California Division of Mines and Geology

Fault Evaluation Report FER-10

July 20, 1976

1. Name of fault: Abel Mountain thrust and related faults.

2. Location of faults: Sawmill Mountain quadrangle, Ventura County.

3. Reason for evaluation: Part of a 10-year program; zoned in Ventura County's Seismic and Safety Element (Nichols, 1974).

4) List of references:


a) California Division of Mines and Geology, 1976, Active fault mapping and evaluation program, ten-year program to implement Alquist-Priolo Special Studies Zones Act: California Division of Mines and Geology, Special Publication 47, 42 p.

b) Crowell, J.C., 1964, The San Andreas fault zone from the Temblor Mountains to Antelope Valley, southern California in Pacific Section A.A.P.G. - S.E.P.M. and San Joaquin Geological Society Guidebook, p. 8-38, pl. 1, map scale 1:62,500. Remarks: Plate 1 has no topographic control.

c) Crowell, J.C., 1968, Movement histories of faults in the Transverse Ranges and speculations on the tectonic history of California in Proceedings of conference on geologic problems of San Andreas Fault System, Dickinson, W.R., and Grantz, A., editors: Stanford University Publications, Geological Sciences, v. XI, p. 323-341.

d) Jennings, C.W., and Strand, R.G., 1969, Geologic map of California, Los Angeles Sheet: California Division of Mines and Geology, scale 1:250,000.

e) Jennings, C.W., 1975, Fault map of California: California Division of Mines and Geology, California Geologic Data Map Series, Map no. 1, scale 1:750,000.

f) Kahle, J.E., 1973, unpublished map compilation and notes on faulting in the Sawmill Mountain quadrangle (filed in the Fault Evaluation Project's planfile).

g) Nichols, D.R., 1974, Surface faulting: in Seismic and Safety Elements of the Resources Plan and Program, Ventura County Planning Department, Section II, p. 1-35, pl. 1.

h) Smith, T.C., 1976, Alamo Mountain thrust and related faults: California Division of Mines and Geology, unpublished Fault Evaluation Report FER-7, 6 p.

i) Van Amringe, J.H., 1957, Geology of a part of the western San Emigdio Mountains, California: unpublished M.A. thesis, University of California, Los Angeles, 120 p., 5 pl., geologic map scale 1:15,840.

j) Weber, F.H., Jr., Kiessling, E.W., Sprotte, E.C., Johnson, J.A., Sherburne, R.W., and Cleveland, G.B., 1975 (Preliminary draft of 2/27/76), Seismic hazards study of Ventura County, California: California Division of Mines and Geology, work in progress as a cooperative project with Ventura County.

k) Ziony, J.I., 1958, Geology of the Abel Mountain area, Kern and Ventura Counties, California: unpublished M.A. thesis, University of California, Los Angeles, 99 p., 4 plates, geologic map scale 1:15,840.

l) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-585, 15 p., map scale 1:250,000, 3 plates.

5. Summary of available data:

Guidelines used to evaluate fault activity are presented in reference "a" (see especially p. 19 and 31).

The Abel Mountain thrust and related faults are classified as secondary fault hazards in the Ventura County Seismic and Safety Element (Nichols, 1974); thus, these faults (shown on figure 1, herein) are considered for zoning for special studies. Weber, et al. (1975, p. 172, figure 9) shows the faults but neither classifies as to recency nor mentions these faults anywhere in his report. ~~Apparently, these faults anywhere in his report.~~ Apparently, these faults were outside of his area of concern.

Kahle (1973) plotted much of the data available in the Sawmill Mountain quadrangle. Kahle chose to reject Crowell's work "because of inaccuracies and for new data" (new data along the San Andreas fault) in favor of Ziony's (1958) and Van Amringe's (1957) works.

Crowell (1964) notes the presence of "recent gouge" along the Abel Mountain thrust. He states that the fault may be a reactivated part of an older fault, and conceivably might be related to the Alamo Mountain thrust (considered to be pre-Quaternary by Smith (1976, p. 5)). Plate 1 of Crowell (1964) shows the Caliente Formation (Miocene) as the youngest unit cut by the Abel Mountain thrust, and terrace deposits (Pleistocene in age) as not cut by the fault.

The two references for Crowell's compiled map are Ziony (1958) and Van Amringe (1957). Ziony describes the Abel Mountain thrust as dipping 5° to 15° southeast, and as being early-to mid-Pleistocene in age. He depicts the fault (see Plate 1) as off-setting Caliente Formation (Miocene) and as buried under terrace deposits (late Pleistocene).

Further, Ziony notes that the Abel Mountain thrust is offset about one mile by the Pattiway Ridge fault. "The Pattiway Ridge fault is overlapped by undeformed terrace deposits. Therefore, its latest movements were older than late Pleistocene" (p. 71). Later he notes (p. 93) that the Pattiway Ridge fault probably moved in the early to mid-Pleistocene.

The related unnamed faults, shown on Plate 1, are designated herein as AB, CD, EF, and GH. Ziony (1958) notes that fault AB is entirely within the crystalline basement. He describes this fault as an ancient strike-slip fault, striking N 60 W and dipping steeply to the north. This "somewhat warped" fault is truncated by the Abel Mountain thrust. The eastern end of fault AB is depicted by Crowell (1964) as buried under terrace deposits (Pleistocene). Van Amringe (1957) presents no evidence to the contrary.

Fault CD is an extension of the Abel Mountain thrust (north segment), which is discussed above.

Fault EF is similar to fault AB in that EF is also entirely within the crystalline basement. The fault strikes N 35 W and dips vertically; the amount or kind of displacement is unknown. Fault EF is truncated by the Abel Mountain thrust and is buried under terrace deposits at its southeastern end.

Fault GH is depicted as cutting the pre-Tertiary granitic complex but not cutting terrace deposits (late Pleistocene). To the south, the Mount Pinos(?) fault of Ziony (Crowell, 1964 shows this as not being the Mount Pinos fault) is depicted as cutting the Caliente Formation (Miocene); no younger units occur along this fault.

Jennings (1975) depicts all of these faults as pre-Quaternary. Further, on one of his reference sheets, Jennings notes that the Abel Mountain thrust is "Not (a) Quaternary fault -- (Ziony, personal communication, October 1972)".

6. Interpretation of air photos:

U-2 aerial photos, Flight 73-194 (EROS Data Center), numbers 6388-6391 add 6442-6444 (scale 1:125,000) were viewed. No scarps were observed along these faults in any of the Quaternary deposits. No features that could not be explained by differential erosion along pre-late-Quaternary faults were observed.

7. Field observations:

In light of the evidence cited above, and since the Abel Mountain thrust fault is of a low priority (priority 3), no field observations were made.

8. Conclusions:

Except for the Mount Pinos(?) fault, all the faults discussed in this FER are pre-Holocene, and probably older than late Pleistocene, since all are overlain by terrace deposits of late Pleistocene age. The Mount Pinos(?) fault can only be dated as post-Miocene; however, there is no evidence in support of recent activity along this fault.

9. Recommendations:

On the basis of the data summarized herein, zoning of these faults is not recommended.

10. Investigating geologist's name, date:

Theodore C. Smith
Assistant Geologist
July 21, 1976

I concur with the recommendations.
E. W. Hart
9/9/76