ENCLOSURE 4

United States Department of the Interior

GEOLOGICAL SURVEY

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Nuclear Regulatory Commission MS8D-22
Washington, D.C. 20555

Dear Bob:

The mid-June, 1989, meeting in San Francisco with PG&E further clarified the geologic, geophysical, and seismologic interpretations offered as support for conclusions contained in the LTSP Final Report. The opportunity to explore the responses to technical questions submitted to PG&E after the NRC audit of November, 1988, was especially helpful. The utility's response to audit reviewer's questions was complete, well-organized, and delivered in a timely way; thus providing an informed basis for the discussions of June 12-14.

Several questions remain to be answered, in part to document matters discussed for the first time at the June meetings, but also to clarify points of difference between the Final Report or the Response to Questions and relations described during the recent meeting. The answers should help evaluate the seismic source characterization and the weights accorded to different competing interpretations for earthquake sources near the Diablo Canyon site.

1. Provide detailed interpretations and discussion of GSI lines 103 and 104 from the eastern ends of these lines to points 10 km seaward of the Hosgri fault zone, to facilitate comparison with other interpretations.

2. For the Hosgri fault, document the calculation of uplift rates (or vertical components of fault displacement) that have been derived from: *a)* the basement reflector, *b)* the top Miocene horizon, and *c)* the base "Foxen" horizon. These relations were discussed in the meeting but are not completely described in written documents.

3. Summarize the evidence for strike-slip and dip-slip along the 16 km reach of the Hosgri fault that extends from the westernmost scarp at 59-meter ridge northward across the north Estero Bay slope break and explain how the geometry of the 30-meter-high, scarp-like, part of the north Estero Bay slope break can be derived by right-lateral strike-slip.

4. Clarify the conflict regarding the elevation of the 18 ka, late Wisconsin, low stand: this is given as -120 m in table 3 and plate 5 of the Response to Question 43 *l*, but as -140 and -160 m in discussion, on June 14, of the north Estero Bay slope break. If the lower value is correct, provide the published source or other supporting data for this departure from globally established values. If evidence supports both the lower value to the west

of the surface scarp of the Hosgri, and the mapped -120 m level near the Hosgri scarp, discuss the rate of vertical fault slip thereby implied.

5. Provide any direct evidence, from common depth point or high-resolution seismic reflection data, to support the postulated stepover of fault slip from the San Simeon fault to the Hosgri.

6. Provide documentation of the tsunami study of the 1927 earthquake, including discussion of potential timing errors that arise from clock error, marking error, or other causes inherent in the San Diego or San Francisco marigrams.

7. Re-read S-P times from the Santa Barbara records for the 1929 Lompoc earthquake.

8. Prepare a balanced, NNE-trending , cross section normal to, and extending across, the Pismo syncline and the northern Santa Maria basin to evaluate the basement-controlled, fold and thrust belt model of Namson, and to compare it with the block-uplift model employed in the LTSP Final Report.

9. Provide logic tree analysis for the ramp-forming, fault-bend fold, which Namson interprets beneath the Point San Luis incline.

10. Evaluate the effect of the basement-controlled fold and thrust belt model on deterministic and probabilistic earthquake hazard.

Most of these questions are intended to persuade PG&E to look more carefully at some of the evidence for other interpretations of the geological and geophysical data. The seismic reflection data along the Hosgri fault, the stratigraphic and structural relations that are interpreted from those data and from bathymetry, and the evidence for onshore reverse and thrust faulting raise many problems for pure strike-slip interpretations of the Hosgri Fault and for the tectonic model to which that interpretation is fitted. I believe an objective review of the data now available (and acquired by PG&E at considerable cost and effort) will afford more weight to: lower dips on the Hosgri and Los Osos faults, a significant vertical slip component on the Hosgri, and tectonic models that are closer to the basement-controlled fault and fold belt style that appears to be well documented by drilling and other control in the onshore Santa Maria basin.

Sincerely yours,

Bob Brown

Robert D. Brown

cc: R. Wesson
G. Roseboom