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January 17, 1997

Docket No. 50-336
B16137

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Unit No. 2
Response to Request For Additional Information
Regarding Generic Letter 87-02 (TAC No. M69459)
Verification of Seismic Adequacy of Mechanical and Electrical Equipment

The purpose of this letter is for Northeast Nuclear Energy Company (NNECO) to provide additional information concerning seismic adequacy of mechanical and electrical equipment as requested by the Staff in the letter of September 11, 1996.¹

The responses to each of the sixteen questions presented by the Staff are contained in Attachments 1 through 8 of this letter.

The following are NNECO's commitments identified within this letter. All other statements contained within this letter are for information only.

B16137-01 NNECO plans, prior to unit startup, to resolve all of the unresolved mechanical, electrical, and structural component outliers and relay outliers as identified in the letter of January 22, 1996,² Table 4.1 of the Seismic Evaluation Report and Attachment G of the Relay Evaluation Report.

¹ Daniel G. McDonald to Ted C. Feigenbaum, "Request for Additional Information - Generic Letter 87-02, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue A-46, Millstone Nuclear Power Station, Unit 2 (TAC NO. M69459)," dated September 11, 1996.

² E. A. DeBarba to U. S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2, USI A-46 Walkdown Summary Report and Proposed Expansion of Licensing Basis for Verification of Equipment and Seismic Adequacy," dated January 22, 1996.

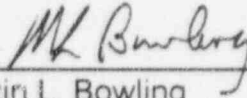
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If you have any additional questions concerning this submittal, please contact Mr.
Richard T. Laudenat at (860) 444-5248.

Very truly yours,
NORTHEAST NUCLEAR ENERGY COMPANY



Martin L. Bowling
Millstone Unit 2 Recovery Officer

Attachments

cc: W. D. Travers, Dr., Director, Special Projects Office
H. J. Miller, Region I Administrator
P. F. McKee, Deputy Director of Licensing, Special Projects Office
W. D. Lanning, Director, Millstone Oversight Team
D. G. McDonald, Jr., NRC Project Manager, Millstone Unit No. 2
D. Beaulieu, Acting Senior Resident Inspector, Millstone Unit No. 2

Attachment 1

Response to Request for Additional Information

Concerning Generic Letter 87-02

Verification of Seismic Adequacy of Mechanical and Electrical Equipment

in Operating Reactors

Unresolved Safety Issue (USI) A-46

January 1997

NRC RAI Number 1

In the reference submittal, you stated that the seismic margin assessment (SMA) methodology, as described in the EPRI report NP-6041, will be used for the resolution of outliers at Millstone Unit 2. It should be noted that while the SMA methodology discussed in the EPRI report NP-6041 may be acceptable for the Individual Plant Examination for External Events (IPEEE) program, the evaluation performed and accepted for the IPEEE program should not be considered automatically acceptable for the A-46 program.

Since this methodology is known to yield analytical results which are not as conservative as those which could be obtained by following the GIP-2 guidelines, its application to the A-46 program is generally not acceptable to the NRC. Describe the extent to which the SMA methodology is used in the program and, for each deviation from the GIP-2 guidelines where the margin methodology is utilized, identify the nature and the extent of the deviation, and provide the justification for its use.

Millstone Unit 2 Response:

The Generic Implementation Procedure (GIP) 2 approach was used for verifying the seismic adequacy of mechanical and electrical equipment which is consistent with the intent of Generic Letter 87-02. Although this approach is consistent with the EPRI Seismic Margins Assessment (SMA) methodology as described in NP-6041 the SMA methodology was not used to screen out any components. The SMA methodology was only identified as part of the proposed outlier resolution for certain components and is identified where applicable on the Outlier Seismic Verification Sheet (OSVS). Therefore, there are no deviations from the GIP-2 guidelines where the seismic margin methodology was used.

Section 5.2 of the GIP-2 identifies the methodology to be used to identify and document outliers which do not pass the screening guidelines.

Section 5.3 of the GIP-2 contains several generic methods for resolving outliers. As stated in the GIP-2:

"The details for resolving outliers, however, are beyond the scope of this procedure. It is the responsibility of the utility to resolve outliers using the existing engineering procedures as they would resolve any other seismic concern."

The GIP-2 further states that it is permissible to resolve outliers by performing additional evaluations and applying judgment to address those areas that do not meet

the screening guidelines contained in the GIP-2 and strict adherence to the screening guidelines is not absolutely required.

We believe that the methods proposed to resolve outliers at the Millstone Nuclear Power Station, Unit 2 are consistent with the generic methods recommended in the GIP-2. Although we had stated in our submittal that we may use the SMA methodology which was performed in support of IPEEE, we have not yet used it to resolve any A-46 outliers.

NRC RAI Number 2

In the third paragraph of Section 4.1.2 of Attachment 3, the Seismic Evaluation Report, concerning the valves located on top of the pressurizer, clarify the statement, "The conservative in-structure spectra for that location does not envelope the Reference Spectrum ..." Also provide the basis for concluding that the valve accelerations will be less than 3g, and that the valves are capable of sustaining a 3g earthquake loading.

Millstone Unit 2 Response:

There are four valves located on the top of the pressurizer. These are pressurizer safety valves 2-RC-200 and 2-RC-201 and Pressurizer Power Operated Relief Valves (PORV) 2-RC-402 and 2-RC-404. The seismic demand was initially based on the Conservative Design Floor Response Spectra at elevation 38.5 feet. The seismic capacity was based on 1.5 times the Bounding Spectrum. The 1.5 times the Bounding Spectrum (Capacity) does not envelope the demand. However, the Seismic Review Team (SRT) performed a review of the piping and support isometrics for the pressurizer safety and relief valve discharge piping. The piping system is rigidly supported in all three directions with snubbers and rigid supports to the pressurizer cubicle concrete walls in the vicinity of the pressurizer safety valves (2-RC-200 and 201), pressurizer PORVs (2-RC-402 and 404) and pressurizer block valves (2-RC-403 and 405).

Based on the fact that the SRT considers the design basis Floor Response Spectra (FRS) to be very conservative and piping supports are in close proximity to the listed valves, the SRT concluded that the actual seismic accelerations that the valves will be subjected to are lower than 3g's. Therefore the SRT judged that the intent of the capacity vs demand caveat was met. In addition a calculation was performed to qualitatively generate A-46 median-centered spectra for the containment structure and its internals. The calculation concluded that if median-centered spectra were to be generated for the containment building at elevation 38'-6", they will be enveloped by 1.5 times the Bounding spectra of USI A-46.

NRC RAI Number 3

For plant structures containing equipment in the USI A-46 scope:

- a) Identify structures which have licensing-basis in-structure response spectra (5% critical damping) for elevations within 40 feet above the effective grade, which are higher in amplitude than 1.5 times the SQUG Bounding Spectrum.
- b) For the structure(s) identified, provide the in-structure response spectra designated according to the height above the effective grade, and provide a comparison of these spectra to 1.5 times the Bounding Spectrum.
- c) With respect to the above comparison of equipment seismic capacity and seismic demand, indicate which method in Table 4-1 of GIP-2 was used to evaluate the seismic adequacy for equipment installed on the corresponding floors.

Millstone Unit 2 Response:

The above series of questions relate to the use of 1.5 times the plant Safe Shutdown Earthquake (SSE) ground response spectra as a realistic estimate of seismic demand under certain limited conditions as specified in the GIP-2. It is Northeast Nuclear Energy Company's understanding that the NRC Staff and representatives of the Seismic Qualification Utility Group (SQUG) are jointly seeking resolution of this issue. Accordingly, response to these questions is being deferred pending this resolution. It is SQUG's position that the GIP-2 methodology, as a whole, has been reviewed and approved by the NRC Staff in Supplementary Safety Evaluation Report (SSER) No. 2 dated May 22, 1992, as an acceptable method of demonstrating the seismic adequacy of equipment within its scope.

This new approved methodology differs from that contained in each SQUG member's licensing basis in substantial and fundamental respects. Accordingly, it is impossible to meaningfully compare isolated aspects of the two whole methodologies including their relative conservatisms; any such comparison must be made at the program level to evaluate compliance with appropriate NRC regulations concerning seismic adequacy.

NRC RAI Number 4

Provide the schedule for resolution of all unresolved mechanical, electrical, and structural component outliers identified in Table 4.1 of Attachment 3, "Seismic Evaluation Report," as well as the unresolved relay outliers identified in Attachment G. You are also requested to provide justification to support the proposed schedule taking into consideration any potential impact on plant safety.

Millstone Unit 2 Response:

The scheduling for resolution of all unresolved mechanical, electrical and structural component outliers identified in Table 4.1 of the Seismic Evaluation Report as well as the resolution of relay outliers identified in Attachment G of the Relay Evaluation Report is an ongoing activity at MP2. NNECO is currently in an extended mid-cycle outage and plans to resolve all of the outliers prior to start-up.

As stated in the Seismic Evaluation Report all outliers except two were found to meet the plant design basis.

Two conditions were identified for Safe Shutdown Equipment List (SSEL) components which represented adverse conditions and were reported in accordance with plant procedures by using the Adverse Condition Report (ACR) process. The two components are the RBCCW surge tank (T3) where the original frequency calculation was in error, and the second was a low voltage switchgear (22F) with missing plug welds. Both components were dispositioned as operable and able to complete their safety function but not fully design compliant, and found not to present any increased risk to public health and safety. The required rework and modifications for these two components have been completed. A nonconformance report was issued to document a pedestal crack for the quench tank (X-82); this was dispositioned as a Repair.

Therefore, with the dispositioning of the two outliers that did not meet the licensing basis, and no other A-46 outliers existed that were also deficiencies against the plant's licensing or design basis, the schedule for resolving the identified outliers will not lead to a potential safety impact on plant safety.

NRC RAI Number 5

In the Peer Review Report, a number of action items were suggested by the independent peer reviewers to enhance the plant operating conditions. Discuss the implementation status of each item recommended in the Peer Review Report and provide the planned completion schedule for those items that are not yet implemented.

Millstone Unit 2 Response:

The Peer Review Report presents the results of the peer review walkdowns for both the USI A-46 (SQUG) and IPEEE evaluation for Millstone Unit 2. As stated in the Peer Review Report the vast majority of the peer review findings and observations were already found and were documented by the SRT. Therefore, the peer reviewers believed that the SRT walkdown was conducted in a thorough and professional manner. It was also noted that nothing was found that would be considered a challenge to the design basis of the plant.

The following is a list of the action items that were suggested to be performed by the peer review team and the resolution of each action item. All items have been resolved.

Action Item 1: A weld inspection should evaluate a small sample of the plug welds that are used to anchor electrical buses to determine their acceptability and quality.

Status: A visual inspection of the plug welds was performed by Welding and Materials Test Engineering. This is documented in NNECO Memorandum CES-94-818. No instances where lack of fusion of a plug weld to embedded plate was observed. Therefore, this action item is closed.

Action Item 2: Recommend that cracked vibration isolator on EDG "B" control panel be replaced.

Status: Non-Conformance Report (NCR) 294-303 was generated. The SRT confirmed during 4/21/95 walkdown that the cracked bracket had been replaced. Therefore, this action item is closed.

Action Item 3: The Auxiliary and Turbine building are in contact with one another at discrete locations at Elevation 54.5 feet along Column Line E. Peer Reviewers recommended that an evaluation be performed to verify judgment that effect would be minimal.

Status: The evaluation was performed (see NNECO response to NRC RAI No. 14). Therefore, this action item is closed.

Action Item 4: Non Safety related fan in "B" Area above "B" diesel Generators is a potential seismic interaction concern. Perform an evaluation to assess its potential as an interaction concern.

Status: The SRT performed a further review and walkdown. The SRT judged that the fan above the "B" diesel generator had adequate support to prevent its failing during an earthquake and impacting the diesel. Therefore, this action item is closed.

Action Item 5: Provide justification for using a median amplification factor of 4.5 for Panel T-041.

Status: The justification for using a median amplification factor of 4.5 was the small size of the panel (not considered to have large plate mass) with three stiffeners in the back welded to the skid. The panel thickness is 1/8" and frequency of the panel was judged to be greater than 12Hz by SRT. Therefore, the intent of median amplification requirements is met. This justification was added to the Screening Evaluation Work Sheets (SEWS). Therefore, this action item is closed.

Action Item 6: Storage Containers located adjacent to the Refueling Water Storage Tank (RWST) should be moved or restrained.

Status: The containers were removed. Therefore, this action item is closed.

Action Item 7: Floor mounted distribution Panel VR11 has marginal anchorage. Classified as an outlier. Can it be resolved by use of median centered amplified floor response spectra?

Status: The anchorage evaluation for Panel VR11 that was performed as part of the SEWS showed that it was acceptable by using the median centered response spectra. Furthermore, Minor Modification (MMOD) Number M2-96570 and Design Change Notice (DCN) DM2-S-0633-96 document and provide the modification details by bolting the VR11 panel to two cabinets to its rear thus, resolving the seismic interaction concerns. The calculation which documented the modification showed that the resulting loads on the anchorage for VR11 were less than the SRT evaluation. Therefore, this action item is closed.

Action Item 8: Weak way bending of the base channels for UAC4 should be considered.

Status: Weak way bending of the base channels for UAC4 was evaluated and found acceptable. This is documented on the SEWS. Therefore, this action item is closed.

Action Item 9: The racks in one battery room are shimmed. Bolts should be evaluated for bending. Need to consider load path and stiffness of the rack.

Status: Battery racks for batteries DB1 and DB2 were judged as A-46 outliers based on the anchorage evaluations. MMOD Number M2-96568 and DCN DM2-S-0631-96 document and provide the modification details to the battery racks anchorages. Therefore, this action item is closed.

Action Item 10: Batteries are 15 years old. Can they be qualified for 20 year life?

Status: The batteries were replaced in 1995. Therefore, this action item is closed.

Action Item 11: The channels for Buses 22E&F are light gage sheet metal. Can they carry the superstructure's load to the weld?

Status: An evaluation was performed to determine the adequacy of the channels used to support Buses 22E&F. The evaluation has shown that the channels are adequate for the SSE loads. This is documented on the SEWS. Therefore, this action item is closed.

Action Item 12: MCC B51 has small gaps between MCC and environmental enclosure. This should be reviewed.

Status: The SEWS for MCC B51 contains an evaluation which addresses this action item. The maximum calculated displacement is less than the minimum observed gap. Therefore, the clearance is acceptable and this action item is closed.

Action Item 13: The bolts on the LPSI pumps are close to the steel edge. Analysis should consider that one side only can be relied upon to take out shear.

Status: The SRT reviewed the anchor bolt minimum edge distance. The minimum edge distance was found acceptable. Therefore, this action item is closed.

Action Item 14: Bolt type for diesel fuel oil day tank are unknown. UT test may be needed to verify length.

Status: UT test was performed. The UT data was used in the anchorage evaluation. Therefore, this action item is closed.

Action Item 15: MP2 should develop a seismic housekeeping plan for the control room.

Status: The Millstone Station developed a manual to establish a formal Materiel Condition Program which includes structures, equipment, systems, and areas, to identify, address, and correct deficiencies such as building

maintenance, housekeeping, equipment, and temporary equipment restraints. Therefore, this action item is closed.

Action Item 16: Need to consider edge distance on the anchorage for service water pumps P-5A, B and C.

Status: The anchor bolt edge distance for pumps P-5A, B, and C was considered in the evaluation. Therefore, this action item is closed.

NRC RAI Number 6

In Attachment G to the Seismic Evaluation Report, the 'A' Diesel Generator Room Vent Fan, listed in the Outlier Seismic Verification Sheet (OSVS), is described as being supported in the Warehouse Structure by vibration isolators from elevation 36 ft. (22 ft. from the grade level). Also, the east 480V Room Supply Fan, listed in the same OSVS, is described as being supported from elevation 71'-6" of the Auxiliary Building. For each of the above referenced components, it is noted that the corresponding design in-structure response spectrum exceeds the Reference Spectrum for frequencies above approximately 8 Hz. It is further stated in the OSVS that the ground response spectrum is well enveloped by the Bounding Spectrum; however, the 8 Hz caveat in the GIP-2 is not met because of the vibration isolators. The lowest natural frequency is estimated to be below 5 Hz. To verify the seismic adequacy for equipment, the GIP-2 specifies the seismic demand spectrum be a least enveloped by the seismic capacity spectrum for frequencies at and above the conservatively estimated lowest natural frequency of the equipment. Based on the above, the staff finds your conclusion, that the spectra exceedances are of no consequences for the seismic adequacy and that the fans meet the intent of the GIP-2 screening criteria, to be unacceptable.

You are requested to provide a quantitative evaluation for a realistic in-structure SSE response spectra for these equipment to ensure that the in-structure spectra are enveloped by the capacity spectra for the corresponding equipment, in accordance with the GIP guidelines.

Millstone Unit 2 Response:

Fan F52 is mounted on a steel frame suspended from the Auxiliary Building roof with W4X13 members welded to the bottom of structural steel at El. 70'-7". The fan sits on top of 4 vibration isolator brackets and is bolted with 1 - 1/2" diameter bolt per bracket. The isolator brackets are mounted on W8 beams and are bolted with 4 - 1/2" diameter structural bolts. The frame is braced in both horizontal directions. The N-S bracing consists of 2 sets of 3" X 3" X 1/4" angles to the roof steel. The E-W bracing consists of 2 sets of 3 1/2" X 3" X 1/4" angles to the concrete wall at El. 63'-6", each angle brace is welded to a base plate which is attached to the wall with 4 - 1/2" diameter expansion bolts. The fan has flex joints at the intake and discharge sides.

The isolation devices are made by Vibration Eliminator of Long Island City, NY model 2KW1-ST2. For each isolator there are 2 - 1/2" bolts provided to limit vertical movement and provide sufficient lateral restraint through bending of bolts.

A quantitative evaluation was performed to determine the in-structure response spectra for fan F52. The evaluation utilized the same structural model that was used for the

generation of the auxiliary building USI A-46 median centered in-structure spectra. The evaluation was performed as follows:

- Three median-centered time histories (2 horizontal, 1 vertical) enveloping the Millstone Unit 2 ground response spectra were generated. The vertical time history chosen was equal to two-thirds the horizontal time history.
- The 3 ground median time histories seismic input were used to generate 3 time histories at the auxiliary building roof at elevation 71.5 ft (2 horizontal, 1 vertical).
- A model of the fan F52 structural frame that is supported from the auxiliary building roof was generated. The structural model included the manufacturer's data for spring stiffness of the vibration isolators.
- In-structure response spectra at 5% damping for the north-south direction were generated from the 3 roof time histories and the fan structural model at the fan center of gravity. It should be noted that the east-west in-structure spectra were not generated since the 1.5 bounding spectrum enveloped the east-west median response at Auxiliary Building roof elevation 71.5 ft. For comparison purposes, the north-south in-structure spectra were generated, first by only utilizing the stiffness of the fan structural frame, and second, by accounting for the spring stiffness of the fan vibration isolators. The natural frequency of the fan structural frame is in the rigid range for both horizontal directions.

The results of the quantitative evaluation show that the 1.5 bounding spectrum envelopes the in-structure seismic demand when the spring stiffness of the vibration isolators is considered. When the vibration isolators are included in the structural model, the reduction in the peak seismic demand for the fan is approximately a factor of 5, when compared to the seismic demand of the fan structural frame. The frequency of the structural model when the vibration isolators are included is approximately 3 Hz vs. 8.5 Hz when only the structural frame is included.

In order to account for any variation in the spring stiffness of the vibration isolators, an additional structural model was generated by doubling the spring stiffness of the isolators. The results again show that the 1.5 bounding spectrum envelopes the in-structure seismic demand, with a reduction factor of approximately 2 to the peak seismic demand. In addition, the frequency increased from 3 Hz to 4 Hz.

Therefore, the results of the above discussed quantitative evaluation validates the engineering judgment of the SRT, "that the spectra exceedances are of no consequences for the seismic adequacy and that the fans meet the intent of the GIP-2 screening criteria".

Fan F38A is mounted on a steel support frame with three neoprene vibration isolator cups per side. Each corner isolator (total of 4) has a 1/2" diameter bolt which limits the vertical movement and at the same time provides sufficient lateral restraint by bending

of the bolt. The structural frame for the fan is welded to the structural roof beams above, at elevation 36'-0", and is braced in both horizontal directions. The SRT judged that the fan frame has adequate structural capacity and thus, meets the GIP-2 anchorage criteria.

Based on the above discussion and the conclusions stated on the OSVS for Fan F38A (in Attachment G of the NRC Seismic Report Submittal), NNECO concludes that the capacity vs demand spectra exceedance above 8Hz has no significant impact to the structural capacity of the fan and its support structure. Although a quantitative evaluation similar to fan F52 was not performed for F38A, the SRT believes that similar results would be obtained when performing a quantitative evaluation.

NRC RAI Number 7

In the OSVS for relays, it is stated that the possibility of operator actions to reset essential relays is pursued. For each relay outlier seeking resolution through operator actions, state if pertinent procedures are in place, and the operators are trained in their use, to ensure timely actions in achieving and maintaining a safe shutdown condition under the postulated conditions of an SSE. Discuss also how potentially harsh environmental conditions are factored into these operator action scenarios.

Millstone Unit 2 Response:

Section II.3.2.8 of GIP-2 states that existing normal and emergency operating procedures (EOPs) are expected to be sufficient to lead operators to use of appropriate, operational equipment and systems following a SSE, and operators are expected to be trained in their use. As stated in the SQUG (Neil Smith) letter to the NRC (James Partlow) dated August 21, 1992, SQUG's understanding of the NRC staff's position on operator training (as described in SSER #2, Section II.3, Evaluation and Conclusion, item 2) is that appropriate training on plant procedures is required only when it becomes necessary to change these plant procedures to achieve compatibility with the SSEL. Training need be provided only to the extent necessary to familiarize operators with changes to these procedures as a result of the A-46 program.

GIP-2, Section 3.2 sets forth the criteria and assumptions used for identifying safe shutdown equipment. Specifically, Section 3.2.5 states that the only potential events postulated to occur, other than a design basis safe shutdown earthquake, is a loss of offsite power. Other events which could cause harsh environmental conditions such as loss of coolant accidents (LOCAs), high energy line breaks (HELBs), and fires do not have to be considered for the USI A-46 program. Therefore, the only "harsh environmental conditions" which must be considered for resolution of USI A-46 are those which are associated with the SSE and loss of offsite power.

The outlier relays are located in Safety Related, Seismic Category 1, structures, in areas which are accessible to operators from the control room. Emergency as well as portable lighting would be available to the operators.

NRC RAI Number 8

In Attachment C, to the Seismic Evaluation Report, "Resume and Training Records of Key Vectra Technologies Personnel," there is no evidence or certificate provided to demonstrate that Mr. John Reilly has completed the necessary SQUG training courses on the seismic adequacy verification of nuclear power plant equipment. Provide evidence to support his qualification for participating in the A-46 implementation program.

Millstone Unit 2 Response:

Mr. John Reilly is a Mechanical Engineer with a BSME and over eight years of experience in the design and evaluation of mechanical equipment for nuclear power plant applicability. Mr. Reilly's primary function in the USI A-46 program was in support of Mr. Stephen Reichle in the selection of the safe shutdown equipment path list and input of data into the SSEL electronic data base. Mr. Reilly worked under the direct supervision of Mr. Reichle who is SQUG trained. Mr. Reilly has not received USI A-46 training. However, he was not involved in any capacity whereby he certified the seismic adequacy verification of nuclear power plant equipment.

Mr. Reilly at all times worked under the direct supervision of qualified and certified SRT members.

NRC RAI Number 9

With regard to the required documentation for the A-46 program, as specified in GIP-2, Part II, Section 9, the licensee has submitted, together with the reference summary report, the following documents:

- a) Safe Shutdown Equipment List (SSEL) Report (Attachment 1),
- b) Relay Evaluation (RE) Report (Attachment 2), and
- c) The Seismic Evaluation (SE) Report (Attachment 3).

It is noted that Attachment A to the SSEL Report (Attachment 1) and Attachments A, C and H to the Relay Evaluation Report (Attachment 2) are not included in the submittal, and neither are Attachments A, B, E and H to the Seismic Evaluation Report (Attachment 3). For these attachments which were not submitted, explain the reasons for their exclusion from the submittal.

Millstone Unit 2 Response:

All documents supporting the A-46 program submittal are available to the NRC for staff review. The Attachments not included in the transmittal to the NRC are contained in the Project file documents and serve as the supporting data for the submittal. These documents are voluminous in nature due to the detailed data collected during the USI A-46 program.

The Attachments that were not submitted are the detailed working files, seismic walkdown data sheets, and supporting documentation used to develop the Screening Verification Data Sheet (SVDS), OSVS which are a summary of these sections as required by the GIP-2.

Section 9 of the GIP-2, Part II describes the various types of documents which should be generated and the types of information which should be submitted to the NRC. The format and data submitted by NNECO for Millstone Unit 2 is consistent with the requirements set forth in GIP-2.

NRC RAI Number 10

In Attachment F, Screening Verification Data Sheet (SVDS), to the Seismic Evaluation Report, the floor elevations and the equipment base elevations are identified and, for most of the equipment listed, the floor and equipment base elevations are the same. However, for some equipment they are different. Evidently the equipment in the former are floor mounted and those in the latter are not floor mounted. Indicate how the response spectra for the latter are generated.

Millstone Unit 2 Response:

For those components where the floor and equipment base elevations are not the same, the equipment is typically wall or platform mounted.

The SRT used judgment in determining the appropriate floor response spectra (FRS) for determining demand. Typically the FRS for the next highest elevation was chosen after careful review and walkdown was performed to determine the type of structure supporting the component. The review and walkdown were used to verify that amplification of the FRS was adequately considered in the evaluation.

NRC RAI Number 11

Identify the largest vertical steel tank existing in the plant and discuss how its seismic adequacy has been evaluated.

Millstone Unit 2 Response:

As part of the USI A-46 program, the GIP-2 was used to provide guidance for identifying the various alternate methods, or paths, to be used in accomplishing the four key functions subsequent to a safe shutdown earthquake. Once the paths were chosen, the components on these paths were identified.

For Millstone Unit 2, T40, the Condensate Storage Tank (CST) and T41, the Refueling Water Storage Tank (RWST), are included on the SSEL. The SRT reviewed existing documentation, and performed a walkdown of these two tanks.

The CST was modified in 1990. The SRT reviewed the documentation and compared the documentation to the "as-found" field conditions. No discrepancies were noted. The SRT also reviewed the existing seismic calculations. Based on the review of the documentation and field walkdown the SRT judged the CST to be seismically adequate.

The SRT performed a document review and walkdown of the RWST. The RWST does not meet the GIP-2 screening criteria because of the anchor bolt edge distance, the stiffener thickness and the ratio of effective tank shell thickness over the radius. A detailed evaluation was performed of the RWST. This is documented in VECTRA Calculation No. MP2OR, Rev. 0, Section 5.4. Based on the detailed evaluation, the SRT judged the RWST to meet the GIP-2 criteria and therefore was screened out.

In summary, Tanks and Heat Exchangers were evaluated by the SRT using the general methodology and acceptance criteria described in Section 7 of the GIP-2. The SRT reviewed any existing analyses and performed supplemental evaluations consistent with the GIP-2 methodology. The evaluations are summarized on the class 21 SEWS with the detailed calculations referenced.

NRC RAI Number 12

Provide an example which shows how the Cable Tray and Conduit Raceway reviews for seismic adequacy are accomplished analytically.

Millstone Unit 2 Response:

As stated in the Seismic Evaluation Report, Section 4.3, Raceway Evaluations:

The Raceway reviews were performed independent of the equipment effort in accordance with the criteria given in Section 8 of the GIP-2. The Cable and Conduit Raceway Review consisted of:

- 1) Plant walkdowns that focused on the inspection of all accessible portions of the installed raceways. The walkdowns were performed on an area basis and documented on a total of sixteen (16) area summary sheets. This enabled the SRT to confirm that the as-built details were consistent with the intent of the original design and installation specification; also, to the extent possible, the SRT looked for any seismic performance concerns in accordance with the GIP-2 guidance. The MP2 designs met the inclusion rules set forth in the GIP-2.
- 2) An analytical check of four (4) selected worst-case supports using a set of Limited Analytical Review (LAR) Guidelines.

The majority of the raceway supports used at MP2 are unistrut trapezes that are braced laterally and longitudinally. The supports were obviously designed with seismic considerations and are consequently very rugged.

Four (4) configurations were selected for Limited Analytical Review (LAR). The results of the raceway LAR evaluations have been documented in VECTRA Calculation 0024-099-C002, Rev. 0, which is provided in Attachment 2 to this letter. All four LARs met the criteria established in the GIP-2 and are therefore acceptable. No outliers were identified from this review.

NRC RAI Number 13

Provide the in-structure response spectra for the following structures at designated locations where most of the equipment and components are installed and, based on the corresponding response spectra, their seismic adequacy evaluated:

- a) Auxiliary Building, Elevations: -5'-6", -25'-6", -45'-6", 14'-6", 36'-6" and 56'-6"
- b) Enclosure Building, Elevations: -5'-6", -25'-6", -54'-6"
- c) Reactor Building, Elevations: -5'-10", -22'-6" and 27'-0"
- d) Turbine Building, Elevations: 1'-6" and 14'-6"
- e) Warehouse, Elevations: 14'-6" and 38'-6"

Since Attachment B to the Seismic Evaluation Report was not provided for staff review (Ref. Item 10), provide a summary of the technical considerations used for the development of the above in-structure response spectra.

Millstone Unit 2 Response:

The following floor response spectra curves are attached to this letter:

Ground Response Spectra: (Attachment 3)

Auxiliary Building: 1% critical damping OBE floor response spectra curves for elevations -5'-0", 14'-6", 38'-6", and 54'-6" are provided. The SSE response spectra curves are two (2) times the OBE response spectra curves. As for elevations -45'-6" and -25'-6", the design basis ground response spectra curves apply for these two elevations due to the configuration of the structure. (Attachment 4)

Enclosure Building: Since the Enclosure Building floor elevations -45'-6", -25'-6", and -5'-0" are common to the Auxiliary Building, they are provided with the Auxiliary Building floor response spectra curves.

Reactor Building: 1% critical damping OBE floor response spectra curves for elevations 0'-0" and 26'-6" are provided. The SSE response spectra curves are two (2) times the OBE response spectra curves. As for elevation -22'-6", the design basis ground response spectra curve apply for this elevation due to the configuration of the structure. (Attachment 5)

Turbine Building: The design basis ground response spectra curves apply for elevations 1'-6", and 14'-6".

Warehouse Building: The 2%, 7%, and 10% critical damping SSE floor response spectra curves for elevations 14'-6" and 38'-6" are provided. (Attachment 6)

The NNECO 120 day plant specific response letter to the NRC for Supplement 1 of Generic Letter 87-02 provided the MP2 required information relative to procedures and criteria used to generate the licensing basis in-structure response spectra for MP2. The existing design spectra were designated as conservative spectra for the USI A-46 effort. Attachment B to the Seismic Evaluation Report contains the NNECO letter and Attachments. A copy of the NNECO 120 day plant specific response is provided in Attachment 7 of this letter.

The NNECO letter and Section 5.8 of the MP2 FSAR contain the required information requested by the NRC. In addition, median-centered in-structure response spectra were generated for the Auxiliary Building. The detailed spectra generation was submitted to the NRC for staff review via letter dated July 7, 1994. An SER dated March 22, 1995 was issued by the staff documenting the review of these spectra and the method used. The staff determined that the generated median spectra was acceptable for use in the A-46 project. A copy of the submittal of the median-centered in-structure response spectra to the NRC is provided in Attachment 8 of this letter.

NRC RAI Number 14

Since the Auxiliary and Turbine Buildings are constructed independently but are in close contact, indicate through analysis the effect of potential impact between these two buildings on the buildings themselves as well as on the equipment during a seismic event.

Millstone Unit 2 Response:

The review of the seismic adequacy of structures is not part of the USI A-46 program but is included in the IPEEE program as delineated in NUREG-1407.

The primary issue of the floor interaction at elevation 54.5 ft between the Turbine Building and the Auxiliary building along column line E deals with the potential for seismic impact loads that could be generated in the Switchgear room immediately adjacent to this column line. This was addressed in IPEEE calculation 93C2799-C-006, by Stevenson & Associates, which calculated the response spectra of the Auxiliary Building floor at elevation 54.5 ft in the coupled configuration. The calculation concluded that the building interaction does not adversely affect the Auxiliary Building floor response spectra. The results of the building interaction analysis confirmed the Peer Reviewers' judgment that the interaction effects were small and not significant.

NRC RAI Number 15

In the second paragraph on Page 11 of the Seismic Evaluation Report, it is stated that Reduction Factors for "reduced inspections" were utilized where the tightness check for anchor bolts could not be performed. Indicate how these reduction factors are established for such anchors.

Millstone Unit 2 Response:

As stated on Page 11 of the Seismic Evaluation Report, tightness check for concrete expansion anchor bolts were performed by the SRT in accordance with the GIP-2 criteria. When the tightness check could not be performed, Reduction Factors for "reduced inspections" were used in performing the required anchorage calculations. The anchorage calculations were performed using the ANCHOR program module which is part of the GIPPER Software package.

The nominal capacities and Reduction Factors for the anchorage evaluations were obtained from Appendix C of the GIP-2. As stated in C.2.3 of the GIP-2, the tightness check is not required if the Reduced Inspection Alternatives as described in Appendix C.2.10 is used. For the concrete expansion bolts where the tightness check could not be performed, a pullout capacity reduction factor and a shear capacity reduction factor were applied to the nominal pullout and nominal shear capacity respectively using the method contained in Appendix C.2.10 of the GIP-2.

NRC RAI Number 16

In the Peer Review Report, concerns were identified on the seismic adequacy of masonry block walls at such locations as Battery Rooms and Warehouse Building. However, in the Seismic Evaluation Report, there is no mention on the proposed resolution of the concern. Provide an explanation of how the concerns have been resolved, in light of the staff comments in Items 1 and 4.

Millstone Unit 2 Response:

The Peer Review Report presents the results of the peer review walkdown for both the USI A-46 and IPEEE evaluations for Millstone Unit 2. The Peer Reviewers as part of their walkdown identified the masonry block walls in the battery rooms and warehouse areas as HCLPF candidates to be evaluated for the IPEEE plant review.

Therefore, the HCLPF calculations are considered and reported as part of the IPEEE submittal. It should be noted that the masonry block walls in the battery rooms were evaluated as part of the NRC I&E Bulletin 80-11 effort.

The IPEEE review for Millstone Unit 2 evaluated the block walls in the battery rooms and warehouse areas and concluded that they have adequate seismic capacity. Therefore, these results address the Peer Reviewer's concerns.