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Faults near Walla Walla, unnamed northwest-striking fault (Class B) No. 578b

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Synopsis	**General:** Faults east of Walla, Washington, consist of both northeast- and northwest-striking features (Kienle and others, 1979 #3728; Foundation Sciences, Inc., 1980 #5722; Schuster, 1994 #4655; Schuster and others, 1997 #3760). The most studied of these features are the northeast-striking Buroker faults. The Buroker faults are mostly covered by Pleistocene to Holocene loess deposits but are exposed in cuts along Russell Road, where a reverse fault in this set of five faults shows evidence for Quaternary offset (Myers and others, 1979 #5175; Foundation Sciences, Inc., 1980 #5722; Farooqui and Thoms, 1980 #5824). The northwest-striking Promontory Point fault was previously inferred and mapped directly south of the Buroker faults (Newcomb, 1965 #5825; Kienle and others, 1979 #3728; Foundation Sciences, Inc., 1980 #5722). The Promontory Point fault, however, is not shown on later geologic maps and fault

	maps of this region, which instead show and emphasize an unnamed northwest-striking fault northeast of the Buroker faults (Tolan and Reidel, 1989 #3765; Schuster, 1994 #4655; Rogers and others, 1996 #4191; Schuster and others, 1997 #3760). There seems to be some confusion regarding this unnamed northwest-striking fault and the northwest-striking Promontory Point fault. Regional fault maps (Tolan and Reidel, 1989 #3765; Rogers and others, 1996 #4191) show the unnamed northwest-striking fault, but these maps cite source information for this fault, which suggests that they consider it to be the Promontory Point fault. The source information cited is the U.S. Department of Energy (1988 #5820), which cites Kienle and others (1979 #3728) and Foundation Sciences, Inc. (1980 #5722) for their information, presumably, on the Promontory Point fault. These studies by Kienle and others (1979 #3728) and Foundation Sciences, Inc. (1980 #5722) did not identify or discuss the unnamed, northwest-trending fault north of the Buroker faults. Because the Promontory Point fault is not shown on recent geologic maps of this region (Schuster, 1994 #4655; Schuster and others, 1997 #3760), and because evidence for its existence and for Quaternary activity along it are speculative (Kienle and others, 1979 #3728; Foundation Sciences, Inc., 1980 #5722), it is classified and discussed herein as a Class C structure until further studies and clarifications are made. The unnamed northwest-striking fault is shown on recent regional fault maps as a known or possible Quaternary fault; however, evidence for Quaternary activity along this fault is also speculative. Consequently, this unnamed northwest-striking fault is classified as a Class B structure herein, and it is discussed as a separate section from the Buroker faults that include one fault (Buroker fault) that shows clear evidence of Quaternary activity. **Sections:** This fault has 2 sections. Faults near Walla are subdivided herein as two sections. The northeast-striking Buroker faults show evidence for Quaternary offsets and are discussed as section a of the faults near Walla Walla. An unnamed northwest-striking fault, north of the Buroker faults, is not known to have direct evidence for Quaternary activity. This unnamed northwest-striking fault, however, is shown as a possible Quaternary fault on some regional structure maps (Tolan and Reidel, 1989 #3765; Rogers and others, 1996 #4191) and it is discussed as section b of the faults near Walla Walla.
Name	**General:**

comments	**Section:** This unnamed northwest-striking fault is shown on geologic maps by Schuster (1994 #4655) and Schuster and others (1997 #3760), and shown on regional structure maps by Tolan and Reidel (1989 #3765) and Rogers and others (1996 #4191). The southwestern part of this fault follows Nightingale Canyon and from there the fault is shown as three buried fault strands that extend northwestward across the east end of Walla Walla valley to about 1.5 km southeast of the small town of Russell, Washington. The fault intersects the Walla Walla valley about 4-5 km to the east-northeast of Walla, and about 5 km to the northeast of the Buroker faults [#578a].
County(s) and State(s)	WALLA WALLA COUNTY, WASHINGTON
Physiographic province(s)	COLUMBIA PLATEAU
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Exposed and inferred fault traces are from the 1:250,000-scale geologic map by Schuster and others (1997 #3760); the traces were transferred directly onto a registered mylar overlay and digitized at 1:250,000 scale. This part of that 1:250,000-scale geologic map was compiled from the 1:100,000 scale geologic map by Schuster (1994 #4655).
Geologic setting	The faults near Walla Walla are northwest- and northeast-striking faults that occur in the southwestern part of the Palouse subprovince of the Columbia Plateaus province, near the southern boundary of this subprovince with the Blue Mountains subprovince to the southeast. This part of the Palouse subprovince is also called the Palouse slope. The region of the Palouse slope is characterized by sparse faults and low-amplitude, long wavelength folds that locally deform Miocene basalts of the Columbia River Basalt Group, which otherwise dip very gently westward above a similarly dipping paleoslope (Swanson and others, 1980 #3574; Reidel and others, 1994 #3539). The Blue Mountains subprovince directly to the southeast, is a 250-km-long anticlinorium that forms the southern margin of the Columbia basin and the Columbia Plateaus province (Reidel and others, 1994 #3539). The prominent, northwest-striking Wallula fault zone [846] is present about 20-25 km to the west-southwest of the

	faults near Walla Walla. Several investigators have suggested that the northeast- and northwest-striking faults near Walla Walla may be similar in age and tectonic environment to the faults of the Wallula fault zone (Kienle, 1977 #4665; Foundation Sciences, Inc., 1980 #5722; Piety and others, 1990 #3733).
Length (km)	This section is 19 km of a total fault length of 19 km.
Average strike	N59°W (for section) versus N69°W (for whole fault)
Sense of movement	Unspecified *Comments:* The sense of movement along this unnamed fault has not been reported. No indication of relative offset is shown for this fault on the geologic maps by Schuster (1994 #4655) and Schuster and others (1997 #3760). Several authors infer that northwest-striking faults near Walla Walla may be related to the northwest-striking Wallula fault zone [#846] that is present to the southwest (Kienle, 1977 #4665; Foundation Sciences Inc., 1980 #5722; Piety and others, 1990 #3733). The Wallula fault zone has been interpreted to show a large component of dextral oblique slip (Piety and others, 1990 #3733).
Dip Direction	Unknown *Comments:* Not reported; the linear known and inferred traces of this fault, as shown on geologic maps by Schuster (1994 #4655) and Schuster and others (1997 #3760), may indicate that the fault dips steeply.
Paleoseismology studies	
Geomorphic expression	No information has been reported on the geomorphic expression of this unnamed fault. The southeastern end of the fault is mapped in the bottom of the northwest-trending Nightingale Canyon (Schuster, 1994 #4655; Schuster and others, 1997 #3760). To the northwest, the fault is shown as three inferred fault strands that are covered by Pleistocene to Holocene loess deposits (Schuster, 1994 #4655; Schuster and others, 1997 #3760). The mapping of three distinct, but inferred fault strands, may suggest that the inferred location of these fault strands is based on some form of geomorphic expression; however, no report of that possible expression is known.

Age of faulted surficial deposits	Evidence of faulted Quaternary deposits along this unnamed fault has not been reported. On geologic maps of this area, the southeastern part of the fault is shown cutting Miocene volcanic rocks (Schuster, 1994 #4655; Schuster and others, 1997 #3760). The northwestern part of the fault is shown as three, inferred fault strands that are buried by Pleistocene-Holocene loess deposits (Schuster, 1994 #4655; Schuster and others, 1997 #3760).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* No specific evidence for a Quaternary faulting event along this unnamed fault is known to have been reported. This unnamed fault, however, is shown on regional structure maps as a known or suspected Quaternary fault (Tolan and Reidel, 1989 #3765; Rogers and others, 1996 #4191). These regional fault maps cite the U.S. Department of Energy (1988 #5820) as the information source for evidence related to known or possible Quaternary activity along this unnamed fault. The U.S. Department of Energy (1988 #5820) cites Kienle and others (1979 #3728) and Foundation Sciences Inc. (1980 #5722) as their information source for evidence of Quaternary activity along this unnamed fault. Kienle and others (1979 #3728) and Foundation Sciences Inc. (1980 #5722), however, did not map or discuss this unnamed fault that is located about 5 km northeast of the Buroker faults. They instead both discussed the northwest-trending, Promontory point fault that they show directly south of the Buroker faults. Evidence for the existence of the Promontory Point fault, and for Quaternary activity along it, are speculative (Kienle and others, 1979 #3728; Foundation Sciences Inc., 1980 #5722). The Promontory Point fault is not shown on recent geologic maps of this region (Schuster, 1994 #4655; Schuster and others, 1997 #3760), and it is classified and discussed as a Class C structure herein. Although no specific evidence for Quaternary offset along the unnamed northwest-trending fault is known, it is included herein because it is shown on recent regional structure maps as a known or inferred Quaternary fault (Tolan and Reidel, 1989 #3765; Rogers and others, 1996 #4191). This unnamed fault is classified herein as a Class B structure until further studies are conducted.
Recurrence	

interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Not reported; low rate for possible Quaternary slip is selected on the basis of the faults apparent lack of geomorphic expression.
Date and Compiler(s)	2003 David J. Lidke, U.S. Geological Survey
References	#3598 Busacca, A.J., 1991, Loess deposits and soils of the Palouse and vicinity, *in* Morrison, R.B., ed., Quaternary nonglacial geology; conterminous U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. K-2, p. 216-228. #5824 Farooqui, S.M., and Thoms, R.E., 1980, Geologic evaluation of selected faults and lineaments, Pasco and Walla Walla basins, Washington: Technical report to Washington Public Power Supply System under the direction of United Engineers and Constructors, Inc., Contract 44013, C.O. 43 Task-3, May 1980, 25 p. #5722 Foundation Sciences Inc., 1980, Geologic reconnaissance of parts of the Walla Walla and Pullman, Washington, and Pendleton Oregon 1° x 2° AMS quadrangles: Technical report to U.S. Army Corps of Engineers, Seattle, Washington, 83 p., 3 pls. #4665 Kienle, C.F., 1977, Geologic evaluation of structures in a Columbia Plateau—Subappendix 2RH, Chapter 7.0, Reconnaissance mapping of the Rattlesnake-Wallula lineament, Eastern Rattlesnake Hills, and Yakima Ridge: Technical report to Washington Public Power Supply System, WPPSS Nuclear Project No. 1, v. 1, 5 p. #3728 Kienle, C.F., Jr., Hamill, M.L., and Clayton, D.N., 1979, Geologic reconnaissance of the Wallula Gap, Washington-Blue Mountains-LaGrande, Oregon region: Technical report to Shannon & Wilson, Inc., Portland, Oregon, under Contract 44013, December 1979, 58 p., 1 pl., scale 1:125,000. #5175 Myers, C.W., Price, S.M., Caggiano, J.A., Cochran, M.P., Czimer, W.J., Davidson, N.J., Edwards, R.C., Fecht, K.R., Holmes, G.E., Jones, M.G., Kunk, J.R., Landon, R.D., Ledgerwood, R.K., Lillie, J.T., Long, P.E., Mitchell, T.H., Price,

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#3760 Schuster, E.J., Gulick, C.W., Reidel, S.P., Fecht, K.R., and Zurenko, S., 1997, Geologic map of Washington-southeast quadrant: Washington Division of Geology and Earth Resources Geologic Map GM-45, 20 p. pamphlet, 2 sheets, scale 1:250,000.

#4655 Schuster, J.E., 1994, Geologic map of the Walla Walla 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open-File Report 94-3, 18 p., scale 1:100,000.

#3574 Swanson, D.A., Wright, T.L., Camp, V.E., Gardner, J.N., Helz, R.T., Price, S.M., Reidel, S.P., and Ross, M.E., 1980, Reconnaissance geologic map of the Columbia River Basalt Group, Pullman and Walla Walla quadrangles, southeast Washington and adjacent Idaho: U.S. Geological Survey Miscellaneous Investigations Map I-1139, 2 sheets, scale 1:250,000.

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