Mr. G. R. Horn
Sr. Vice President of Energy Supply
Nebraska Public Power District
1414 15th Street
Columbus, NE 68601

October 7, 1998

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION RELATED TO UNRESOLVED SAFETY ISSUE A-46, "VERIFICATION OF SEISMIC ADEQUACY OF MECHANICAL AND ELECTRICAL EQUIPMENT IN OPERATING REACTORS," COOPER NUCLEAR STATION (TAC NO. M69439)

Dear Mr. Horn:

By letter dated June 13, 1996, the Nebraska Public Power District (NPPD) submitted a summary report for the Cooper Nuclear Station related to Unresolved Safety Issue A-46, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors." Based on the NRC staff's ongoing review of that submittal, the staff has developed the enclosed request for additional information (RAI). This is a correction and superceeds the request transmitted to you on September 8, 1998.

You are requested to provide a response to the enclosed RAI within 90 days of the receipt of this letter. If you have any questions concerning the enclosure, please contact me at (301) 415-1301.

Sincerely,

ORIGINAL SIGNED BY:

David L. Wigginton, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosure: Request for Additional Information

cc w/encl: See next page

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

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Mr. G. R. Horn
Nebraska Public Power District

Cooper Nuclear Station

cc:

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REQUEST FOR ADDITIONAL INFORMATION

RELATED TO UNRESOLVED SAFETY ISSUE A-46:

VERIFICATION OF SEISMIC ADEQUACY OF MECHANICAL AND ELECTRICAL

EQUIPMENT IN OPERATING REACTORS

COOPER NUCLEAR STATION

By letter dated June 13, 1996, the Nebraska Public Power District (NPPD, the licensee) submitted a summary report for the Cooper Nuclear Station (CNS) related to Unresolved Safety Issue (USI) A-46, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors." The NRC staff has developed the following questions, based on our review of that submittal and its attachments.

1. Based on the information provided, it is unclear as to how some equipment was determined to meet the intent of the caveats described in Appendix B of the Generic Implementation Procedure (GIP-2). The following items pertain to Table 3.1 in Attachment 2 to your letter of June 13, 1996.

    a. For equipment CRD-ACC-125 and CRD-ACC-128, you stated that the HCU racks differ from the typical instrument racks in the experience data base, but the Seismic Review Team judged that their construction, equipment attachments, and anchorage are at least as strong as those racks included in the data base. Provide the basis of the judgement.

    b. Core Spray and RHR instrument racks LRP-PNL-(25-1), LRP-PNL-(25-59), LRP-PNL-(25-60), and LRP-PNL-(25-62) are anchored to 3.5" thick concrete pads that are not doweled into the underlying floor slab. Provide the technical basis to demonstrate the seismic adequacy of the anchorage.

    c. For valves SW-AOV-857AV and SW-AOV-858AV whose bodies are made of cast iron, provide the technical basis to demonstrate that the seismic stresses in the valve bodies due to piping loads are within the allowable limits.

    d. For valves SW-MOV-2128MV, SW-MOV-2129MV, and CRD-AOV-CV33, provide a calculation to demonstrate that the offsetting operators do not over-stress the valves and the attached piping during a seismic event.

2. On page 5 of Attachment 2 to your June 13, 1996, letter, you stated that since the 120-day submittal, other floor response spectra (FRS) were developed that, per the GIP, would be considered realistic, median-centered. You further stated that these FRS were being considered for outlier evaluations. In your submittal, you mentioned several computer programs such as SHAKE, CLASS, SSIN and SUPELM which were used in the analyses. However, these computer codes were reviewed and approved by the

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NRC on a case-by-case basis for limited application. Identify the extent to which the above-referenced computer codes were used in outlier resolution. Discuss the percentage reduction in floor acceleration responses as a result of using any of these codes in developing the FRS, in comparison to accelerations obtained from FRS that are based on the 120-day submittal. Also, indicate whether any FRS developed on the basis of these codes were used, or intended for use, in licensing activities.

3. Cable and Conduit Raceway System

   a. Provide the percentage of raceways and cable trays that were selected for worst-case analytical calculations and were classified as ductile in your USI A-46 evaluation and, therefore, you did not perform a horizontal load evaluation.

   b. Discuss raceways and cable trays that are outside of the experience data by explaining criteria used for making your safety determination, the configurations of such raceways and the percentage with respect to the whole population of raceways. How were they evaluated and disposed?

   c. The loading diagram (sheet 1 of 86 of calculation 95C2893 - C -, LAR001, ID RACC001, Control Building Elevation 918'-6") indicates that the top and the right hand side of the cable tray system are attached to the unistrut and wall respectively, leaving the left and the bottom of the panel free to deform in the directions out of the plane, as well as in the plane of the panel. In your resolution of the outlier of this cable tray support or any other similar supports, discuss how you evaluated potential in-plane buckling (horizontal direction perpendicular to the direction of the cable run) since horizontal earthquake loads can be in both directions not just for the direction you have already evaluated. Also, discuss your evaluation of the load perpendicular to the plane of the unistrut cable tray support assembly (in the direction parallel to the direction the cable run). Was Top unistrut p 3270 evaluated for its strength adequacy?

4. If Thermo-Lag panels are attached to a cable tray system, discuss how the changes in weight have been incorporated in the GIP evaluation of these systems and their supports.

5. In the summary report, you stated that you were committed to implement GIP-2, including the clarifications, interpretation, and exceptions in SSER-2, and to communicate to the NRC staff any significant or programmatic deviations from the GIP guidance. You further stated that there are no significant or programmatic deviations from the GIP guidance.

   Provide the worst-case items (from the safety point of view) which deviate from the GIP-2 guideline but were categorized as not being significant. In addition, provide the definition of "safety significant" that the walkdown crew used and the technical basis to ensure that the definition is adequate for plant safety.

6. In reference to Section 4 of Attachment 2, provide a sample calculation to demonstrate the seismic adequacy of large tanks (e.g., Diesel Generator Fuel Oil Day Tanks DGDO-TK-DOD1, Diesel Generator Fuel Oil Storage Tanks DGDO-TK-DOSA, Diesel Generator Air Receivers DGSA-RCVR-1A).

7. Appendix I to Attachment 3 of your letter contains thirty-two outlier relays; including sixteen relays whose seismic capacity could not be established from the EPRI GERS, fourteen relays for which the seismic demand exceeded relay capacity, and two low ruggedness relays that were identified from Table 6.2 of EPRI Report NP-7147-SL. Describe the analyses or proposed methods for resolving these outlier relays and the schedule for completion of this activity.

8. 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) which have 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 grade level ground response 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 GIP-2, provide a technical justification for not using the in-structure response spectra provided in your 120-day-response. It appears that some USI 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 of 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 was 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.

9. With respect to operator actions in response to a seismic event:

   a. Describe what reviews were performed to determine if any local operator actions required to safely shutdown the reactor (i.e., implement the SSEL) could be affected by potentially adverse environmental conditions (such as loss of lighting, excessive heat or humidity, or in-plant barriers) resulting from the seismic event. Describe how staffing was evaluated and describe the reviews which were conducted to ensure operators had adequate time and resources to respond to such events.

   b. As part of the licensee's review, were any control room structures which could impact the operator's ability to respond to the seismic event identified? Such items might include, but are not limited to MCR ceiling tiles, non-bolted cabinets, and non-restrained pieces of equipment (i.e., computer keyboards, monitors, stands, printers, etc.). Describe how each of these potential sources of interaction has been evaluated and describe the schedule for implementation of the final resolutions.

   c. Describe what reviews were performed to determine if any local operator actions were required to reposition "bad actor relays." For any such activities, describe how adverse environmental conditions (such as loss of lighting, excessive heat or humidity, or in-plant barriers) resulting from the seismic event were analyzed and dispositioned. Describe how staffing was evaluated and describe the reviews which were conducted to ensure operators had adequate time and resources to respond to such events.

   d. Describe which of the operator actions associated with resetting SSEL equipment affected by postulated relay chatter are considered to be routine and consistent with the skill of the craft. If not considered skill of the craft, what training and operational aids were developed to ensure the operators will perform the actions required to reset affected equipment?

   e. Assume the alarms associated with " bad actor relays" are expected to annunciate during the seismic event. Do the operators have to respond to those annunciators and review the annunciator response procedures associated with them for potential action? How would those additional actions impact the operators' ability to implement the Normal, Abnormal, and Emergency Operating Procedures required to place the reactor in a safe shutdown condition?

   f. To the extent that Normal, Abnormal, and Emergency Operating Procedures were modified to provide plant staff with additional guidance on mitigating the USI A-46 Seismic Event, describe what training was required and provided to the licensed operators, non-licensed operators, and other plant staff required to respond to such events.