

May 16, 1997

Mr. Richard R. Grigg
Chief Nuclear Officer
Wisconsin Electric Power Company
231 West Michigan Street, Room P379
Milwaukee, WI 53201

SUBJECT: POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2 - REQUEST FOR
ADDITIONAL INFORMATION ON GENERIC LETTER 87-02, "VERIFICATION OF
SEISMIC ADEQUACY OF MECHANICAL AND ELECTRICAL EQUIPMENT IN
OPERATING REACTORS, UNRESOLVED SAFETY ISSUE (USI) A-46 (TAC NOS.
M69472 AND M69473)

Dear Mr. Grigg:

By letter dated September 30, 1996, you responded to our request for
additional information dated May 23, 1996. Based on the review of this
response and previous responses dated September 21, 1992, June 1, 1994,
June 30, 1995, November 20, 1995, and January 19, 1996, an additional request
for information is enclosed. Please provide your response to this request
within 30 days of receipt of this letter. If you have additional questions,
please contact me at (301) 415-1380.

Sincerely,

Original signed by:

Linda L. Gundrum, Project Manager
Project Directorate III-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-266
and 50-301

Enclosure: Request for Additional
Information

cc w/encl: See next page

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Mr. Richard R. Grigg
Wisconsin Electric Power Company

Point Beach Nuclear Plant
Unit Nos. 1 and 2

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SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION
POINT BEACH NUCLEAR PLANT
A-46 SUMMARY REPORT

1. Adequacy of Seismic Demand Determination (Ground Spectra and In-Structure/Floor Response Spectra)

The staff has reviewed your September 30, 1996, response (Ref. 1) to the request for additional information (RAI) (Ref. 2) and finds that additional information is required.

Referring to the in-structure response spectra provided in your 120-day response to the NRC's request in Supplement No. 1 to Generic Letter (GL) 87-02, dated May 22, 1992, the following information is requested:

- a. Identify structure(s) that have in-structure response spectra (5 percent of critical damping) for elevations within 40-feet above the effective grade, which are higher in amplitude than 1.5 times the Seismic Qualification Utility Group (SQUG) Bounding Spectrum.
- b. With respect to the 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 in the structure(s) identified in item (a) above. If you have elected to use method A in Table 4-1 of the GIP-2, provide a technical justification for not using the in-structure response spectra provided in your 120-day response. It appears that some A-46 licensees are making an incorrect comparison between their plant's safe shutdown earthquake (SSE) ground motion response spectrum and the SQUG Bounding Spectrum. The SSE ground motion response spectrum for most nuclear power plants is defined at the plant foundation level. The SQUG Bounding Spectrum is defined at the free field ground surface. For plants located at deep soil or rock sites, there may not be a significant difference between the ground motion amplitudes at the foundation level and those at the ground surface. However, for sites where a structure is founded on shallow soil, the amplification for the ground motion from the foundation level to the ground surface may be significant.
- c. For the structure(s) identified in Item (a) above, provide the in-structure response spectra designated according to the height above the effective grade. If the in-structure response spectra identified in the 120-day-response to Supplement No. 1 to GL 87-02 was not used, provide the response spectra that were actually used to verify the seismic adequacy of equipment within the structures identified in item (a) above. Also, provide a comparison of these spectra to 1.5 times the Bounding Spectrum.

2. Seismic Adequacy of Tanks and Heat Exchangers

- a. You stated that the RWST [refueling water storage tank], 1(2)T-13, did not meet the Section 7 evaluation rules of the GIP-2 (page 8-5, Ref. 1) and were identified as outliers. You further stated that a detailed evaluation was performed in accordance with Appendix H of EPRI NP-6041. Since the EPRI NP-6041 Appendix H methodology is known to yield less conservative results than those based on GIP-2

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methodology, the staff did not accept the Appendix H methodology without a technical justification for its acceptance.

Your September 30, 1996, response did not provide a technical justification for the tank's evaluation methodology (use of Appendix H to EPRI NP-6041). The staff therefore requests that you identify all the items whose acceptance were based on methodologies that differ from the GIP-2 Guidelines and provide a justification for the acceptability of each item. When computer codes were used in arriving at certain conclusions, validation documents should be provided especially for those codes where non-linear analyses were performed. The validation should be beyond quality assurance/quality control arguments. It should include, as a minimum, a numerical error bound and a comparison with physical test data.

In addition, analysis of a soil structure interaction for the tank evaluation should also be validated, documented and submitted for NRC review when it differs from the one used in constructing the floor response spectra in your 120-day submittal or differs from the FSAR [final safety analysis report] when the subject was not discussed in your 120-day submittal.

- b. On page 4/23 of Enclosure 4 (Ref. 2), a list of the failure modes is provided, including item 4 "Global shell buckling due to overturning moments." However, a calculation was not provided for this mode. Provide such a calculation and discuss why buckling is not a governing mode of failure. Also provide validation documentation as discussed above.

3. Seismic Adequacy of Cable and Conduit Raceways

During our review of the GIP-2 Guidelines, the staff found that the procedure for ductile cable tray systems needed further evaluation. The guideline stated that the ductile cable tray system is not required to be evaluated for a lateral load. The staff is currently pursuing the resolution of this issue with SQUG. A generic resolution, when established, should apply to the Point Beach plant cable trays as well, and you should revise the evaluation of the Point Beach cable tray systems accordingly.

For the interior of the cable spreading room, provide drawings of cable trays, structural drawings of the floor and/or the ceiling at the elevation where the cable trays are attached, floor response spectra (discuss how the flexibility of the floor was taken into consideration) and final results of cable tray evaluation in terms of deflection due to the system stress level. Provide stiffness (natural frequencies) of the cable tray systems and supporting floor and/or ceiling including weight of the cable tray and its contents such as fire retardant. Provide the margins to the design limits and/or failure. In addition, provide validation documents of any computer codes used to produce the results discussed above.

4. Licensee Event Report

The Licensee Event Report 97-008-00 (Reference 3) discussed existence of nonseismic duct work located above safety-related equipment in the containment. This situation existed for some time and it is apparent that the walkdown crew for the A-46 program failed to identify the deficiency. Demonstrate that this is not an indication of a general weakness in the USI A-46 walkdown program.

5. Deviation from GIP-2

In Reference 4, you stated that you are committed to implement the GIP-2 including the clarifications, interpretations, and exceptions in SSER-2, and to communicate to the NRC staff any significant or programmatic deviations from the GIP-2 guidance. You further stated that the submittal confirms that no significant or programmatic deviations from the GIP-2 guidance were made.

Provide the worst-case items (from the safety point of view) that deviate from the GIP-2 guidelines but were categorized as not being significant. In addition, we request that you provide the definition of "Significant deviations" that the walkdown crew used to classify the deviation as significant or insignificant and provide a justification for why such a definition is adequate.

6. Relays Mounted on Vibrating Equipment

Your response dated September 30, 1996, to our RAI (Item 11) on "Relays Mounted on Vibrating Equipment" states that you agree with the SQUG position on this issue in the SQUG letter to the NRC, dated August 19, 1996. However, as indicated in the NRC letter to the SQUG, dated December 5, 1996, the SQUG's generic response to the NRC question is not acceptable. First, the specific issue in question is not regarding relays mounted on diesel generators and air compressors. The issue is the inappropriateness of using the "rule-of-the-box" concept and the judgment based on the normal operation of the diesel generators or air compressors to justify the seismic adequacy of devices, such as relays, mounted in the instrumentation and control cabinets anchored on the common skid of the diesel generator or air compressor.

The concept of the "rule-of-the-box" applies to components in a system that has already been successfully subjected to a vibratory environment comparable with or greater than the required motion (e.g., SSE). Therefore, the "rule-of-the-box" concept can also be applicable for acceptance of the relays mounted on vibratory equipment (or in a cabinet supported on the common skid) provided it is demonstrated that the vibratory motion of the equipment (or the skid) is at least equal to the required seismic motion at that location, and that the relays performed all their intended functions during the periods of vibration.

With regard to relays mounted on diesel generators and air compressors, the following specific questions should be addressed:

- a. Does the mechanical vibration envelop the required input motion (e.g., SSE) from all aspects (e.g., amplitude, frequency, direction, etc.)?
- b. Do these vibratory equipment-mounted relays perform all their operational safety functions (e.g., change of state) while the supporting equipment is vibrating (i.e., during startup and normal operation) so that the relays can be considered qualified to that level?
- c. For any of these vibratory equipment items, could an SSE occur when the equipment is vibrating? If so, then the earthquake load will be an increment to the normal operational vibratory load, and the relay may need to be reviewed for the increased motion.

The vibratory motion of the skid is expected to be less severe than the vibratory equipment item itself provided the skid is rigidly mounted on a heavy foundation. Therefore, all of the above questions will also apply for relays contained in skid-mounted cabinets with a particular emphasis on the vibration level verification, with the understanding that it is the vibration of the skid and not of the vibrating equipment, that will be compared with the required input motion (i.e., Item a. above). In addition, the cabinet that houses the relays may also change the vibration level and characteristics at the relay locations.

Regarding "bad actor" relays, they are so described mainly because of their low seismic capacities, or inexplicable performance characteristics. Therefore, "bad actor" relays mounted on vibratory equipment may be expected to have demonstrated their performance under certain conditions. But, in general, these relays also should be verified following the approach for other vibratory equipment-mounted relays discussed above.

In conclusion, the staff's original RAI has been clarified and divided into three questions as described above. Any USI A-46 plant licensees who have inappropriately used the "rule-of-box" concept or exercised the judgment, based on normal operation of the vibratory equipment, to justify the seismic adequacy of component/device mounted on a vibratory equipment or mounted in a cabinet that is anchored to the common skid of the vibratory equipment, should demonstrate the seismic adequacy of the component/device by calculation and/or test data.

The above revised RAIs have been sent to the SQUG. In response to these RAIs, the SQUG did not provide specific responses to the above RAIs in its letter to NRC dated April 18, 1997. Therefore, the staff does not accept the SQUG response as a resolution to this issue. You are requested to provide specific resolutions to the above RAIs.

7. Human Factors Aspects of A-46

- a. In response to question 23 on page A32 of 42 of the licensee's submittal, the licensee did not specifically address how the multi-disciplinary team evaluated that sufficient time was available to ensure operators could accomplish the required actions associated with a safe shutdown. Please describe how the team determined that sufficient time was available to accomplish these activities?
- b. Regarding question 24, the staff agrees that the USI A-46 scenario is not expected to cause harsh environmental conditions. As discussed in a letter from the staff to the SQUG dated December 5, 1996, following a joint meeting of representatives of the NRC and SQUG on August 28, 1996, the staff provided the SQUG with additional clarification of the types of concerns that should be considered including (1) the potential for diminished lighting due to loss-of-offsite power, (2) other barriers such as damaged equipment or structures which could inhibit operators ability to access plant equipment (e.g., ingress/egress paths to SSEL equipment), and (3) the potential for requiring operators to enter hazardous (e.g., high temperature, humidity, steam, flooding, or electrical hazards) or unfamiliar areas to manually reset or realign equipment.

How were these potentially hazardous environmental conditions and additional concerns factored into the analysis?

8. Please provide an updated status on the component cooling water system issues at Point Beach as described in your November 20, 1995, letter.
9. Please provide a status of outstanding outliers that remain to be completed and current schedule dates of completion.

REFERENCES

1. Letter from NRC to Wisconsin Electric Power Company, "Request for Additional Information Regarding the Report on the Verification of Seismic Adequacy of Mechanical and Electrical Equipment on Operating Reactors," dated May 23, 1996.
2. Letter from Wisconsin Electric Power Company to NRC Document Control Desk, "Response to Request for Additional Information Regarding the Report on the Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors," dated September 30, 1996.
3. Licensee Event Report 97-008-00, Wisconsin Electric Power Company, "Non-Seismic Duct Work Located Above Safety-Related Equipment in Containment, Point Beach Nuclear Plant, Units 1 and 2," dated March 3, 1997.
4. Letter from Wisconsin Electric Power Company to NRC Document Control Desk, "Generic Letter 87-02 Summary Report for Resolution of Unresolved Safety Issue A-46, Point Beach Nuclear Plant, Units 1 and 2," dated June 30, 1995.