STATE OF CALIFORNIA — RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
DIVISION OF OIL AND GAS

SACRAMENTO, CA 95814
1416 Ninth Street

JUL 5 1979

Dr. Harold Denton, Director
Office of Nuclear Reactor Regulations
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Denton:

Since 1975, a significant amount of geotechnical data have become available regarding the Sierra Foothills fault system which lies on the western flank of the Sierra Nevadas. Because this system extends to within eleven to twelve miles of the Rancho Seco Nuclear Unit I, we have undertaken a routine review of the plant earthquake-design criteria.

During this analysis, the California Division of Mines and Geology (CDMG) has identified several questions regarding the ground response spectrum for the plant. These have been the subject of examinations which began during April.

Our concerns regarding the ground motion input used for the Rancho Seco Nuclear Plant Unit I were expressed in our letters to you dated April 13 and April 24, 1979. Conversations with Mr. Kenneth Herring of your staff and our further investigations established the following answers to our questions concerning ground motion:

(1) The free field ground motion input used for seismic design is represented by the design spectra shown in Figure SK-2692-s-61, Vol. VI of the FSAR.

(2) The time history from the Taft 1952 record adjusted to a peak horizontal acceleration of 0.25g was used as basic input to develop response spectra for equipment design at various levels within the structure.

(3) Near the fundamental period of the reactor containment structure, the values of the ratio of spectral acceleration to peak ground acceleration used for design are approximately one-half those specified for horizontal ground movement in the U. S. Nuclear Regulatory Commission published standards in Regulatory Guide 1.60.

At our request, Mr. Herring reviewed the Rancho Seco FSAR for several hours and informed us that he did not find that the difference between the design spectra and the RC 1.60 spectra was a serious safety issue. Because of staff commitments, Mr. Herring advised us that the NRC could not provide any further review at this time. It was Herring's opinion that modern analyses using current design spectra, current damping values, and other new procedures would show that the original design was adequate.

We undertook a further evaluation of the ground motion input and the results of Mr. Herring's review. Our conclusions are as follows:

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(1) The peak acceleration which might be expected at the Rancho Seco site, taking account of the location of the Foothills fault system in reference to the facility and the possibility of a Magnitude 6.5 maximum credible event occurring on these geologic structures, provides a conclusion that 0.25g is an appropriate value. This value is the same as the value presented by the applicant in the FSAR. In the 1971 analyses, the Sierra Foothills fault system was assumed to be inactive, and the principal source of potential ground motion at the plant was considered to be related to events of 7.5 to 8 magnitude in the San Francisco Bay vicinity.

(2) The base ground motion spectra (input design spectra) employed in the applicant's analysis were based upon Housner's composite set of earthquake spectra and the curves applied in the applicant's analysis yielded response acceleration values that are approximately half of those currently recommended by the NRC in Regulatory Guide 1.60.

(3) Tentatively, we have concluded that the currently approved damping values and soil structure interaction procedures for evaluating structural response to ground motion, using the Regulatory Guide 1.60 curves, yields design specifications for both the containment structure and the equipment which are comparable to those originally developed by the applicant employing smaller response acceleration values, lower damping values, and more conservative soil interaction analyses.

The conclusion of Item 3 above was based on a general comparison of the original and current soil structure interaction methods and no detailed analysis was made for the Rancho Seco plant. Although we tentatively conclude that the Ranco Seco seismic design specifications compare with results which would be obtained using current NRC analytical procedures, we feel that this matter does merit priority staff attention. We therefore request that the NRC undertake a standard soil structure interaction analysis based on reasonable assumptions regarding possible variations in the soil properties in order to confirm the tentative conclusions reached by Mr. Herring and the CDMG. We feel the conclusions that the original soil structure interaction model was conservative and that the design force levels were satisfactory should be confirmed by use of currently approved methods combined with the RG 1.60 curves.

We very much appreciate your attention to this matter. If you have questions, please contact John Ragsdale at (916) 322-9317.

Sincerely,

Priscilla C. Grew

Priscilla C. Grew
Director, Department of Conservation

James F. Davis
State Geologist

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