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Ortigalita fault zone, Los Banos Valley section (Class A) No. 52b

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Compiled in cooperation with the California Geological Survey

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Synopsis	**General:** The Ortigalita fault zone is a major Holocene dextral strike-slip fault in the central Coast Ranges that is an eastern part of the larger San Andreas fault system. The Ortigalita fault zone extends from about 20 km northwest of San Luis Reservoir southeast to the vicinity of Panoche Valley. The Ortigalita fault zone is characterized by en echelon fault traces separated by pull-apart basins. Anderson and others (1982 #5344; 1982 #5345) excavated trenches along each of the four sections, demonstrating that the Ortigalita fault zone is latest Pleistocene to Holocene (active) and that the Little Panoche Valley section is late

	Holocene active. Most of the Ortigalita fault zone is delineated by geomorphic evidence of latest Pleistocene to Holocene dextral strike-slip displacement and is locally marked by complex dextral normal offset, primarily at the section boundaries marked by pull-apart basins (Anderson and others, 1982 #5344; 1982 #5345; Hart, 1985 #5350; Manson, 1985 #5355). Late Quaternary slip rates and recurrence intervals are unknown, although Anderson and others (1982 #5344) concluded that the recurrence interval for the entire Ortigalita fault zone is about 2–5 k.y. Clark and others (1984 #2876) reported a minimum vertical slip rate of 0.01–0.04 mm/yr. The dextral slip component is probably greater than the vertical component, but this has not been documented. **Sections:** This fault has 4 sections. Anderson and others (1982 #5344) defined four segments of the Ortigalita fault, from north to south: Cottonwood Arm, Los Banos Valley, Piedra Azul, and Little Panoche. There is insufficient data to define these as seismogenic fault segments. The names and segment boundaries from Anderson and others (1982 #5344) are adopted as sections for this compilation and include the Cottonwood Arm [52a], Los Banos Valley [52b], Piedra Azul [52c], and Little Panoche [52d] sections.
Name comments	**General:** The Ortigalita fault zone was first recognized and mapped by Anderson and Pack (1915 #5347) for a fault that juxtaposes Cretaceous Franciscan Complex rocks against Upper Cretaceous Chico Group along the eastern side of Ortigalita Peak. The fault was first named by Taliaferro (1943 #5356), who identified a steeply west-dipping reverse fault (cross-section VII) that he named the Ortigalita Thrust. The fault has also been referred to as the Tesla-Ortigalita fault (e.g., Cotton, 1972 #5348). This compilation refers to the Ortigalita fault zone (most common name) as the zone of faults from about 20 km northwest of San Luis Reservoir southeast to Panoche Valley that are characterized by predominantly dextral late Pleistocene and Holocene strike-slip. **Section:** Los Banos Valley section corresponds to Los Banos Valley segment of Anderson and others (1982 #5344). This section extends from the large right-releasing step in the San Luis Reservoir area (San Luis Creek) southeast to Carrisalito Flat. **Fault ID:** Refers to number 214 (Ortigalita fault) of Jennings (1994 #2878) and number L03 (Ortigalita fault) of Working Group on Northern California Earthquake Potential (1996 #1216).

County(s) and State(s)	MERCED COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Locations based on digital revisions to Jennings (1994 #2878) using original mapping by Dibblee (1975 #4832) at 1:62,500 scale and mapping by Anderson and others (1982 #5345), Lettis (1982 #5353), and Manson (1985 #5355) at 1:24,000 scale.
Geologic setting	The Ortigalita fault zone consists of near vertical dipping dextral strike-slip faults located along the eastern border of the central Diablo Range (Anderson and others, 1982 #5344; Lettis, 1985 #5354). This fault zone separates the Franciscan core of the range from the Great Valley Sequence of the eastern foothills of the range (Anderson and others, 1982 #5344). The fault's style of displacement locally is complex with minor reverse and normal components to the predominant dextral strike-slip displacement (Anderson and others, 1982 #5344; 1982 #5345; Manson, 1985 #5355). Cumulative dextral displacement is unknown, but the large-scale dextral displacement of Los Banos Creek suggests at least 5 km of offset (Manson, 1985 #5355). Anderson and La Forge (1990 #5346) estimated that at least 1–2 km of dextral slip is indicated by the size of pull-apart basins associated with the Ortigalita fault zone. Lettis (1985 #5354) argued that the location of Basalt Hill, an outlier of the late Miocene Quien Sabe volcanic field, limits the amount of significant late Cenozoic dextral displacement along the Ortigalita fault zone. Elevations of the Quien Sabe volcanic rocks on either side of the Ortigalita fault zone also limit the amount of late Cenozoic vertical displacement (Lettis, 1985 #5354).
Length (km)	This section is 35 km of a total fault length of 71 km.
Average strike	N32°W (for section) versus N28°W (for whole fault)
Sense of movement	Right lateral *Comments:* Los Banos Valley section is characterized by dextral normal offset near its northern end. Trench exposures near the

	northern end of this section reported in Anderson and others (1982 #5344; 1982 #5345) indicate normal drag of sedimentary deposits of the Tulare (?) Formation into a steely dipping fault. Further southeast, dextral displacement is indicated by geomorphic features that show a consistent sense of dextral displacement. La Forge and Lee (1982 #5352) reported that dextral strike-slip focal mechanisms characterize seismicity associated with the Ortigalita fault zone.
Dip Direction	V *Comments:* La Forge and Lee (1982 #5352) reported that focal mechanism of small earthquakes associated with the Los Banos Valley section are characterized by near vertical dipping dextral strike-slip faults. Trench exposures indicate vertical to steely northeast dipping fault planes along strands of the Los Banos Valley section (Anderson and others, 1982 #5344), (1982 #5345).
Paleoseismology studies	Anderson and others (1982 #5344; 1982 #5345) conducted a detailed study of the fault zone, and excavated about nine fault-normal trenches along traces of the Cottonwood Arm, Los Banos Valley, Piedra Azul, and Little Panoche Valley sections of the Ortigalita fault zone. Two study sites were examined along Los Banos Valley section. Site 52-2 involved excavation of two fault-normal trenches. Trench T-7 exposed a 20-m-wide shear zone marked by steeply NE-dipping faults (with horizontal slickensides) that offset latest Pleistocene colluvium. Trench T-3 exposed steeply dipping faulting and drag folding of Tulare Formation sediment, indicating a normal component of displacement. Site 52-3 involved the excavation of one fault-normal trench across the base of a SW-facing scarp. The fault offsets colluvium derived from sediment of the Tulare Formation. The steeply NE-dipping fault flattens upward and is overlain by unfaulted colluvium of undetermined age.
Geomorphic expression	Los Banos Valley section is delineated by moderately well-defined geomorphic indicators of dextral strike-slip displacement, such as dextrally deflected drainages, linear scarps, linear tonal contrasts on Holocene alluvium, aligned saddles, side-hill benches, and a closed depression (Anderson and others, 1982 #5345; Manson, 1985 #5355).

Age of faulted surficial deposits	Faults of Los Banos Valley section offset latest Pleistocene and Holocene alluvium as mapped by Lettis (1982 #5353).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Anderson and others (1982 #5344; 1982 #5345) reported that the most recent paleoevent along Los Banos Valley section occurred since 10-15 ka. This is based on a trench exposure of faulted colluvium interpreted to be 10–15 ka on the basis of soil profile development. The overlying (undated) soil is not offset.
Recurrence interval	*Comments:* Anderson and others (1982 #5344) concluded that the average recurrence interval for movement somewhere along the entire fault is about 2–5 k.y. based on their observations that there have been at least 4 major surface rupturing earthquakes on the Ortigalita fault zone in the past 15 k.y. There is no documentation for recurrence intervals on specific fault sections, although Anderson and others (1982 #5344) state that recurrence of large earthquakes on individual sections may be on the order of 10–15 k.y.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Clark and others (1984 #2876) reported a late Pleistocene vertical displacement rate of about 0.01 mm/yr for Los Banos Valley section; the dextral component of slip is unknown. Clark and others (1984 #2876) qualify this vertical rate by stating that the rate is an extreme minimum, that trench exposures and geomorphic expression of the fault zone suggest a much greater dextral rate on the order of 0.5–1.0 mm/yr or greater. Petersen and others (1996 #4860) used a probable slip rate of 1±0.5 mm/yr, so the 1–5 mm/yr category seems to fit best.
Date and Compiler(s)	2000 William A. Bryant, California Geological Survey Sereyna E. Cluett, California Geological Survey
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