ENCLOSURE 6

Lawrence Livermore National Laboratory

NUCLEAR SYSTEMS SAFETY PROGRAM

June 30, 1989
EG89-82

Mr. Robert L. Rothman
Structural & Geosciences Branch
Division of Engineering & Systems Technology
Office of Nuclear Reactor Regulation
11555 Rockville Pike - MS 8-D22
Rockville, MD 20852

Dear Bob:

Please find attached a copy of Professor K. Aki's letter report on the PG&E June 13-14, 1989 meeting on geology/tectonics of the Diablo Canyon Long Term Seismic Program.

Sincerely,

Jean B. Savy
Engineering Geosciences

Enclosure

JBS/mh

DEPARTMENT OF GEOLOGICAL SCIENCES
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15 June 1989

Dr. Jean Savy
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LLNL
P.O. Box 808
Livermore, CA 94550

Dear Jean:

This is my letter report on the 13-14 June 1989 meeting on Geology/Seismology/Geophysics/Tectonics of the Diablo Canyon Long Term Seismic Program. Although I was not asked to submit a report, I'd like to write about my impression for the record.

The most important scource parameters affecting the ground motion are the amount of fault slip and rupture length in an individual event.

The basis for the 1~2 m average slip adopted by PG and E comes from the San Simeon fault. The particular segment of the San Simeon fault for which the slip estimate was made is bounded in the north by a rather strong barrier with a major branch and many splay faults and in the south by another strong barrier of 5 km wide pull-apart basin. For this segment (with length about 20 km), it is possible that the slip in an individual event is restricted between the above two barriers. Then, if we assume that the nature of faulting is similar between the San Simeon and the Hosgri fault, the same scenario may be applicable to the Hosgri fault.

On the other hand, the argument offered by David Schwarz in the meeting that the rupture length of a 1~2 meter average slip strike-slip fault is probably longer than 20 km, and most likely around 100 km is supported by observations on past California strike slip earthquakes, as shown below (Papageorgiou and Aki (BSSA 73, p. 974)).

Earthquake	Rupture length in km	Maximum slip in meters
1857	~300	4-6
1906	~300	10
Borrego Mt.	33	0.9
Long Beach	30	0.3
Parkfield	35	0.5

Thus, the 1~2 average slip strike-slip fault with rupture length 100 km is another possible scenario.

My over-all impression based on the past California earthquakes and the presentation on characteristics of the Hosgri fault is that Kevin Coppersmith's comparison between the Hosgri and the San Jacinto is a very reasonable one. I agree, therefore, the logic-tree weight given to the rupture length.

Another point I'd like to record here is on ground motion from the brief lunch meeting with Leon Reiter. In the response by PG and E to Question 16 (on ground motion), it is stated on p. 2 that the uncertainty in source mechanism was not treated as a parameter uncertainty. In other words, it is assumed to be known. The variability of ground motion estimate given by PG and E is, therefore, conditional to a certain prescribed scenario. The uncertainty of the particular scenario is temporarily set aside.

Since the numerical approach can incorporate more detailed scenarios as a given condition than the empirical approach, it is not surprising that the conditional variability is less for the former than the latter. In any case, the assumption of a particular scenario in the estimation of conditional variability should not be forgotten in the evaluation of total uncertainty.

Sincerely yours,

Keiiti Aki

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