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Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.

Mercury Ridge faults (Class A) No. 1070

Last Review Date: 1998-04-13

citation for this record: **Anderson, R.E., compiler, 1998, Fault number 1070, Mercury Ridge faults, 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 02:18 PM.**

Synopsis	There are two main faults; one along the northwest margin of Mercury Ridge and the other along the southeast margin. These faults strike northeast and may be part of a northeast-striking structural zone (the Spotted Range-Mine Mountain structural zone) containing faults of known or suspected sinistral displacement located in and near the southern part of the Nevada Test Site. Published interpretations of Quaternary faulting vary from none to displacement along 3 and 10 km trace lengths, either way indicating limited evidence for Quaternary displacement. Recent unpublished mapping at 1:100,000-scale suggests that Quaternary faulting may be limited to the northern fault and to a short (600 m long) trace on a subsidiary fault located northwest of Mercury Ridge where deposits estimated to be middle Pleistocene are faulted against bedrock. That mapping does not show the Mercury Ridge faults cutting deposits of estimated Holocene and late Pleistocene age, precluding movement the past 130 ka.

Name comments	Name taken from Piety (1995 #915). Comprised of two main faults: one along the northwest margin of Mercury Ridge and the other along the southeast margin. **Fault ID:** Referred to as fault MER by Piety (1995 #915).
County(s) and State(s)	CLARK COUNTY, NEVADA NYE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* The trace of the fault on the northwestern flank of Mercury Ridge is compiled from the 1:100,000-scale mapping of Reheis (1992 #1604) who, in turn, compiled it from 1:24,000-scale geologic quadrangle mapping (Barnes and others, 1982 #1441) and inspection of 1:60,000-scale aerial photos. The trace of the fault on the southeastern flank is compiled from 1:250,000-scale mapping by Dohrenwend and others (1991 #288) who compiled it from 1:60,000-scale aerial photos. Recent unpublished mapping by P.L. Guth and J.C. Yount of the Indian Springs sheet at 1:100,000-scale suggests that Quaternary faulting may be limited to the northern fault and to a short (600 m long) trace on a subsidiary fault
Geologic setting	The Mercury Ridge faults are part of a group of relatively short (<20 km) northeast-striking faults located north of the northwest part of the Spring Mountains. From south to north this group includes the Peace Camp fault [1072], Cactus Spring fault [1071, South Ridge fault (not considered a Quaternary structure), Crossgrain Valley faults, Mercury Ridge faults [1070], and the Checkpoint Pass and Ranger Mountains faults (both not considered Quaternary structures). These faults are subparallel to a group of four main predominantly sinistral low-slip-rate Quaternary faults located directly to the west and northwest. This second group of faults forms the Spotted Range-Mine Mountain structural zone (SRMM) of Carr (1984 #1472), consisting of (from south to north) the Rock Valley [1065], Cane Spring [1067], Wahmonie [1068], and Mine Mountain [1066] faults. Together, the two groups of faults comprise a broad structural zone of northeast-striking faults that intersects and extends into

	the Las Vegas Valley shear zone. It is as much as 50-km wide across its northeast end. It is uncertain whether these faults are conjugate to the Las Vegas shear zone (Carr, 1984 #1472) or are early normal faults that were bent clockwise and reactivated in sinistral shear as a result of drag associated with dextral displacement on the Las Vegas shear zone (Ekren and others, 1968 #1508).
Length (km)	9 km.
Average strike	N54°E
Sense of movement	Normal *Comments:* The northwest of the two main faults is shown as having oblique displacement with the dip-slip portion being down to the northwest (Barnes and others, 1982 #1441; Reheis, 1992 #1604). The strike-slip portion is portrayed as left lateral (sinistral) (Reheis, 1992 #1604) and as right lateral (dextral) (Barnes and others, 1982 #1441; Dohrenwend and others, 1991 #288). The southeast fault is shown as having oblique displacement with the dip-slip portion as down to the southeast and the strike-slip portion as left lateral (Barnes and others, 1982 #1441). No displacement sense is reported for an isolated Quaternary fault shown by solid-line trace on unpublished mapping of the 1:100,000-scale Indian Springs sheet by P.L. Guth and J.C. Yount, but its dip-slip component is probably down to the southeast.
Dip Direction	SE
Paleoseismology studies	
Geomorphic expression	Both of the faults flanking Mercury Ridge are shown as juxtaposing Quaternary alluvium against bedrock, but not as major range-front faults (Dohrenwend and others, 1991 #288). Their morphology would be similar to that along a major range-front fault and may be characterized by "fault juxtaposition of Quaternary alluvium against bedrock, fault scarps and lineaments on surficial deposits along or immediately adjacent to range front, a general absence of pediments, abrupt piedmont-hillslope transitions, steep bedrock slopes, faceted spurs, wineglass valley, and subparallel systems of high-gradient, narrow, steep-sided canyons orthogonal to range front." Although the morphology of the margins of Mercury Ridge is similar to that along major

	range-front faults, the "associated fault systems are significantly less extensive and fault scarps would be substantially lower, shorter, and less continuous" (Dohrenwend and others, 1991 #288). All but about 1 km of the northwest fault is shown as a topographic lineament bounding a linear range front (Reheis, 1992 #1604).
Age of faulted surficial deposits	The faults flanking Mercury Ridge on the north and south are shown as juxtaposing Quaternary alluvium against bedrock (Dohrenwend and others, 1991 #288), or as juxtaposing Oligocene rocks against pre-Tertiary rocks and as concealed by Quaternary and Tertiary alluvium (Barnes and others, 1982 #1441). On the basis of recent unpublished geologic mapping by P.L. Guth and J.C. Yount, stratigraphic subdivisions of Quaternary units allows for improved understanding of the distribution of Quaternary displacement in the Mercury Ridge area. That mapping suggests that Quaternary faulting may be limited to the northern fault and to a short (600 m) trace on a subsidiary fault located northwest of Mercury Ridge where deposits estimated to be middle Pleistocene are faulted against bedrock. They do not show the Mercury Ridge faults cutting deposits of Holocene and late Pleistocene age (<130 ka).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The unpublished mapping P.L. Guth and J.C. Yount shows Quaternary faulting to be limited to displacement of deposits estimated to be middle Pleistocene down against bedrock on the northern fault and on a <300 m long trace of a subsidiary fault. Deposits estimated to be Holocene and late Pleistocene do not appear to be faulted. The most recent faulting event on the northern fault could be as old as middle Pleistocene, and on the south fault, it could be older than middle Pleistocene.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Although no scarp height or displacement data exist to constrain the slip rate, the apparent lack of traces through late Pleistocene deposits along the main faults suggests low slip rates.

	The less than 0.2 mm/yr slip-rate category is assigned on the basis of poor geomorphic preservation and relative inactivity of similar distributed faults in the Basin and Range province.
Date and Compiler(s)	1998 R. Ernest Anderson, U.S. Geological Survey, Emeritus
References	#1441 Barnes, H., Ekren, E.B., Rodgers, C.L., and Hedlund, D.C., 1982, Geologic and tectonic maps of the Mercury quadrangle, Nye and Clark Counties, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1197, 1 sheet, scale 1:24,000. #1472 Carr, W.J., 1984, Regional structural setting of Yucca Mountain, southwestern Nevada, and late Cenozoic rates of tectonic activity in parts of the southwestern Great Basin, Nevada and California: U.S. Geological Survey Open-File Report 84-854, 114 p. #288 Dohrenwend, J.C., Menges, C.M., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Las Vegas 1° by 2° quadrangle, Nevada, California, and Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-2182, 1 sheet, scale 1:250,000. #1508 Ekren, E.B., Rogers, C.L., Anderson, R.E., and Orkild, P.P., 1968, Age of Basin and Range normal faults in Nevada Test Site and Nellis Air Force Range, Nevada, *in* Eckel, E.B., ed., Nevada Test Site: Geological Society of America Memoir 110, p. 247-250. #915 Piety, L.A., 1995, Compilation of known and suspected Quaternary faults within 100 km of Yucca Mountain, Nevada and California: U.S. Geological Survey Open-File Report 94-112, 404 p., 2 pls., scale 1:250,000. #1604 Reheis, M.C., 1992, Aerial photographic interpretation of lineaments and faults in late Cenozoic deposits in the Cactus Flat and Pahute Mesa 1:100,000 quadrangles and the western parts of the Timpahute Range, Pahranagat Range, Indian Springs, and Las Vegas 1:100,000 quadrangles, Nevada: U.S. Geological Survey Open-File Report 92-193, 14 p., 3 pls., scale 1:100,000.