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March 7, 1988

Dr. Chester P. Siess
Advisory Committee on Reactor Safeguards
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Dear Chet:

The studies by P.G.&E. of earthquake history, potential and resulting ground motions for the Diablo Canyon Power Plant site and region set a high standard for similar future studies. The combination of intensive geologic mapping, reflection and refraction seismic surveys, dating of fault movements and analysis of current and past earthquake data significantly reduce chances of underestimating possible earthquake damage of the DCPP. The following seem to me to be worth noting:

Hosgri Fault

The Hosgri fault remains the controlling geologic structure for strong ground motion at the plant site. Ground motion generated by strike slip and by high angle thrusting on elements of the Hosgri fault zone are modeled for the site. Earlier suggestions that the Hosgri, San Simeon and San Gregorio faults constitute a continuous fracture system capable of yielding magnitude 8 earthquakes now seem highly improbable. Offshore seismic mapping reveals offsets between the three fault zones. Furthermore, the magnitude 7+ Lompoc event (11-4-1927), regarded by some as evidence of strike slip displacement of a southern extension of the Hosgri fault, on further detailed study was determined to have resulted from upthrusting on a steep fault west of the Hosgri fault.

Heirarchy of Faults

The P.G.&E. study classifies active faults in four categories, having annual slip rates which vary by four orders of magnitude. (See attached handout from 2-23-1988 subcommittee meeting in San Francisco). Over half of the 5 to 6 cm/year of shearing motion between the Pacific and North American plates, and a proportional release of seismic energy, occurs along the San Andreas fault system, which is

characterized by magnitude 8+ earthquakes. The next lower category includes the Hosgri, West Huasna and Rinconada strike slip faults. These faults, characterized by annual movement rates less than one centimeter and by earthquakes to magnitude 7+, release most of the seismic energy in the coastal area of the plant site. Faults with smaller slip rates should not produce earthquakes larger than 6+. The proportionality between fault length, slip rate and characteristic maximum earthquake seems to be valid for strike slip faults. A similar relation may be recognizable among dip slip faults, but the two types cannot be compared on the basis of fault length. In recent years several damaging earthquakes in central and southern California have occurred on faults which do not reach the surface, or are poorly exposed and unrecognized.

Los Osos Fault

Exceptionally detailed geologic studies by P.G.&E. employees and staff consultants have defined the structural framework of the immediate plant site. New faults have been recognized, ages of latest movement determined, and rates estimated. Of known capable faults, only the Los Osos structure would seem to pose a threat to the plant. Upthrusting of the San Luis-Pismo structural block along the Los Osos fault zone north of the plant site has occurred at an estimated annual rate of 1 mm/year or less. A recurrence rate of a thousand years or so could result in a significant earthquake. If it has not been done, perhaps a thrust type earthquake should be modeled for this fault and its possible continuation offshore.

With best regards,

John C. Maxwell

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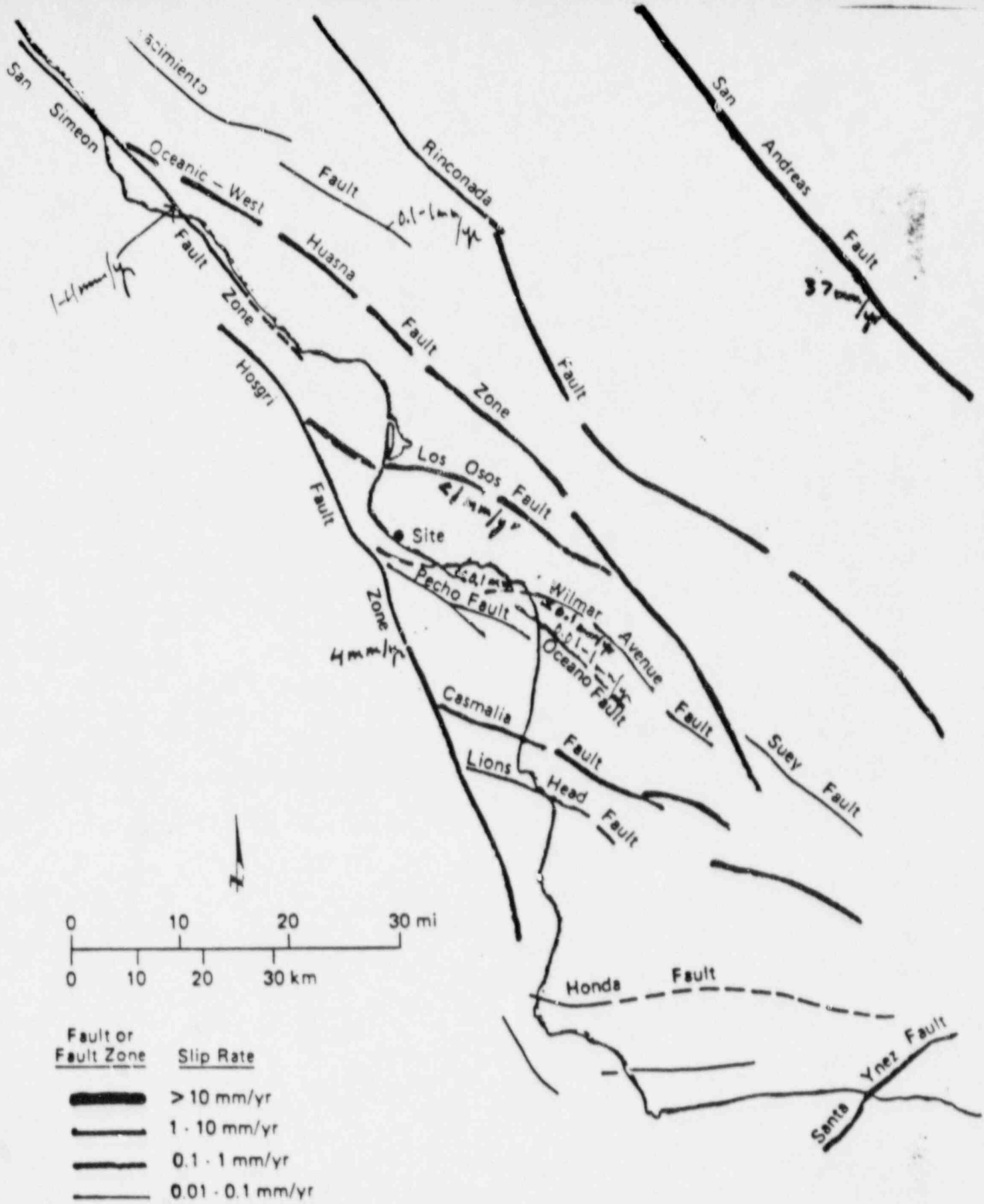

SLIP RATES OF FAULTS IN COASTAL CENTRAL CALIFORNIA