 5) provides the licensee's implementation results for the USI A-46 program at MNGP. The report discusses the safe shutdown equipment list (SSEL) and documents the screening verification and walkdown of mechanical and electrical equipment as well as the relay evaluation. The report also documents the evaluation of seismic adequacy for tanks, heat exchangers, and cable and conduit raceways, identifies outliers, and proposes resolutions including projected schedules.

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

MNGP was designed using the safe shutdown earthquake (SSE) ground response spectrum (GRS) which was derived from the North 69-degree West component time history of the 1952 Taft earthquake, scaled to a 0.12g peak ground acceleration (PGA). The structures at the MNGP include the reactor building, turbine building, plant control and cable spreading structure, emergency diesel generator building, the emergency filtration train (EFT) building and the intake structure. NSP used the response spectra generated from the seismic analysis of the reactor building model for equipment housed in buildings other than the reactor building and the EFT Building. The reactor and the EFT buildings have their own response spectra which were used for the equipment housed within each building. The in-structure response spectra (IRS or FRS) for these buildings were presented to the NRC for staff review by NSP in response to GL 87-02. The staff reviewed the original and subsequent modeling performed by NSP and determined that the building model was acceptable and the resulting IRS could be accepted as "conservative design" spectra in accordance with the definition in GIP-2. Selected plots of the MNGP FRS are provided in Appendix B to NSP's USI A-46 Seismic Evaluation Report (Ref. 5).

The reactor building is founded at elevation 888 feet (ft)-3 inches (in.) on medium sand with gravel type foundation. The building consists of a lower portion reinforced concrete structure rising from its foundation to elevation 1027 ft-8 in., and an upper portion steel framed structure rising up to elevation 1073 ft-2 in. The reactor building dynamic model was developed as part of the design-basis seismic analysis. The model was constructed from lumped masses, beam elements, spring elements, and rigid elements. It was assumed to be rigid in the vertical direction. The FRS associated with the SSE was generated for major elevations of the reactor building main structure. For elevations where an original design FRS was available, that data was used to calculate a response spectrum for additional oscillator dampings. When no such data existed, FRS was generated from a full seismic response analysis of the building. For the response analysis, FRS was calculated from a time history analysis using the North 69-degree West component time history of the 1952 Taft earthquake, normalized to a 0.12g PGA as the base input motion. A conservative 3 percent damping ratio was used in the analysis.

The EFT building is a reinforced concrete structure supported in the east side of the building by a mat foundation and in the west side by two reinforced concrete piles. A finite element model was developed using plate, beam, and spring elements to represent the structure. Soil structure interaction effects are taken into account by coupling the structural model with the supporting soil. In accordance with the approach provided in Regulatory Guide (RG) 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," synthetic time histories (developed by Bechtel), normalized to 0.12g horizontal acceleration and 0.08g vertical accelerations, were used as input for seismic analysis of the EFT. IRS were generated as part of the design-basis seismic analysis of the EFT. A modal analysis was performed to determine natural frequencies and mode shapes. The RG 1.60 synthetic time histories scaled to 0.12g ground horizontal acceleration and 0.08g vertical acceleration with a 7 percent damping were used in the time history analysis to determine the SSE time history response for the EFT building. Response spectra with 15 percent peak widening were generated from the time history at key elevations. The staff determined that the seismic demand used by NSP is adequate for the resolution of USI A-46.

2.2 Seismic Evaluation Personnel

The MNGP seismic evaluation was conducted by a multi-disciplined project team. The team included both NSP and contractor employees. The seismic capability engineers (SCEs) for MNGP included Messrs. W. Djordjevic and J. J. O'Sullivan of Stevenson & Associates, and Messrs. D. Zeecher and Ron Peterson of NSP, and are identified in Section 4.2 of Reference 5. All SCEs were SQUG trained and certified. Their resumes and SQUG Walkdown Course Completion Certificates are provided in Appendix C of Reference 5. The independent peer reviewers were Dr. R. P. Kennedy and Dr. John D. Stevenson. The peer reviewers' assessment of the walkdown and analyses are documented in Appendix E of the Reference 5.

The licensee developed the SSEL in accordance with GIP-2. The SSEL items were reviewed by the operations department engineers at MNGP to ensure that the SSEL is compatible with existing plant operating procedures. The lead relay review engineer is an electrical engineer and has been SQUG trained and certified.

The staff finds that the SCE's qualifications fully satisfy the provisions of GIP-2. The staff also notes that the "third party" reviewer and the SCEs are widely recognized for their experience in the field of seismic evaluation of structures, systems, and components.

2.3 Safe-Shutdown Path

GL 87-02 specifies that licensees 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, the licensee addressed the following plant safety functions in its submittal of November 20, 1995: reactor reactivity control; pressure control; inventory control; and decay heat removal. A primary and an alternate safe shutdown success path with their support systems and instrumentation were identified 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 A to Reference 5 provides the safe shutdown equipment list.

The reactor decay heat removal function is accomplished by relieving steam from the reactor via the safety/relief valves into the suppression pool. The reactor coolant system (RCS) inventory is controlled by injecting water into the reactor via the core spray system which takes suction from the suppression pool. The decay heat removal is achieved by placing the residual heat removal (RHR) system in the suppression pool cooling (SPC) mode of operation. During the SPC mode of RHR, the RHR system takes suction from, and discharges to, the suppression pool via the RHR heat exchangers. The RHR service water system provides the capability to transfer the decay heat from the RHR system to the ultimate heat sink.

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 A to Reference 5.

The staff concludes that the approach to achieve and maintain a safe shutdown for 72 hours following a seismic event is in accordance with the GIP-2 provisions, and is therefore, acceptable.

2.4 Seismic Screening Verification and Walkdown of Mechanical and Electrical Equipment

Seismic screening and walkdown included verification of 359 equipment items that are typical of those found in the SQUG experience database in the 20 classes of equipment covered in Appendix B of GIP-2 (Ref. 1). Heat exchangers and tanks are evaluated in Section 2.5 of this SE.

2.4.1 Equipment Seismic Capacity Compared to Seismic Demand

The seismic capacity of equipment classes covered in GIP-2 (Ref. 1) was used by the licensee to verify the seismic adequacy and compared with either the GRS or the IRS as recommended by GIP-2. The capacity spectra are provided in GIP-2 as the bounding spectra (BS), amplified bounding spectra (ABS = 1.5 x BS) or generic equipment rugged spectra (GERS).

For equipment located within 40 ft of the grade elevation with estimated fundamental frequencies greater than 8 Hertz, the bounding spectrum provided in GIP-2 was used for comparison against the ground spectrum to determine the seismic design adequacy of these equipment. MNGP is a soil site plant and the grade elevation near plant structures is approximately 930 ft to 935 ft above sea level. Effective grade for MNGP was conservatively set at 930 ft above sea level for all structures. This approach for evaluating the effective grade is conservative and acceptable. Most equipment at MNGP met both the 40-ft and the 8-Hertz criteria and their seismic design adequacy was evaluated by using Method A of Table 4-1 of GIP-2. There is a limitation on the use of GIP-2 Method A as stated on page 4-16 of GIP-2, in that the use of the GRS for comparison with the BS is based on the condition that the amplification factor between the free-field ground spectrum and the IRS will not be more than about 1.5. In the response to the NRC's request for additional information (RAI), the licensee provided key IRS for the MNGP reactor and EFT buildings. The staff compared the Housner GRS, with a zero period acceleration of 0.12g, used to generate the reactor building IRS to the IRS at elevations below 40 ft in the reactor building at frequencies above 8 Hertz. At elevation

935 ft, the amplification is from 1.45 to 1.67 depending on the frequency. The use of Method A is acceptable for USI A-46 verification of equipment at this elevation because the amplification is about 1.5. At elevation 963 ft, the amplification is from 1.8 to 2.3 depending on the frequency. The staff considers this amplification reasonably acceptable to allow the use of Method A in verifying equipment seismic adequacy, considering that the IRS are conservative design spectra rather than a median center realistic spectra. The staff also compared the RG 1.60 GRS, with a zero period acceleration of 0.12g, used to generate the EFT building IRS to the IRS at elevations below 40 ft in the EFT building at frequencies above 8 Hertz. At elevation 944 ft, the amplification is from 2.4 to 3.0 and at elevation 960 ft, the amplification is from 2.7 to 3.6 depending on the frequency. The staff considers these amplifications acceptable for the application of Method A in verifying equipment seismic adequacy, since the IRS are considered conservative design spectra rather than a median center realistic spectra.

Based on information provided in Appendix A (SSEL) and Appendix D (SVDS) to the MNGP seismic evaluation report (Ref. 5) and the licensee's response to the staff RAIs (Ref. 7, 8, and 9), most of the seismic capacity versus seismic demand comparisons for equipment in the SSEL were implemented by comparing the experience-based BS against the GRS. For some equipment, comparison of 1.5 times the bounding spectra versus the seismic demand as defined by the IRS were adopted in assessing the adequacy of equipment seismic capacity. Considering the large conservatism inherent in the original generation of the IRS, the staff finds that the licensee's application of Method A of Table 4-1 in GIP-2 is consistent with the applicable GIP-2 guidance for the resolution of the USI A-46 issue.

Therefore, the staff concludes that the above approaches are acceptable means for resolving the issue pertaining to the comparison of seismic capacity versus seismic demand for SSEL equipment, as related to the resolution of USI A-46 at MNGP.

2.4.2 Assessment of Equipment "Caveats"

The licensee indicated in Reference 5 that the SCEs verified that the caveats listed in Appendix B of GIP-2 were met for each equipment class identified at MNGP. The caveats are the inclusion and exclusion rules, which specify characteristics and features particularly important for seismic adequacy of a specific class of equipment when the equipment seismic capacity is determined by the experience-based data. The phrase "meeting the intent of the caveats" applies to equipment that does not meet the specific wording in certain caveats but is deemed seismically adequate based on the judgment of the SCE.

The results for equipment whose seismic adequacy was verified by meeting the caveats were documented in Appendix D of Reference 5. In many cases, items of equipment that did not meet GIP-2 caveats were considered as outliers and were documented in Section 7 of the MNGP summary report for USI A-46 resolution. In some cases, if an item of equipment was judged to meet the intent of a certain caveat, but the specific wording of the caveat rule is not met, the equipment item was considered to have met the caveat rule, in accordance with GIP-2. Equipment items that met the intent rather than the specific wording of related caveats are listed in Table 4-1 of Reference 5. In its response of April 29, 1997, to the staff's RAI dated January 29, 1997, the licensee indicated that if a component did not meet the wording of a caveat, and was not found as an outlier, the assessment and justification for meeting the intent of a caveat were noted on the screening and evaluation work sheets (SEWS).

In general, the staff finds that the seismic adequacy determination for equipment identified in Section 4 of the MNGP summary report conforms with the GIP-2 guidance on use of the caveats, and is, therefore, acceptable.

2.4.3 Equipment Anchorage

The licensee's first step in evaluating the seismic adequacy of equipment anchorage is to check the anchorage installation and its connection to the base of an equipment. This inspection consisted of visual checks and measurements along with a review of plant documentation and drawings on an as-needed basis, and an anchor bolt tightness and embedment check for concrete expansion anchors. The licensee discussed significant anchorage inspection findings in the SEWS for consideration in the anchorage capacity evaluation. The pullout and shear capacities for anchors were then determined using the guidelines in Section 4 and Appendix C of GIP-2. In general, anchorages were rigorously analyzed using a hand calculation or the ANCHOR software package developed by Stevenson & Associates. Bounding calculations were developed to cover similar items. Small equipment, weighing 50 pounds or less was accepted by judgment and a "tug test."

The seismic demand for an item of equipment is established based on the type of demand spectrum used. If the IRS are used, no additional factors of conservatism are used to determine the demand load since the IRS were accepted by the staff as "conservative design" IRS. If the ground spectrum is used for demand load determination, then 1.875 times the appropriate spectral acceleration is used where 1.875 is the product of 1.5, the median amplification factor, and 1.25, the additional anchorage factor of conservatism. The demand load is the product of the appropriate spectral acceleration value times the weight of the equipment item.

The final step in performing an anchorage evaluation, is to determine the seismic demand on the equipment anchorage and to compare that seismic demand to the anchorage capacity. The demand on the anchorage is calculated using the equivalent static analysis. If the demand is less than the capacity, the anchorage is judged to be acceptable; otherwise, the equipment is classified as an outlier. Some 50 percent of a total of 42 MNGP outliers resulted from identification of anchorage-related deficiencies. These outliers are listed in Table 7-1 of NSP's seismic evaluation report. Specific resolutions of the outliers adopted by the licensee are listed in Table 8-1 of the same report.

The above-described approaches used by the licensee in ensuring adequate equipment anchorage capacity to withstand seismic effects are consistent with the staff position as discussed in SSER-2 (Ref. 2) and the applicable GIP-2 guidelines. Therefore, the staff concludes that the licensee's evaluation of equipment anchorage is adequate and acceptable for USI A-46 resolution.

2.4.4 Seismic Spatial Interaction Evaluation

The licensee stated in its summary report (Ref. 5) that several seismic interaction conditions were identified during the walkdown. The identified conditions included control room ceiling lights, a vertical duct in the B RHR room, a cart on wheels, a rod hung conduit, a tape rack, and a supply cabinet. These conditions were identified as outliers. Twenty interaction outlier equipment items are identified in Table 7-1 of Reference 5. These identified outliers were resolved either during the plant walkdown or later by analyses and/or physical modifications.

The licensee's summary report also indicated that all block walls that could potentially affect the SSEL equipment were investigated to confirm that they are seismically adequate under MNGP's Bulletin 80-11 ("Masonry Wall Design") program. In all cases, the block walls in question were verified to be seismically adequate by the provisions of NRC Bulletin 80-11. The information, including wall ID and evaluation reference, was recorded on the SEWS.

The staff finds that the licensee's seismic spatial interaction evaluation is in accordance with GIP-2, and is, therefore, acceptable for the resolution of the USI A-46.

2.5 Tanks and Heat Exchangers

The scope of MNGP tanks and heat exchanger evaluation included one large buried and two large horizontal tanks, two sets of air accumulator tanks for start of the diesel generator, two large vertical heat exchangers, and a group of relatively small air accumulator tanks. There are no vertical tanks on the MNGP SSEL.

The methodology adopted by the licensee in performing the tank and heat exchanger evaluation included consideration of tank shell integrity, hydrodynamic loading on the tank wall, anchor integrity against breakage and pullout, anchorage connection between the tank shell and the anchor bolts, and piping strength and flexibility check for piping attached to large tanks. The methodology also included a field inspection of the tank, the anchorage connections, and the anchor bolt installation against the guidelines described in Section 4.4, Section 7, and Appendix C of GIP-2.

The evaluation guidelines provided in Section 7 of GIP-2 are applicable only to large, flat-bottom, cylindrical vertical and horizontal tanks, and heat exchangers with support saddles made of plate elements. Since these guidelines do not apply to MNGP's waist-supported-vertical heat exchangers, the licensee had to use equivalent procedures and loading conditions as allowed in Section 7 of GIP-2 in evaluating the waist-supported heat exchangers. A simple, equivalent static method was used to determine the seismic demand on, and capacity of, the anchors and supports for horizontal tanks. In addition to considering the seismic loads due to the inertial response of horizontal tanks, the nozzle loads due to the seismic response of attached piping were also included in defining the seismic demand applied to the anchorage and supports of such tanks.

Based on the above-described methodology for tank and heat exchanger evaluation, both the diesel oil storage tank (T-44) and the standby diesel generator day tanks (T-45A and T-45B) were found to have adequate seismic capacity to resist the SSE-induced loads in combination with other applicable loads and are judged acceptable. The diesel air start tanks (T-79A, B, C, D, E, F and T-80A, B, C, D, E, F) were classified as outliers because each tank was held to the rack by clamps whose frictional resistance could not be verified. This deficiency was resolved by performing a tightness check on all clamps to verify they had an adequate torque. The RHR heat exchangers (E-200A and E-200B) were classified as outliers due to the use of Cinch anchors in the original installation, which are not covered by GIP-2. The outliers were resolved by performing an evaluation of the capacity of the Cinch anchors, and the replacement of those not found acceptable by the Hilti-type anchors in a recent upgrade. All other Class 21 air accumulators associated with operation of valves were evaluated per the above-described methodology and found to have adequate seismic capacity to resist SSE-induced loads and are judged to be acceptable. The outliers and the methods utlized for their resolution are provided in Table 7-1 and Table 8-1 of Reference 5, respectively.

The staff concludes that the approaches used in seismic adequacy evaluation of MNGP tanks and heat exchanger are appropriate and acceptable and that the methods used by the licensee for outlier resolution are adequate and acceptable for resolving USI A-46 related tank and heat exchanger issues.

2.6 Cable and Conduit Raceways

The licensee implemented the cable and conduit raceway supports review in two parts. The first part covers a plant walkdown which evaluated the raceways against the GIP-2 inclusion rules and other seismic performance concerns, as well as the walkdown guidelines. The second part consisted of an analytical check of selected worst-case supports using GIP-2, Section 8 Limited Analytical Review (LAR) guidelines. The seismic demand for these cable and raceways was determined based on the methodology discussed in Section 2.1 of this SE. The raceway evaluation program was carried out by the licensee following the guidelines of GIP-2.

Twelve representative, bounding samples of the MNGP raceway supports were selected for the LAR. Of the 12 systems reviewed, 2 systems were identified as outliers. These two outliers were resolved with performance of the analytical outlier evaluation specified in GIP-2 and upgrading of supports as indicated by the outlier analysis. The two outliers and the method used for their resolution are identified in Tables 7-1 and 8-1 of Reference 5, respectively.

The staff determined that the licensee implemented an adequate engineering evaluation of MNGP's cable trays and conduit raceways with an appropriate scope consistent with the guidelines provided in Section 8 of GIP-2. The evaluation covered both the plant walkdown of cable trays and conduit raceways and a limited analytical review of 12 representative cable tray and raceway supports. Two outlier supports were identified and adequate measures were taken to resolve the outliers. Based on these findings, the staff concludes that the licensee has adequately addressed the USI A-46 related cable tray and conduit raceway issue at MNGP.

2.7 Essential Relays

The licensee stated that relay spot checks were performed by the seismic review teams during the equipment walkdown and during the separate relay evaluation walkdown. According to the GIP-2 procedure, the purpose of spot checks is to verify the relay mounting, orientation, model number, load path, possible interaction, and cable slack. Accordingly, essential relays were checked to confirm that they were mounted in accordance with manufacturer recommendations and to identify any abnormal or atypical relay mounting configurations. The licensee indicated that relays were found to be well secured to the cabinet housings and that no loose or missing hardware was identified.

Section 7 of the USI A-46 relay evaluation report (Ref. 15) identifies 70 outlier essential relays (located in essential Panels C91, C92, C93, and C94), of which 54 were reassessed to be seismically adequate. These 54 devices are listed in Table 1-1 of Attachment 1 to Reference 6. The remaining outlier essential relays listed in Tables 1-2 and 1-3 of Attachment 1 to Reference 6 were replaced with relays that are seismically qualified for their intended use. In its letter dated September 17, 1998, the licensee confirmed that all relay outliers have been resolved and closed out during the refueling outage that ended in April 1998.

The staff finds the licensee's seismic relay evaluation to be acceptable for the USI A-46 resolution.

2.8 Human Factors Aspect

The licensee provided information that outlined the use of the "desk-top" and simulator-based evaluation method by the Operations Department 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. The staff verified that the licensee had considered its operator training programs and verified that its training was sufficient to ensure that those actions specified in the procedures could be accomplished by the operating crews. Members of the licensee's training department and licensed operators were involved with the simulator scenario development and implementation.

In addition, the staff requested verification that the licensee had adequately evaluated potential challenges to operators, such as lost or diminished lighting, harsh environmental conditions, potential for damaged equipment interfering with the operator's tasks, and the potential for placing an operator in unfamiliar or inhospitable surroundings. The licensee provided information regarding its evaluations to substantiate that operators' actions could be accomplished in a time frame required to mitigate the transient. Specifically, the licensee reviewed the safe shutdown equipment that required local operator action and determined that the equipment initially screened for manual operator action (i.e., 125 VDC and 250 VDC divisional battery chargers) in fact were seismically qualified. As such, no local operator actions are currently required to safely shut down the plant. In addition, the licensee verified that no local operator actions were identified that were required to reset low ruggedness relays. The licensee verified that existing procedures, availability of adequate control room equipment, and operator training were adequate to ensure the operators could perform the required actions necessary to shut down the plant. The licensee performed seismic verification walkdowns which identified a potential interaction issue associated with control room lighting fixtures that could impact the operators. The licensee has taken corrective actions to modify the equipment. Therefore, the potential for physical barriers resulting from equipment or structural earthquake damage, which could inhibit operator taking the required actions to safely shut down the plant, is not considered to be a significant hazard. The licensee has provided the staff with sufficient information to demonstrate conformance with the NRC-approved review methodology outlined in the SQUG/GIP-2 (Ref. 1) and is, therefore, acceptable.

On the basis of its review of the licensee's information, the staff finds that the licensee has adequately substantiated that operator's actions could be accomplished in time to mitigate the seismic event.

2.9 Outlier Identification and Resolutions

The licensee identified 70 relays as outliers and the resolution of these relay outliers has been completed as delineated in Section 2.7 of this SE. Section 7 of Reference 5 documents the equipment outliers identified during the USI A-46 implementation effort at MNGP. Equipment outlier items are listed in Table 7-1, including the associated defects or inadequacies. Table 8-1 of the summary report identified the proposed resolution of outliers.

Items of equipment were identified as outliers for three reasons: equipment class caveats, anchorage adequacy, and seismic interactions. The significant outliers associated with anchorages, tanks and heat exchangers, and cable tray and conduit raceway supports are discussed in Sections 2.4.3, 2.5, and 2.6 of this SE, respectively.

By letter dated April 29, 1997 (Ref. 16), the licensee indicated that necessary actions to resolve outliers listed in Table 8-1 have been completed. In its response (Ref. 8) to the staff's RAI dated January 15, 1998, the licensee further provided the specific analysis and resolution methods performed for each outlier resolution. The staff finds the licensee's approach in identifying and resolving outliers to be acceptable for the resolution of USI A-46.

3.0 SUMMARY OF STAFF FINDINGS

The staff's review of the licensee's USI A-46 implementation program, as discussed above, did not identify any significant or programmatic deviation from GIP-2 regarding the walkdown and the seismic adequacy evaluations at MNGP.

4.0 CONCLUSION

The licensee's USI A-46 program at MNGP was established in response to Supplement 1 to GL 87-02 through a 10 CFR 50.54(f) letter. The licensee conducted the USI A-46 implementation in accordance with GIP-2. The licensee's submittal on the USI A-46 implementation showed that the SSEL contained 841 components, of which 359 were walked down to verify their seismic adequacy. A total of 42 equipment items and 70 essential relays were identified as outliers. In its letter dated September 17, 1998, the licensee indicated that all

MNGP USI A-46 outliers were closed out during the refueling outage that ended in April 1998. The licensee's implementation report did not identify any instance where the operability of a particular system or component was questionable. As described in Section 3.0, the staff's review did not identify any areas where the licensee's program deviated from GIP-2 and the staff's SSER No. 2 on SQUG/GIP-2 issued in 1992.

The staff concludes that the licensee'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 No. 2 for the resolution of USI A-46. The staff has determined that the licensee's corrective actions have resulted in safety enhancements, in certain aspects, that are beyond the original licensing basis. Accordingly, the licensee's actions provide sufficient basis to close the USI A-46 review at the facility. The staff also concludes that the licensee's implementation program to resolve USI A-46 at the facility has adequately addressed the purpose of the 10 CFR 50.54(f) request. Licensee activities related to the USI A-46 implementation may be subject to NRC inspection.

Regarding future use of GIP-2 in licensed activities, the licensee may revise its licensing basis in accordance with the guidance in Section I.2.3 of the staff's SSER No. 2 on SQUG/GIP-2, (Ref. 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 (USQ) 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 a licensee to conclude a USQ is involved, incorporation of the GIP-2 methodology into the licensing basis would require the licensee to seek an amendment under the provisions of 10 CFR 50.90.

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5.0 REFERENCES

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2. U.S. NRC, "Supplemental Safety Evaluation Report No. 2 (SSER-2) on Seismic Qualification Utility Group's Generic Implementation Procedure, Revision 2, as corrected February 14, 1992 (GIP-2)," transmitted by NRC Generic Letter 87-02, Supplement 1, dated May 22, 1992.

3. Thomas M. Parker (NSP) letter to USNRC Document Control Desk, "Response to Generic Letter 87-02, Supplement 1, on SQUG Resolution of USI A-46 Monticello Nuclear Generating Plant (MNGP)," Docket No. 50-263, September 21, 1992.

4. A. H. Hsia (USNRC) letter to Thomas M. Parker (NSP), "Evaluation of Monticello Nuclear Generating Plant (MNGP), 120-Day Response to Supplement No. 1 to Generic Letter 87-02" (TAC No. M69460)," Docket No. 50-263, December 10, 1992.

5. William J. Hill (NSP) letter to USNRC Document Control Desk, "Monticello Nuclear Generating Plant, Response to Supplement 1 to Generic Letter 87-02, Submittal of USI A-46 Seismic Evaluation Report (TAC No. M69460)," Docket No. 50-263, November 20, 1995. (Report 91C2687.A46, USNRC USI A-46 Resolution for MNGP)

6. William J. Hill (NSP) letter to USNRC Document Control Desk, Monticello Nuclear Generating Plant, Response to Supplement 1 to Generic Letter 87-02, Submittal of USI A-46 Seismic Evaluation Report (TAC No. M69460)," Docket No. 50-263, February 19, 1996.

7. William J. Hill (NSP) letter to USNRC Document Control Desk, "Monticello Nuclear Generating Plant, Response to Request for Additional Information on the Resolution of Unresolved Safety Issue A-46 (TAC No. M69460)," Docket No. 50-263, April 29, 1997.

8. Michael F. Hammer (NSP) letter to USNRC, "Response to Request for Additional Information on the Resolution of Unresolved Safety Issue A-46 (TAC No. M69460)," Docket No. 50-263, January 15, 1998.

9. Craig A. Schibonski (NSP) letter to USNRC, "Response to NRC's Request for Additional Information on the Resolution of USI A-46 (TAC No. M69460)," Docket No. 50-263, February 11, 1998.

10. Michael F. Hammer (NSP) letter to USNRC, "Response to NRC's Request for Additional Information on the Resolution of USI A-46 (TAC No. M69460)," Docket No. 50-263, May 15, 1998.

11. T. Kim (NRC) letter to R. Anderson (NSP), "Request for Additional Information Resolution of USI A-46 (TAC No. M69460)," Docket No. 50-263, January 29, 1997.

12. T. Kim (NRC) letter to R. Anderson (NSP), "Request for Additional Information Resolution of USI A-46 (TAC No. M69460)," Docket No. 50-263, October 8, 1997.

13. T. Kim (NRC) letter to R. Anderson (NSP), "Request for Additional Information Resolution of USI A-46," Docket No. 50-263, Docket No. 50-263, November 12, 1997.

14. T. Kim (NRC) letter to R. Anderson (NSP), "Request for Additional Information Resolution of USI A-46," Docket No. 50-263, February 27, 1998.

15. "USNRC USI A-46 Resolution, Relay Evaluation Report for MNGP," November 1995, (Attachment to Reference 5 - "MNGP Response to Supplement 1 to Generic Letter 87-02, Submittal of USI A-46 Seismic Evaluation Report (TAC No. M69460)," Docket No. 50-263, November 20, 1995.

16. William J. Hill (NSP) letter to USNRC Document Control Desk, "Monticello Nuclear Generating Plant, Update on Status of Response to NRC Generic Letter 87-02, Supplement 1, USI A-46 Seismic Evaluation Report (TAC No. M69460)," Docket No. 50-263, April 29, 1997.

17. Michael F. Hammer (NSP) letter to USNRC Document Control Desk, "Monticello Nuclear Generating Plant, Completion of Commitment associated with NRC Generic Letter 87-02, Supplement 1, USI A-46 Seismic Evaluation Report (TAC No. M69460)," Docket No. 50-263, September 17, 1998.