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SUBJECT: Comments on long-term Seismic Program described at 860311-12 meetings in Bethesda. Problems still remain in defining ground motion & earthquake potential of deeper Crustal Structures.

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NOTICE: Comments on long-term seismic Program described at 880311-12  
meetings in Bethesda. Problems still remain in defining  
ground motion & earthquake potential of depth (local  
structure)  
PWR Project Director  
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# United States Department of the Interior

GEOLOGICAL SURVEY

OFFICE OF EARTHQUAKES, VOLCANOES, AND ENGINEERING

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April 4, 1986

Hans Schierling, Senior Project Manager  
PWR Project Directorate #3  
Division of Power Licensing-A  
Nuclear Regulatory Commission  
Washington, D.C. 20555

50-275/329

Dear Hans:

The following comments summarize my review of Pacific Gas and Electric Company (PG & E) work on the Long Term Seismic Program for Diablo Canyon as described by PG & E staff at the March 11-12 meeting in Bethesda.

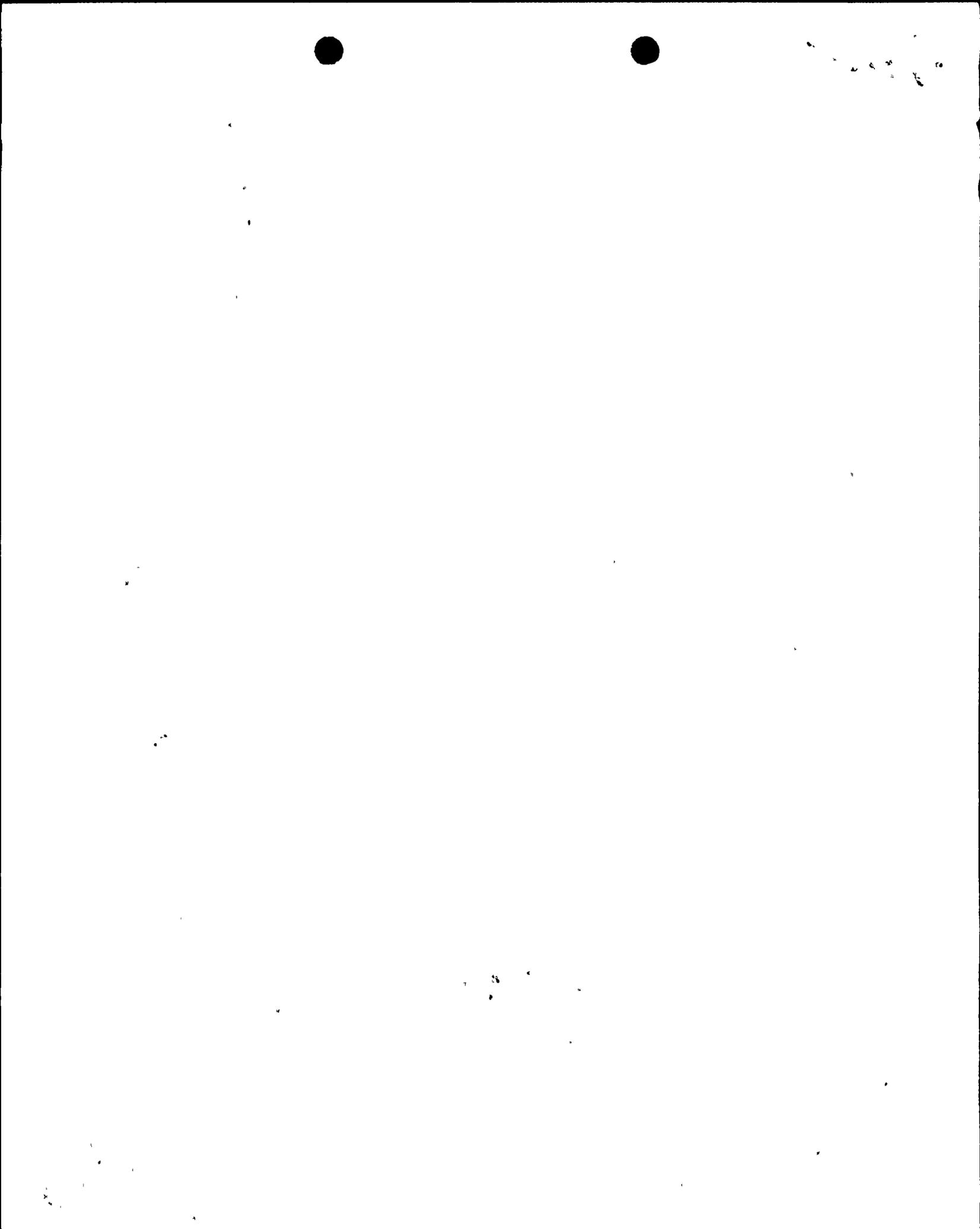
Work on the scoping study, which was presented at the meeting, has significantly improved the focus of the program; has identified high-priority issues for geologic, geophysical, and seismologic investigations; and has shown that a well-coordinated team effort is now underway. Discussions and visual aids presented at the meeting amplified previous written documents and were most useful in understanding the program and in evaluating progress. Clearly, an effort was made to respond to earlier comments by NRC staff and consultants. This effort is commendable and has produced the framework for an effective program.

The scoping study, a well-balanced systematic review of existing knowledge and interpretations from the earth-sciences, is potentially flexible in the sense that it can accommodate new discoveries and results--provided these become available during the life of the program. Two problems, however, arise from major gaps in existing knowledge, and these may remain unresolved without more aggressive effort than is currently evident.

The first problem is the crustal structure, at seismogenic depths (down to 10 km), of the Hosgri fault and related crustal elements near the plant, especially in the offshore region. This problem, long recognized, gains importance because of the recent discovery, by Annie Trehu (USGS, Woods Hole), of an eastward-thinning wedge of low-velocity crust that underlies coastal California as far inland as the central part of the Gabilan Range. The wedge is interpreted from seismic reflection and refraction lines extending from Morro Bay northeast to the San Andreas fault at Cholame. At the southwestern end of the seismic profiles, near Morro Bay, the upper boundary of the wedge is about 14 km deep; projecting the boundary seaward places it within 10 to 12 km of the surface near the Hosgri fault. If the wedge is, as Trehu suggests, subducted oceanic sediment, its upper boundary is an important tectonic surface, and its relation to the Hosgri fault is critical to understanding earthquake locations, depths, and mechanisms. PG & E plans include the reprocessing and reanalysis of existing seismic reflection lines, but these lines, acquired for offshore petroleum exploration, are unlikely to resolve structural features at seismogenic depths.

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The second problem concerns site ground motion. The topographic and geologic setting of the plant--between a steep hillslope and a coastal bluff, and on strongly jointed sedimentary rock that presumably overlies melange--is likely to be poorly represented, if at all, in records of strong ground motion. Because these site conditions may produce significant departures from standard peak-value curves, the ground motion investigations need to be carefully designed for this site and for the range of earthquake sources expected. Program tasks imply that this problem is recognized, but they do not explain how it will be solved.

Comments by NRC staff recognized the need for more informative progress reports as a basis for review and discussion. I agree that such reports are critical to an effective and productive program and, from the response of PG & E representatives at the March meeting, I perceive that PG & E also recognizes this need and intends to meet it. I suspect that past report deficiencies resulted because until recently much of the program effort has been devoted to the scoping study and design of the program; as work on the technical aspects of the program proceeds, opportunities for the exchange of results and progress through reporting procedures should increase. Such exchanges, of course, need not be confined to the formal report requirements; topical meetings and field conferences, such as the forthcoming April 14-16 conference on soil structure interaction and ground motion, are even more effective as communication techniques.

In summary, important progress is evident in the design of the program, in organizing an effective team of specialists in critical disciplines, and in improved communication with NRC staff and consultants. Some problems appear to remain in defining site ground motion and the earthquake potential of deeper crustal structures. Moreover, the technical staff faces a tight and demanding schedule in completing interdependent tasks on schedule and within the projected life of the program. These time constraints reaffirm the importance of effective reporting and communication.

Sincerely yours;



Robert D. Brown

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