December 17, 1996

Mr. John K. Wood
Vice President - Nuclear, Davis-Besse
Centerior Service Company
c/o Toledo Edison Company
Davis-Besse Nuclear Power Station
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON THE RESOLUTION OF UNRESOLVED SAFETY ISSUE (USI) A-46 - DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1 (TAC NO. 69441)

Dear Mr. Wood:

Your letter to the Nuclear Regulatory Commission (NRC) dated August 29, 1995, forwarded the Seismic Evaluation Report which summarized your Unresolved Safety Issue (USI) A-46 evaluation results. This was submitted in response to Generic Letter (GL) 87-02 on the resolution of the USI A-46 program at the Davis-Besse Nuclear Power Station (DBNPS), Unit 1. The NRC staff has reviewed your report and determined that additional information is necessary to complete the review of your A-46 program. Please provide your response to the enclosed questions by April 30, 1997.

If you have any questions regarding this issue, or need additional time to respond, please contact me at (301) 415-1390.

Sincerely,

Original signed by:
Allen G. Hansen, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Request for Additional Information

cc w/encl: See next page

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E. Adensam, (EGAI)
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Commissioner of Ottawa County
Port Clinton, Ohio 43452

REQUEST FOR ADDITIONAL INFORMATION

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

USI A-46

1. Section 4.3, "Operations Department Review of the SSEL," contains a short description of the procedural evolutions an operating crew would be required to take in order to mitigate the design basis earthquake. As stated in Section 4.3, "This review concluded that a trained licensed operator, without a need for an operating procedure following a seismic event, can follow the existing Davis-Besse procedures and will be directed to use the Safe Shutdown Equipment and Instruments to cool the plant to Hot Shutdown conditions. Although direction to use the Safe Shutdown Equipment and Instruments was not always provided as the primary procedure path, no procedural flow paths were identified that would prevent a trained licensed operator from completing the cool down to the Hot Shutdown condition." Based on these statements, what measures have been taken to ensure that the operating crews will in fact use the SSEL given that procedural directions do not always explicitly provide for their use? Do you expect the operating crew to rely solely on the equipment and instrumentation provided in the SSEL for mitigation of the postulated seismic event? If so, how do you plan to ensure only the SSEL equipment is used. If not, what additional equipment is to be used and how did you determine that it would be available and operational during the postulated event?

2. Section 4.3 states in part that a scenario was developed that limited operator response to only that equipment of the SSEL. How was this accomplished? Based on the method used to limit the operators to the SSEL, does this present a realistic scenario of the conditions an operating crew would encounter during an actual seismic event?

3. Section 4.3 states in part that the scenario was not inclusive of a cool down to hot shutdown conditions. Based on the procedural outline provided in Section 4.3, what parts of this procedural outline were initiated/accomplished during the simulator scenarios? As part of the scenario exercises, were any time critical operator actions identified? What were they and what were the time constraints determined?

4. Based on the procedural outline provided in 4.3, were any activities identified which require local manual action by an auxiliary operator outside of the control room? If so, please describe these actions. How were these actions evaluated to determine if they could be accomplished in the time frame required under the assumed post-transient conditions present in the plant? Were any manual actions identified which would require performance of tasks under harsh environmental conditions (e.g., temperature, humidity, lighting, radiological, etc.)? How was this factored into the evaluation?

5. Appendix E, "Seismic Review Safe Shutdown Equipment List," contains several pieces of equipment requiring manual or a combination of electrical/manual support systems. Did the operations review of the SSEL ensure that these items requiring manual actions were embodied in the

ENCLOSURE

procedures to be used for mitigation of the seismic event? As with (4) above, how were potentially harsh environmental conditions evaluated to ensure these manual actions could be accomplished in the time frame required to successfully mitigate the postulated transient?

6. Appendix E, "Third-Party Audit Report," states in part, "The control room ceiling was inspected with the understanding that some re-work is in order." Please describe the extent of this re-work and what, if any, implications it may have on crew activities.

7. Section 5.2 and Table 5-1 of your submittal provide a summary of instances where the intent rather than the letter of certain caveats, as described in Appendix B of the Generic Implementation Procedure, Revision 2 (GIP-2) was met. Based on the information you provided, it is unclear as to how some equipment was determined to meet the intent of the stated caveat. Listed below are specific areas that fall in this category for which we are requesting additional information:

   a. As indicated in Table 5-1 of your submittal, the cutouts on end panels of the switchgear for E1 and F1, 480V Essential Unit Substation, exceed the allowable limit described in GIP-2. The concern regarding these cutout caveats, as described in Appendix B of GIP-2, is that the shear load from the earthquake will not be able to be transferred through the shear walls to the anchorage. GIP-2 states that reinforcement around the cutouts with additional plate or steel members may alleviate the concern of shear transfer. Based on the information you provided, it is unclear as to how these end panels were judged to meet the intent of the caveat. Please provide additional information concerning the size of the cutouts and a description of how the transformers that are bolted to the switchgear may stiffen the end panels and alleviate the concern of shear transfer.

   b. In Table 5-1 of your submittal, you stated that Pumps/Motors K3-1, K3-2, P14-1, and P14-2 are installed with 1-1/2" expansion anchors. Since GIP-2 only provides anchor allowables up to 1" diameter, the 1" anchor allowables were used in your analyses. Please confirm that the analyses were found to be acceptable.

   c. For the reactor coolant pump seal return isolation valve MU-38, you stated that the valve actuator and yoke are supported independently of the connecting pipe. The caveat described in Appendix B of GIP-2 is that the valve actuator and yoke should not be independently braced to the structure or supported by the structure unless the pipe is also braced/supported to the same structure immediately adjacent to the valve. The concern is that if the actuator is independently supported from the valve and attached piping, then the operator may act as a pipe support during seismic motion and attract considerable load through the yoke and possibly fail the yoke or bind the shaft. In addition, if both the operator and the valve/pipe are restrained, and if they are both not tied back to the same structure, then differential motion of support points may lead to high seismic loads and possible binding of the shaft. If either

of these concerns are noted, then a special evaluation should be conducted to demonstrate low stress and small deflections. Please provide additional information to address these concerns.

d. In Table 5-1 of your submittal, you stated that temperature indicating controllers, TIC 5443 and 5444, are anchored to block walls and that those anchorages were judged to be acceptable due to low loads. However, GIP-2 does not provide anchor capacity installed in block walls. It is unclear as to how you determined these anchorage capacities. Please describe how the anchorage capacities were determined and provide a comparison of the anchorage capacity with the seismic demand.

8. In your submittal, you proposed to resolve all the identified outliers by the end of the 12th Refueling Outage (currently scheduled to begin March 2, 2000). Please provide a justification to ensure that the proposed schedule for resolving all the identified outliers does not lead to a potential safety-significant scenario. For all outliers that require analysis or modification, please provide the current/planned status of the modification and a brief justification on why the as-found configuration does not affect system/component operability.

9. Table 4-1 of Section 4, Attachment 2 of your submittal provides a relay review safe shutdown equipment list. On pages 1 through 5 of the same section, you provide a list of explanations for the notes used in the review of the safe shutdown equipment list of Table 4-1. However, the staff noted that Table 4-1 does not contain all the notes listed on pages 1 through 5. Please examine the completeness of Table 4-1 and provide clarification.

10. As indicated in the notes for safe shutdown equipment list in Section 4, Attachment 2 and the relay evaluation report in Section 5.2 of your submittal, the screenings and evaluations for some equipment were noted as relying upon operator actions. Please confirm that a controlled procedure that prioritizes the operator actions exists and that it will preclude any conflicting or competing events which could lead the operator to not perform timing actions.

11. Please provide definitions for the acronyms BA, CA1, CA4, CA6, CA7, CA8, and NG contained in G-4 Forms for relay evaluation report.

12. 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 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 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 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.

13. The Summary Results Report (SRR) states that Toledo Edison committed to implement GIP-2. The SRR also states that no significant or programmatic deviations from the GIP guidance were made. Please list all the deviations that are considered to be insignificant for Davis-Besse and provide the bases for categorizing them as such.

14. Section 2.1 states that Davis-Besse's ground response spectra are completely enveloped by the SQUG Bounding Spectrum at all frequencies (Table 2-1). However, no mention was made which spectra were used for the Davis-Besse A-46 evaluation. The implication was that SQUG Spectrum was used and that it was conservative because it is higher than the plant ground response spectra. Please provide a clarification.

15. Three different in-structure response spectra were provided in the report. Discuss how these different spectra are used. For instance, it is indicated that conservative design USI A-46 spectra were used for the Auxiliary Building. However, no indication was provided as to how the other two spectra were used. Discuss in detail how the USI A-46 spectra were developed and how the spectra used were in conformance with GIP and staff criteria.

16. The staff did not review the floor response spectra (FRS) during its 120-day review (see NRC letter to Toledo Edison, dated December 6, 1992). Provide detailed information for the spectra including the input ground motion, the structural model, the methodology used to construct the FRS, basis for the methodology, as well as the final results that are used for Davis-Besse.

17. Equipment items C5792 and C75-2 have been identified as outliers; the gap between the cabinet base and the concrete is greater than 1/4 inches (Pages 36 and 37). Provide the analysis performed for the outlier resolution together with drawings that illustrate the gap as well as the equipment and the concrete base. Is this equipment expected to be subjected to a significant increase in temperature as result of a design basis accident? If so, please discuss the temperature differential between the equipment and the concrete base and how the expansion of the equipment relative to the anchors imbedded in concrete is accommodated. Discuss how the dynamic effect of the earthquake load (SSE) due to the gap is accommodated (impact) when the design is such that a sliding or movement within the gap is allowed between the equipment and the concrete base.

18. Tables 6-1 and 6-2 of the report provided a brief description and resolutions for the tank and heat exchanger outliers. Provide the analyses performed for equipment T12-1 and T18 together with references and justifications for the analyses methods.

19. Table 7-1 provides descriptions for the selected cable and conduit raceways for limited analytical reviews. Provide a typical sample calculation for the raceway that is not selected as an outlier (for example, case 422A-4, Aux. Bldg. Area 7). Also provide a discussion why the analysis method used is conservative.

20. Table 7-2 provides a description for the cable and conduit raceway outliers. Most of the resolutions were based on the assumption that the calculated weight on the structures is less than that allowed by GIP. Since the weight criterion of GIP is met for outlier incidents, discuss how they were determined to be outliers. Also, it should be noted that, for a dynamic response, weight alone would not determine the worst condition. Weight criterion may be sufficient for screening the raceways for outliers, but for the resolution of such outliers, one may need additional considerations such as stiffness of the raceways and their supports as well as forcing function (dynamic loading). Discuss how they were considered in the resolution.

21. Discuss the issue described in Information Notice 95-49 regarding Thermo-Lag panels, in particular the issue regarding seismic resistance capability of the cable tray and its support when appropriate weight and modulus of the Thermo-Lag are included in the analysis.