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Jemez-San Ysidro fault, Jemez section (Class A) No. 2029a

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Compiled in cooperation with the New Mexico Bureau of Geology & Mineral Resources

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Synopsis	**General:** The Jemez-San Ysidro fault is a steeply east-dipping normal fault that, in part, forms the active western margin of the Rio Grande rift south of the Valles caldera. The fault is divided into sections on the basis of a 45° change in fault strike at the latitude of Cañones and evidence for young (Holocene) rupture along its southern section. The northern, northeast-striking section of the fault (Jemez section) is aligned with northeast-striking faults within the collapsed center of the Valles caldera and the Embudo fault, and is coincident with the Jemez Lineament. The

	central fault (San Ysidro section) merges with the southern fault (Calabacillas section) about 7 km south of the town of San Ysidro. **Sections:** This fault has 3 sections. The Jemez-San Ysidro fault consists of a northeast-striking fault (the Jemez fault of Goff and Kron, 1980 #1099), and north-striking faults along the northwestern margin of the Albuquerque basin (the Jemez and San Ysidro faults of Woodward, 1987 #1130). The boundary between the northern (Jemez) and central (San Ysidro) sections is placed at the 45° change in fault strike near Cañones. The boundary between the central and southern (Calabacillas) sections is near Arroyo Piedra Parada, 7 km south of San Ysidro. These sections are distinguished primarily on the basis of younger demonstrated displacement on the Calabacillas section, a prominent down-to-the-east normal fault that offsets the west side of the Llano de Albuquerque along the western margin of the Rio Grande rift.
Name comments	**General:** The Jemez-San Ysidro fault extends from the latitude of the Albuquerque Volcanoes north to the southern rim of the Valles caldera near Highway 4. As used herein, the Jemez-San Ysidro fault includes the northeast-striking faults referred to as the Jemez fault zone by Goff and Kron (1980 #1099) and Goff and others (1981 #1182), the north-striking Sierrita fault of Woodward and DuChene (1975 #1131), Aldrich (1986 #1084), and Woodward (1987 #1130); the north-striking San Ysidro fault of Woodward and Ruetschilling (1976 #1133), Hawley and Galusha (1978 #1103), and Woodward (1987 #1130); and the north-striking Calabacillas fault of Bryan and McCann (1937 #1288, fig. 4), Wright (1946 #1427) and Cather and others (1997 #1763). All of these faults are grouped together herein because of lateral continuity (Wong and others, 1995 #1155; Koning and others, 1998 #7375). **Section:** This part of the Jemez-San Ysidro fault was named the Jemez section by Wong and others (1995 #1155). The section extends from Highway 4 near Jemez Falls in the Jemez Mountains, southwest to Crow Springs, about 5 km west of Cañones. Smith (2004 #7529) connected this fault with the Cañones fault [2003].
County(s) and State(s)	SANDOVAL COUNTY, NEW MEXICO
Physiographic	SOUTHERN ROCKY MOUNTAINS

province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Detailed geologic maps are available at a scale of 1:24,000 along the entire Jemez fault (Woodward and others, 1977 #1132), which was originally compiled and synthesized by Woodward (1987 #1130). More recent 1:24,000-scale maps include those of Osburn and others (2002 #7528) and Kelley and others (2003 #7527). Maps of selected parts of the fault are given by Goff and Kron (1980 #1099) at a scale of 1:12,000, and by Goff and Shevenell (1987 #1476) at a scale of 1:66,667.
Geologic setting	The Jemez-San Ysidro fault forms the northwestern margin of the Albuquerque basin, although the amount of Quaternary vertical separation is less than that along other rift-margin faults. Aldrich (1986 #1084) stated that the fault was the western margin of the Rio Grande rift during the Oligocene, and that activity later stepped eastward to the Pajarito fault zone [2008]. Wong and others (1995 #1155) and House and Hartse (1995 #1160) identified seismicity aligned along the northern part of the fault.
Length (km)	This section is 28 km of a total fault length of 92 km.
Average strike	N41°E (for section) versus N14°E (for whole fault)
Sense of movement	Normal
Dip Direction	V *Comments:* The Jemez fault appears to be near vertical at the surface and in the shallow subsurface based on the relatively straight traces across rugged topography. Microseismicity in the vicinity of the Jemez fault appears to be aligned along a near-vertical zone, with a slight westerly dip (L. House, unpublished data, 1993). However, as a rift-margin fault, the Jemez fault probably dips to the east (Woodward and Ruetschilling, 1976 #1133). Wong and others (1995 #1155) considered dip values of 80° W, 90°, and 80° E, without a preferred dip to constrain the fault's geometry for seismic source characterization.
Paleoseismology studies	

Geomorphic expression	The Jemez section is marked by a prominent southeast-facing scarp across Virgin Mesa, which is underlain by the 1.2–1.3 Ma Tshirege Member of the Bandelier Tuff. Goff and Shevenell (1987 #1476) note a 15-m-high fault scarp on older travertine deposits near Soda Dam.
Age of faulted surficial deposits	The youngest faulted bedrock is the 1.2–1.3 Ma Tshirege Member of the Bandelier Tuff. Tafoya (2012 #7530) obtained U-series ages of 210 ka and younger for calcite growth in the Jemez fault. These ages could relate to fault reactivation or infilling of younger sediment.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The timing of the most-recent event is unknown. Prominent geomorphic expression across Virgin Mesa, displaced upper Bandelier Tuff suggest Quaternary deformation (Wong and others, 1995 #1155). Tafoya's (2012 #7530) U-series ages (<210 ka) on calcite growth in the Jemez fault allow for the possibility of middle or late Quaternary activity. Alternatively, the calcite growth may reflect younger geomorphic phenomena associated with fluvial deposition and incision.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Assigned slip rate category based on 12 m of separation of 1.2–1.3 Ma Tshirege Member of the Bandelier Tuff along the Jemez fault (Woodward, 1987 #1130) and 50 m of separation of the same unit along the fault reported by Goff and Shevenell (1987 #1476) and Goff and others (1989 #1098).
Date and Compiler(s)	2016 Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources Keith I. Kelson, William Lettis & Associates, Inc. Stephen F. Personius, U.S. Geological Survey
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