

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of )  
PACIFIC GAS AND ELECTRIC )  
COMPANY )  
(Diablo Canyon Nuclear Power )  
Plant, Units 1 and 2 )

Docket Nos. 50-275  
50-323

AFFIDAVIT OF STEWART W. SMITH

STATE OF CALIFORNIA )  
COUNTY OF )  
SAN FRANCISCO )

ss.

I, Stewart W. Smith, being duly sworn, depose and say:

I am currently professor of Geophysics at the University of Washington. My credentials have previously been submitted to the Atomic Safety and Licensing Appeal Board in these proceedings.

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A. Diablo Canyon remains an area of low to moderate seismicity.

Dr. Brune concludes that the six earthquakes reported on by Eaton "testify that the coastal region including the Hosgri fault is one of high seismicity". (Brune Affidavit at 16) The earthquakes referred to span the coastal region for in excess of 250 kilometers, from Santa Barbara to Point Sur, regions that exhibit markedly different records of geologic deformation than the area around Diablo Canyon, and which are even in distinctly different geologic provinces. It should be noted that none of these earthquakes have occurred on the Hosgri fault, although the two Point Sal earthquakes had hypocenters some 7-8 km beneath the dipping Hosgri fault plane and thus occurred on the system of faults which have a surface expression of active folding and faulting to the west of the southern end of the Hosgri fault.

There does appear to have been a significant increase in seismicity in the western U.S. during the past decade. This only emphasizes the fact that long periods of time, preferably extending back into geologic time, should be used to characterize the seismic potential of an area. The recent earthquake activity referred to by Dr. Brune seems well within what one might expect for a region of low to moderate seismicity. Perhaps the most significant feature of these recent earthquakes, however, is that they

have, without exception, occurred in regions where one would expect activity based on the geologic record of deformation. To constitute a region of high seismicity as Dr. Brune suggests would require that there have been larger and more frequent earthquakes, and the accompanying deformation could not have gone undetected in the geologic record, particularly if such events had a substantial element of thrust motion.

To put the seismicity of the past several years into proper perspective, the entire recorded history of the region is displayed in the figures attached hereto. This clearly illustrates that the character of the region has not changed as a result of the recent seismic activity.

B. New developments and understanding the nature of the Hosgri Fault.

Dr. Brune cites three independent investigations that are "all consistent with a tectonic model in which the region of the Hosgri fault is in transition from a major component of thrust faulting to the south to predominantly strike slip faulting to the north." (Brune Affidavit at 18, 19) He puts this forth as new information, relevant to safety of the site. In my opinion, these recently published professional articles provide a picture of the tectonic framework that is much more consistent with the view put forth by the Applicant in the 1978-79 ASLB and 1980 ALAB hearings than with that provided by the Joint Intervenors'

witnesses. The position of the latter has been that the Hosgri is an alternate plate boundary, functioning much like the San Andreas fault, with a record of in excess of 100 km of strike slip motion over the past several millions of years. While the Joint Intervenors' thesis is now shown to be implausible in light of the recent work of Crouch et al., that fact should not in any manner be a basis for re-opening the record on seismic issues nor does it impair the findings of this Board in its previous decision.

- C. The Morgan Hill Earthquake does not provide new evidence not already considered in the Diablo Canyon design spectrum.

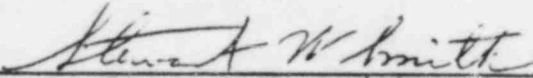
The Brune affidavit (at 3) cites the Coyote Lake Dam record of the recent Morgan Hill earthquake (April 24, 1984, M=6.1) as "--definitive evidence that horizontal ground accelerations in the direction of rupture propagation can be much higher than predicted by average or 84th percentile curves based on the small amount of data presently available for moderate earthquakes." Dr. Brune readily admits that the "high accelerations resulting from rupture focusing (directivity) and high stress drop events . . . have a lower probability of occurrence than values predicted by 84th percentile regression curves. . . ."

There is no doubt that focusing effects are present to some extent in the records of all moderate and larger earthquakes. It is just one of a large number of seismologic and geologic conditions that are responsible for

the statistical scatter seen in earthquake ground motion measurements. In the case of the Morgan Hill earthquake, some clear effects of focusing can be seen, but other effects including a possible local zone of energetic seismic radiation, and local site amplification are also apparent. For example, the Coyote Lake Dam record showed a peak horizontal acceleration of 1.29g. This station is on the abutment of Coyote Lake Dam, and there are geologic and topographic factors that suggest the potential for structural amplification influencing the record. Future efforts will undoubtedly lead to a more complete physical understanding of the significance of the various contributing factors. The point is however, that it is not necessary to discard or explain away such a record, but simply to accept it along with others and not be surprised when some of them lie on the tail of the statistical distribution as they must. The Coyote Dam record (1.29g) is not significantly different from the Pacoima Dam record (1.25g), which already played a significant role in arriving at the Diablo design spectrum. The observation of a new

record, obtained in similar circumstances with a value only  
3% higher, does not appear to be a cause of any concern.

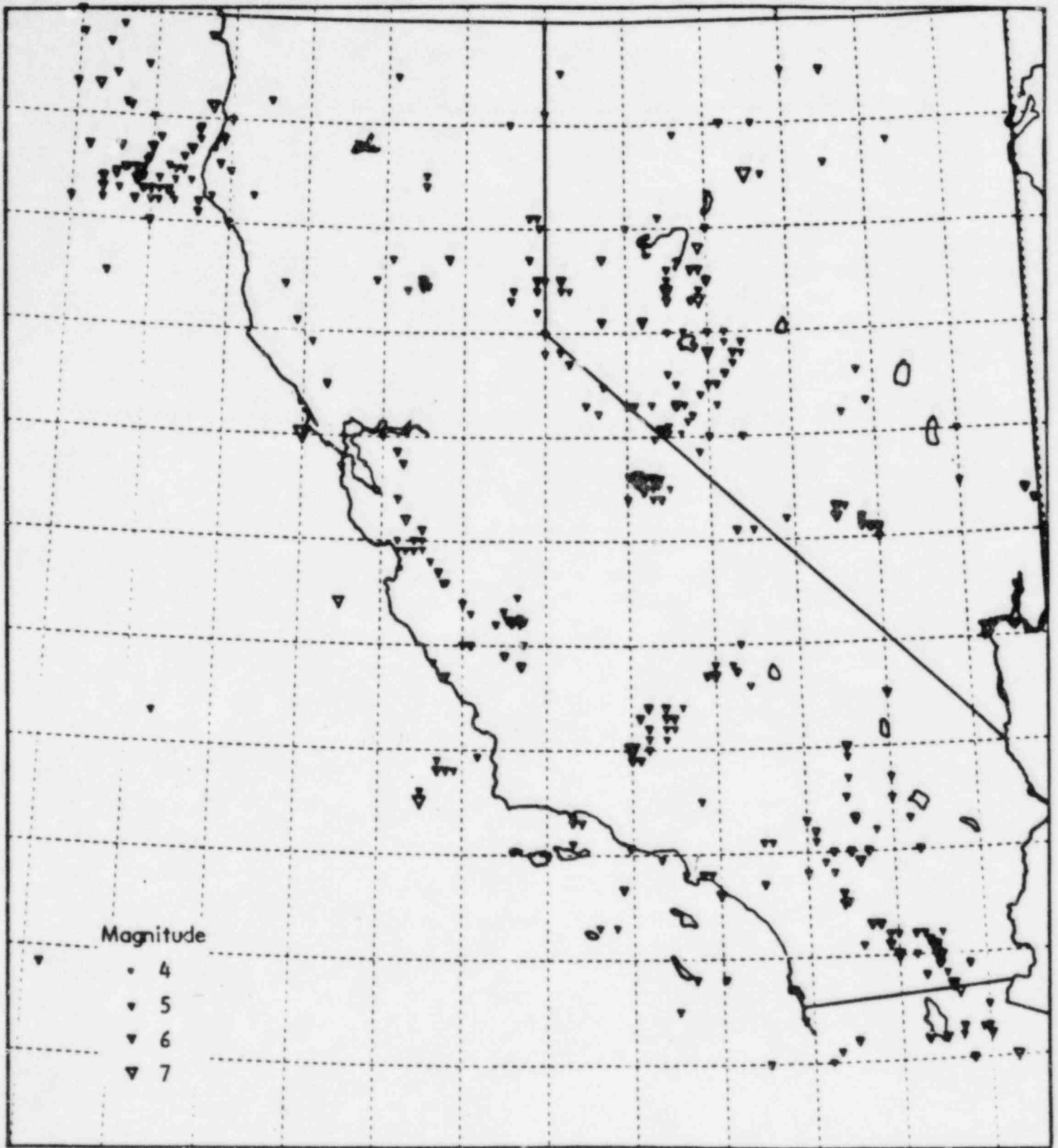
DATED: July 26, 1984

  
Stewart W. Smith

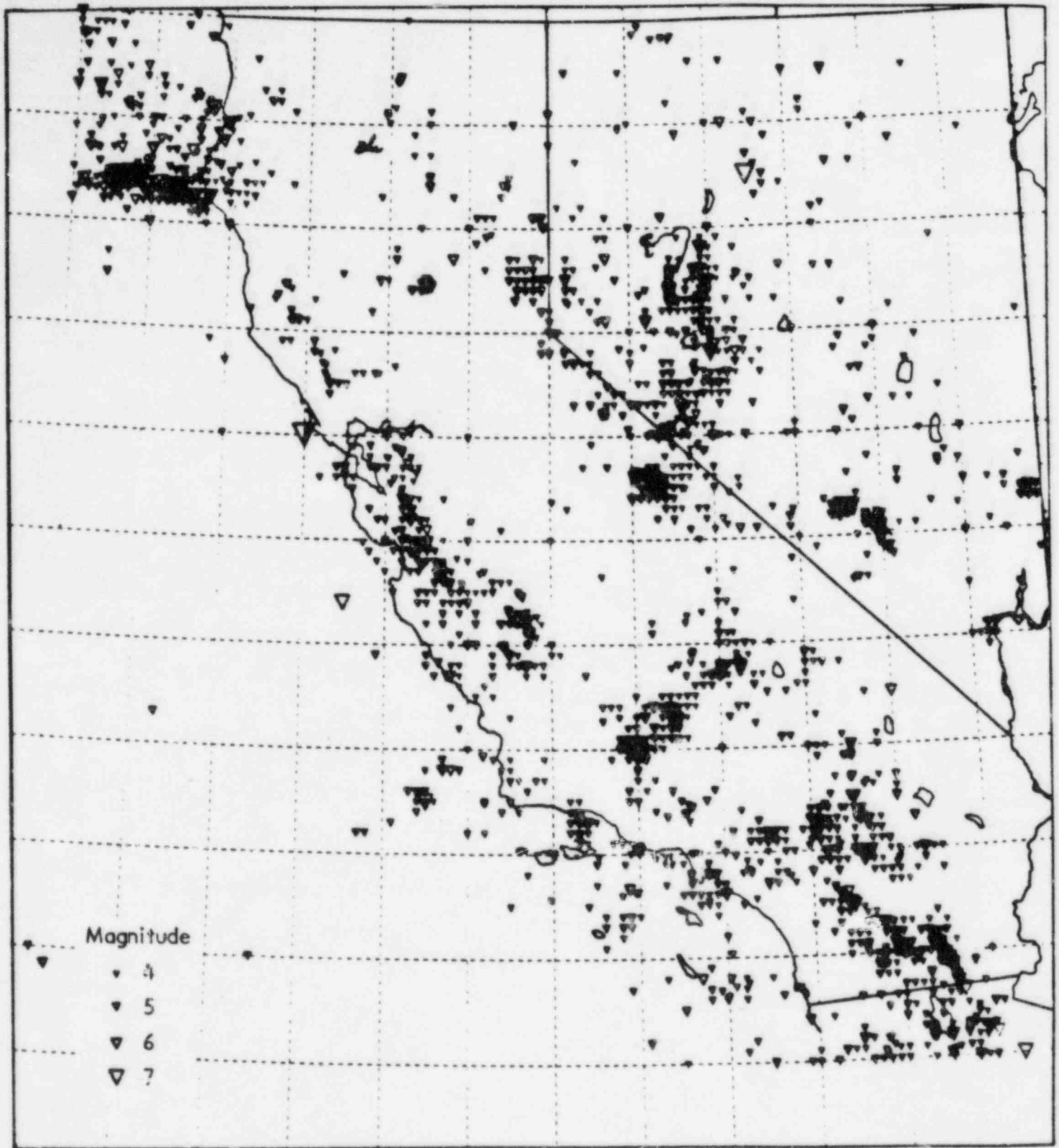
Subscribed and sworn to  
before me this 26th day  
of July, 1984

C. T. Neal-Madison  
C. T. Neal-Madison  
Notary Public in and for the  
City and County of San  
Francisco, State of California.  
My commission expires  
December 27, 1985





CALIFORNIA EARTHQUAKES 1900 - 1983  
MAGNITUDES 5 AND GREATER  
(NATIONAL GEODETIC DATA CENTER)



CALIFORNIA EARTHQUAKES 1900 - 1983  
MAGNITUDES 4 AND GREATER  
(NATIONAL GEODETIC DATA CENTER)