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MECHANICAL AND NUCLEAR ENGINEERING DEPARTMENT

RECEIVED
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
U.S. A.E.C.
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October 17, 1973

Mr. J. C. McKinley
Senior Staff Assistant
Advisory Committee on Reactor Safeguards
United States Atomic Energy Commission
Washington, D.C. 20545

Subject: PSAR of Grand Gulf Nuclear Stations Units 1 and 2

Dear Mr. McKinley:

I have completed review of volumes 1 and 2 of the subject PSAR and listed my comments and questions in the enclosure. Some of the items identified are intended to suggest more adequate mathematical modelling others to obtain additional design information.

As the review of remaining volumes progresses, I will transmit further comments, possible at the opening of the ACRS meeting on October 25, 1973.

Trusting that the above will be found satisfactory, I remain

Very truly yours,

Zenons Zudans

Zenons Zudans
Director

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encl.

Filed: Grand Gulf
Z. Zudans, Cons.

GRAND GULF NUCLEAR STATION, UNITS 1 & 2, PSAR

SUMMARY OF COMMENTS ON VOLS. I, II

1. Fig. 3.7-18, Vol. II - Math Model for Containment Structure for Horizontal Ground Motion.

   Model indicates rigid base slab. It is to be expected that the pedestal and drywell stiffness is in the same order of magnitude as that of the mat. Improved modelling is suggested by introducing a set of spring constants based on mat stiffness between drywell plus pedestal and containment.

2. Drywell carries upper water pool of a considerable size. It is to be expected that under seismic loading some sloshing may occur in this pool and hence affect the response of the rest of the structure. Does the applicant plan to consider this condition in seismic analysis?

3. Containment is modelling as a beam. Has any consideration been given to include shell type modes?

4. Fig. 3.7-19a, auxiliary building dynamic model does not include fuel sloshing effects on seismic model. Can applicant make an estimate as to the effect sloshing may cause?

5. Diesel generator building modelled as a beam does not appear to be adequate in particular in the area of ventilation equipment floor, where vertical stiffness may be smaller than the lateral stiffness. Can applicant demonstrate without a two dimensional model that the ventilation floor is adequate under seismic loadings?

6. 3.7.3.4, Combination of closely spaced frequencies, what is the criteria for closely spaced eigenvalues?

7. In case of time-history seismic response, describe the techniques employed to assure that the maximum values of $X(t)$, $\dot{X}(t)$, $\ddot{X}(t)$ and $L(t)$ are in fact properly identified.

8. Explain what is meant by "dynamic effects of water enclosed by the RPV are accounted for by introduction of a hydrodynamic mass matrix," 3.7.2.1.6.1, pg. 3.7-17, Vol. II.

9. What reconciliation of results obtained by model Fig. 3.7-18 and Fig. 3.7-24 will be made to justify the conservatism of the reactor pressure vessel and internals seismic analysis.

10. Can applicant justify beam type seismic model of reactor vessel and internals in particular in the area of support skirt and bottom head intersection and core support. What methods are used to compute stiffness of various elements of the model, Fig. 3.7-24.

11. Reactor core spray system has points of attachment at various elevations. From Section 3.7.2.1.6.6 it is not clear how the response spectra of various attachment prints will be used in the analysis-envelope curve?

12. Please supply one copy of:

    "Seismic Analysis of Structure and Equipment for Nuclear Power Plants" Bechtel Topical Report, BC-TOP-4, August 1972, Bechtel Corp.

13. Describe criteria used to determine the number of mode shapes retained in seismic analysis? (modal mass?)

14. 3.7.3.6 Seismic Design Criteria for Piping.

    Explain in greater detail the method employed to account for relative displacement between piping support points.

15. 3.7.3.1.3 - Earthquake Safety of Polar Crane Seismic Retainer Attachments.

    Identify the loads for which circumferential locking devices are designed, and give the rational for these loads.

16. 3.8.2.1.2 Drywell Structure

    Identify loadings for which steel drywell head is designed. What are the design provisions to assure the leak tightness of the flange-seal? Describe the consequences of the collapse of steel drywell head.

17. 3.9.1.4 LOCA Loadings on Core Support Structures

Demonstrate the adequacy of the model Fig. 3.9-1 LOCA loading consideration. Show that beam type mode shapes are adequate for representing the dynamic behavior of the internal structures, in particular as related to the core support.

18. 3.9.1.5 Core Support and Reactor Internal Structures Stress Evaluation Methods

Explain how the stiffness value "corresponding to the inelastic displacement value" will be determined. The inelastic displacement value is unknown unless the inelastic analysis is done.