

NOV 29 1976

MEMORANDUM FOR: Dennis Allison, LPM, Light Water Reactors Branch #1, DPM

FROM: Renner Hofmann, Leader, Geology Section, GSB, DSE

SUBJECT: REGARDING TELEPHONE CALL OF NOVEMBER 16, 1976 TO
DR. JAMES BRUNE OF THE SCRIPPS INSTITUTE OF
OCEANOGRAPHY

My phone call to Dr. Brune concerned his recent letter regarding the possible affects of beaming of seismic energy towards Disblo Canyon from a rupture along the Hosgri fault based upon theoretical work not referenced in his letter.

Dr. Brune said that the reference by Benioff, in which he proposed that such a mechanism may have been responsible for certain areas of increased damage in the vicinity of the Kern County 1965 Earthquake, appears in the California Division of Mines Bulletin 171. He stated further that there were several theoretical articles which touched upon the subject. One of them is by Ralph Archuleta in the bulletin of the Seismological Society of America, 1975 Volume 65 No. 5 for October. Another article he mentioned is by Paul Richards entitled "Self Similar Rupture Propagations, Dynamic Motions near an Earthquake Fault: A Three Dimensional Solution." This either has appeared or will appear in the Seismological Society of American Bulletin. He did not have a reference at this time. Another reference was paper 296 of the Fifth World Conference on Earthquake Engineering entitled "Dynamic Properties Earthquake Source." Still another reference by author Paul Richards, appears in the 1973 International Journal of Solids and Structures, Volume 9 pages 843-861 "Dynamic Field of Growing Plan Elliptical Shear Crack." Also, there is the paper by Brune in a book edited by Rosenbluth and Lomnitz, with a title something like "Earthquake Risk." It is a new book.

Dr. Brune has stated that this subject would be discussed in a paper at the west coast American Geophysical Union Meeting in the week of December 6, 1976 given by Jerry Frazier and Ralph Archuleta based on numerical modeling. He said they did not have a pre-print this time but should they prepare one before the meeting, he would send it. He also referred me to his past papers written concerning modeling of

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fault movements in foam rubber. Offhand, I do not know what they are. I do recall having seen them probably in the American Geophysical Union Journals or Seismological Society Bulletin.

The proposed beaming of high energy is extremely theoretical. The question of the appropriateness of foam rubber as in analogy to the real earth is questionable in developing any kind of quantitative results. The theoretical modeling requires many assumptions, and the type of mathematical modeling will influence the results. The principal rebuttal to this kind of an attack is the intensity contours around the 1906 San Francisco earthquake of magnitude 8.3 where high intensities, that is over Modified Mercalli VIII occurred within only about 1 1/2 miles of the fault. Inasmuch as Diablo Canyon is about 3 1/2 miles from the Hosgri fault, if such beaming does occur one can argue that it has dissipated by the time it reaches that distance. Apparently, the principal of arguments that are going to be used by Dr. Brune are those to be put forth by Jerry Frazier and Ralph Archuleta at the AGU meeting. This involves numerical modeling with some form of dynamic finite element analysis. I hope to attend that meeting and to talk with Dr. Frazier and Archuleta on the subject. Perhaps I can provide more detailed information after that. In the mean time, I am trying to locate the various references that Dr. Brune provided.

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cc: J. Stepp
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