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Quaternary Fault and Fold Database of the United States

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Los Osos fault zone, Lopez Reservoir section (Class A) No. 79c

Last Review Date: 2016-12-01

citation for this record: **Hanson, K.L., and Bryant, W.A., compilers, 2016, Fault number 79c, Los Osos fault zone, Lopez Reservoir section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 03:16 PM.**

Synopsis	**General:** Detailed mapping of surficial deposits and paleoseismic trenching investigations (PG&E, 1988 #7833; Lettis and Hall, 1994 #7842) and mapping (Nitchman, 1988 #7846) provide evidence for late Quaternary and locally, Holocene activity along the Los Osos fault zone. These studies confirmed many of the bedrock fault traces mapped by Hall and others (1979 #7840) and identified additional traces within the zone. The central portion of the fault zone meets the criteria of "sufficiently active and well-defined" to warrant zoning under the Alquist-Priolo Special Studies Zone Act (Bryant and Hart, 2007 #7836; Treiman, 1989 #7847). **Sections:** This fault has 4 sections. PG&E (1988 #7833) and Lettis and Hall (1994 #7842) define segments along the fault zone based on differences in physical (*i.e.*, spatial coincidence with

	distinct topographic elements of the San Luis/Pismo structural block (Lettis and others, 1994), en echelon separation of fault traces, intersection with known or inferred branching or crossing structures, and geomorphic character as a range-front fault or intra-range fault) and behavioral (*i.e.*, recency of activity and late Quaternary slip rate). From west to east, these segments are referred to as the Estero Bay, Irish Hills, Lopez Reservoir, and Newsom Ridge segments. Although paleoseismic studies conducted on the two central sections of the fault provide sufficient data to define at least one seismogenic segment boundary, additional data on timing and recency of activity are needed on the two end sections to verify these as seismogenic segments. Segments defined by Lettis and Hall (1989 #7842) are herein described as sections.
Name comments	**General:** Initially mapped by Hall and others (1979 #7840); southwest part of fault as mapped by PG&E (1988 #7833) and Lettis and Hall (1994 #7842) coincides with the Edna fault as mapped by Hall (1973 #7838) and Hall and others (1979 #7840). **Section:** Defined as Lopez Reservoir segment by PG&E (1988 #7833); northwest boundary is defined by 1 to 2 km en echelon right step to Irish Hills section, coincident with NW termination of Edna sub-block (as defined by Lettis and others, 1994 #7843); southeast boundary is poorly defined because geomorphic expression of fault becomes indistinct, coincides with SE termination of Edna sub-block. **Fault ID:** Refers to number 285 (Los Osos fault zone) of Jennings (1994 #2878).
County(s) and State(s)	SAN LUIS OBISPO COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Source of traces digitized from base map at 1:250,000 with topographic and bathymetric control; original mapping at 1:24,000 scale (Hall 1973 #7838; PG&E, 1988 #7833; Lettis and Hall, 1994 #7842) and 1:48,000 (Hall and others, 1979 #7840).
Geologic setting	Southwest-dipping reverse fault bounding northern margin of the

	San Luis Range; fault has a complex history of strike-slip and dip-slip displacement (Hall, 1981 #7839; Lettis and Hall, 1994 #7842). Hall (1981 #7839) interprets the southwestern part of the fault to have experienced late Cenozoic dextral strike-slip and to be part of a larger system of late Cenozoic NW-trending strike-slip faults that are responsible for creating the late Tertiary Santa Maria, Pismo, and Huasna pull-apart depositional basins. An alternative tectonic model (Namson and Davis, 1990 #7845) interprets the presence of an active detachment fault beneath the San Luis Range and does not identify nor discuss implications of an active fault along the northeastern margin of the range.
Length (km)	km.
Average strike	
Sense of movement	Reverse
Dip	50° SW. *Comments:* Fault is exposed in road cuts near the Lopez re-regulating reservoir; Miocene Monterey diatomite in the hanging wall is thrust over weathered older alluvium (the Paso Robles formation of Hall, 1973 #7837) (Nitchman, 1988 #7846; PG&E, 1988 #7833; Lettis and Hall, 1994 #7842).
Paleoseismology studies	Geomorphic features suggestive of recent faulting were investigated by detailed mapping and trenching at four locations: Guidetti site (SW ¼, Sec. 14, T31S, R12E), Brughelli property NE ¼, Sec. 14, T31S, R12E), Glick property (Sec. 35, T31S, R13E), Lopez re-regulating reservoir area (Sec. 1, T32S, R13E). These investigations indicate that older (Pliocene ? and Pleistocene) Paso Robles Formation is displaced against Miocene Monterey formation along high-angle, SW-dipping reserve faults. These investigations provided minimal to no site-specific data to document the late Pleistocene and Holocene slip rate and behavior of this section of the fault.
Geomorphic expression	Poorly defined range-front fault; geomorphic features suggestive of faulting are sparse, laterally discontinuous, and not well defined. These features include linear drainages, anomalous drainage patterns, deflected drainages, topographic saddles, and ponded alluvium; becomes an intra-range fault near its southern end.

Age of faulted surficial deposits	Fault offsets Miocene Monterey Formation, Pleistocene Paso Robles Formation, and younger alluvium in Edna Valley of probable late Pleistocene age.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* No evidence for latest Pleistocene (post-40 ka) or Holocene displacement observed in trenches. Geomorphic relations (apparent ponding or tectonic impoundment of alluvium of Pismo Creek drainage upstream from Los Osos fault and outcrop pattern of both older alluvium (Paso Robles formation) and younger alluvium in Edna Valley suggest late Pleistocene uplift of the Edna sub-block of the San Luis/Pismo block (PG&E, 1988 #7833; Lettis and others, 1994 #7843; Lettis and Hall, 1994 #7842).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Probably <0.1 mm/yr (Lettis and Hall, 1994 #7842).
Date and Compiler(s)	2016 Kathryn L. Hanson, AMEC Environment & Infrastructure (AMEC E&I) William A. Bryant, California Geological Survey
References	#7836 Bryant, W.A., and Hart, E.W., 2007, Fault-rupture hazard zones in California: California Geological Survey Special Publication 42, 42 p., ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf. #7837 Hall, C.A., Jr., 1973, Geologic map of the Morro Bay South and Port San Luis Quadrangles, San Luis Obispo County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-511, scale 1:24,000. #7838 Hall, C.A., Jr., 1973, Geology of the Arroyo Grande quadrangle, California: California Division of Mines and Geology Map Sheet 24, scale 1:48,000, 8 p. #7839 Hall, C.A., Jr., 1981, Map of geology along the Little Pine

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#7833 Pacific Gas and Electric (PG&E), 1988, Final report of the Diablo Canyon Long Term Seismic Program for the Diablo Canyon Power Plant: U.S. Nuclear Regulatory Commission Docket Nos. 50-275 and 50-323.

	#7847 Treiman, J.A., 1989, Los Osos Fault Zone, San Luis Obispo County, California: California Department of Conservation, Division of Mines and Geology Fault Evaluation Report FER-200, 11 p., 1 plate.