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Reliz fault zone, Sierra de Salinas section (Class A) No. 286b

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Synopsis	**General:** Late Quaternary, predominately high-angle reverse fault. The Reliz fault zone is mapped at regional scales of mainly 1:62,500 and 1:24,000. No paleoseismic data are available for this fault. Vertical uplift rates derived from marine terrace profiles on western side of Santa Lucia Range suggest a late Quaternary slip rate of about 0.16 mm/yr (Page and others, 1998 #6176). Dextral slip rate unknown, but is probably 0.2-1 mm/yr if assumed the same as for the Rinconada fault zone, and maybe less if slip is partitioned along intra-Salinian faults, such as the Tularcitos fault [62c], westward to the San Gregorio fault zone [60] (Working Group on Northern California Earthquake Potential, 1996 #1216; Jachens and others, 1998 #6174; Clark and Rosenberg, 1999 #5394). Only one site has been investigated by trenching. At site 286b-1 (Terratech Inc., 1989 #6179) strands of the Reliz fault zone offset soil horizons estimated to be between several tens of

	thousands to a few hundred thousand years old that have developed within Pliocene-Pleistocene Paso Robles Formation. Overlying late Pleistocene colluvium estimated to be 30-50 ka is not offset. **Sections:** This fault has 2 sections.
Name comments	**General:** **Section:** This section includes the 60 km length of the Reliz fault zone along the eastern side of the Sierra de Salinas from Spreckels southwestward to Arroyo Seco and is herein named the Sierra de Salinas section. **Fault ID:** Refers to number 239 (Reliz fault) of Jennings (1994 #2878) and L01 (Rinconada fault) of Working Group on Northern California Earthquake Potential (1996 #1216).
County(s) and State(s)	MONTEREY COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Location of fault digitized from Tinsley (1975 #6180) at 1:62,500 scale.
Geologic setting	The Reliz fault zone is a major, high-angle reverse fault, which offsets Salinian block crystalline basement rocks and locally juxtaposes Pliocene-Pleistocene age Paso Robles Formation against basement rocks. The continuity of the Reliz fault zone with the Rinconada fault zone [63] to the southeast is controversial. Durham (1974 #6171) regarded the Reliz fault as a relatively minor Coast Range structure, stating that it is unlikely that the fault extends south of Arroyo Seco. On the other hand, Dibblee (1976 #6170) interprets the Reliz fault as the northern component of a major structural feature he calls the Rinconada-Reliz fault zone. Although the Reliz and Rinconada [63] faults are roughly aligned, there is a 10-15 degree difference in strike at the juncture. More significantly, the dominant style of displacement on the Reliz fault is reverse, whereas on the Rinconada fault zone [63], it is dextral strike-slip. Indeed, based on the distribution of the schist of the Sierra de Salinas, Ross (1974 #6178, (Ross, 1984

	,p. 18) sees "no compelling reason to believe that this schist belt was significantly faulted or offset" by this fault zone. Limited subsurface data (Ross, 1984 #6458, fig.11) suggest that this schist terrane continues to the east across the Reliz fault zone and disallow right-slip in excess of 23 km since Cretaceous time. Most of the offset on the Reliz fault appears to have been reverse dip-slip with Sierra de Salinas and Salinian basement uplifted to the southwest by as much as 3,000 m (Dibblee, 1976 #6170). The total documented dextral-slip on the Rinconada fault zone [63] is 38 km, whereas the maximum possible right-slip on the Reliz fault zone probably does not exceed 23 km and may be less. Thus, some, if not all, of the strike-slip motion along the Rinconada trend may have been partitioned northwestward via the Paloma and related faults to the Tularcitos fault [62c] of upper Carmel Valley. This latter fault is Holocene active and may have at least 16 km and possibly as much as 40 km of right-lateral displacement (Clark and others, 1997 #6137). Therefore, we believe that the Reliz fault is a separate zone because of the difference in type of displacement, the change in overall strike, and the likelihood that slip is partitioned at different rates between the Rinconada fault zone [63] and the Reliz fault zone.
Length (km)	This section is 55 km of a total fault length of 77 km.
Average strike	N41°W (for section) versus N43°W (for whole fault)
Sense of movement	Reverse *Comments:* In the Sierra de Salinas section, the sense of movement is best exposed in a roadcut on the north side of the iron bridge that crosses the Arroyo Seco. Here, the fault strikes N30?W and dips 74? SW, and a 1- to 2-m-wide gouge zone separates the Pancho Rico Formation of early Pliocene age to the northeast from the Monterey Formation of middle to late Miocene age to the southwest. At this exposure, the upper Pleistocene stream terrace and terrace gravel have not been displaced vertically by the fault (1979 #6181).
Dip	74° *Comments:* Measured at Arroyo Seco roadcut. A pronounced gravity gradient indicates that this fault dips steeply to the southwest beneath the quartz monzonite of Pine Canyon near Spreckels (Langenheim and others, 2002 #6175).

Paleoseismology studies	Only one trenching study (Terratech Inc., 1989 #6179) has been performed on the Sierra de Salinas section. Site 286b-1 by Terratech, Inc., was not a detailed paleoseismology study instead, its focus was to locate faults at potential land development sites. The study involved excavating five trenches across the fault on the Las Palmas Ranch property. Trenches TR-1, 2 and 4 exposed a 4.5-m-wide fault zone which displaces a duripan (estimated age several tens of thousands to a few hundred thousands years old) within the Pliocene-Pleistocene Paso Robles Formation, but does not offset late Pleistocene colluvium (estimated age of 30-50 ka). Terratech, Inc., did not estimate recurrence interval, slip rate, or timing of most recent paleoevent.
Geomorphic expression	Good. The Sierra de Salinas section forms the linear range front of the Sierra de Salinas, a northeast-facing escarpment. Dibblee (1976 #6170) reported that the fault is delineated by faceted spurs and a small southwest-facing scarp in an older alluvial fan. Tinsley (1975 #6180) concluded that the King City-Reliz fault is delineated by multiple fault strands. Fault traces generally are concealed by late Pleistocene alluvium and Tinsley (1975 #6180) concluded that many scarps at the base of the Sierra de Salinas are fluvial.
Age of faulted surficial deposits	Faults of the Sierra de Salinas section offset Pliocene-Pleistocene Paso Robles Formation (Dibblee, 1976 #6170), but late Pleistocene and Holocene alluvium generally conceal fault traces. Dibblee (1976 #6170) reported that a southwest-facing scarp in an older alluvial fan surface is evidence of late Pleistocene displacement. Tinsley (1975 #6180) determined that an alluvial fan surface that buries part of the scarp is capped by Chualar soil (mid-Wisconsin).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Soil horizon (estimated age several tens of thousands to a few hundred thousands years old) developed within the Pliocene-Pleistocene Paso Robles Formation is offset, but late Pleistocene colluvium (estimated age of 30-50 ka) is not offset (Terratech Inc., 1989 #6179).

Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Vertical uplift rates derived from marine terrace profiles on western side of Santa Lucia Range suggest a late Quaternary slip rate of about 0.16 mm/yr (Page and others, 1998 #6176). Dextral slip rate unknown, but is probably within the 0.2-1 mm/yr category if assumed the same as for the Rinconada fault zone. May be less if slip is partitioned is partitioned along intra-Salinian faults, such as the Tularcitos fault, westward to the San Gregorio fault zone (Working Group on Northern California Earthquake Potential, 1996 #1216; Jachens and others, 1998 #6174; Clark and Rosenberg, 1999 #5394). Slip rate assigned to the entire Reliz fault by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 1 mm/yr (with minimum and maximum assigned slip rates of 0 mm/yr and 2 mm/yr, respectively.
Date and Compiler(s)	2003 Lewis I. Rosenberg, San Luis Obispo County Planning Department William A. Bryant, California Geological Survey
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