DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Analytical results and sample locality map of volcanic rocks from the Pedregosa Mountains, Arizona

[Appendix to Geologic map and cross sections of the Pedregosa Mountains, Cochise County, Arizona, U.S. Geological Survey Map I-1827]

By

William E. Brooks[1] and Harald Drewes[1]

Open-File Report 91-0617

1991

[1]Denver, Colorado

CONTENTS

ILLUSTRATION

TABLES

DISCUSSION

Analyses in this compilation are for samples of volcanic rocks collected during geologic mapping in the Pedregosa Mountains quadrangle, Cochise County, Arizona, during 1982 and 1983. Volcanic rocks in the field area are Cretaceous to Quaternary in age and include basalt, andesite, intrusive and extrusive rhyolite, pyroclastic rocks, and ash-flow tuff. Detailed descriptions and isotopic ages of the Pedregosa volcanic rocks, discussion of the structural geology, and descriptions of the Paleozoic rocks in the field area are given in Drewes and Brooks (1988).

Major and trace element analyses for selected rocks are compiled in table 1. Ash-flow tuffs in the Pedregosa Mountains, especially the tuff of Bruno Peak (Tbn), are outflow of the Turkey Creek caldera based on these analyses and rock descriptions (du Bray and Pallister, 1991).

No prospects, mines, or altered rock indicative of mineralization were found during our study. However, Packsaddle Mountain, in the west-central part of the quadrangle (plate 1), is a garnet-bearing, high-silica (74 wt. percent) rhyolite. Age of this rhyolite (23 Ma); F, U, and Th content; presence of garnet; high silica content; thick, 5 m apron of vitrophyre (83E119B) and pyroclastic debris invite comparison with topaz rhyolites described by Burt and others (1982). Topaz rhyolites, though not mineralized themselves, may indicate a F-rich magma with possible Mo, W, and other elements. Therefore, Mo and W analyses for the rhyolite of Packsaddle Mountain (Tpi, 83E119A, B) are listed on table 2, and F, U, and Th analyses are compiled on table 3.

Latitudes and longitudes for analyzed samples of volcanic rocks are included on table 2 and a sample locality map, plate 1, is in the pocket.

REFERENCES CITED

Burt, D.M., Sheridan, M.F., Bikun, J.V., and Christiansen, E.H., 1982, Topaz rhyolites--Distribution, origin and significance for exploration: Economic Geology, v. 77, p. 1818-1836.

Drewes, Harald, and Brooks, W.E., 1988, Geologic map and cross sections of the Pedregosa Mountains, Cochise County, Arizona: U.S. Geological Survey Miscellaneous Investigations Series Map I-1827, scale 1:48,000.

du Bray, E.A., and Pallister, J.S., 1991, An ash-flow caldera in cross section: Ongoing field and geochemical studies of the Mid-Tertiary Turkey Creek caldera, Chiricahua Mountains, SE Arizona: Journal of Geophysical Research, v. 96, p. 13435-13457.

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*

[Major oxides (weight percent, uncorrected) determined by X-ray spectroscopy; analysts, A.J. Bartel, K.C. Stewart, and J.E. Taggart. LOI, loss on ignition at 900 °C. FeO, H_2O^+, H_2O^-, and CO_2 analyses (weight percent) by H. Neiman, G. Mason, and J.L. Ryder. Rb, Sr, Y, Zr, and Nb analyses (parts per million) determined on an energy dispersive analyzer, Cd 109 source, by W.E. Brooks and R.A. Yeoman. -, indicates sample not analyzed; error is 10% of ppm listed or ±6(Rb), ±5(Sr), ±4(Y), ±3(Zr), and ±3(Nb), whichever is greater]

Field No.	Lab No.	SiO_2	Al_2O_3	$FeTO_3$	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO
QTb, Basalt of San Bernardino Valley											
82D127	D255389	45.70	15.70	11.20	7.97	9.49	3.70	0.98	2.29	0.64	0.18
82D45	D255388	46.60	16.10	11.10	7.89	9.45	3.09	1.19	2.16	.55	.17
83D46	D255387	46.40	16.10	12.00	7.63	8.93	3.48	1.08	2.38	.64	.18
QTbc, Cinder-cone deposits											
83E101	D256940	46.00	15.00	8.80	9.95	9.52	3.19	1.14	1.88	.42	.18
83E102	D256941	45.20	15.30	9.70	8.41	9.81	3.24	.44	2.24	.58	.17
83E103A	D256942	46.10	15.20	10.00	9.17	9.68	3.06	.82	2.14	.55	.17
QTbi, Intrusive dikes and plugs											
83E92	D256938	75.20	11.80	6.90	.19	.16	2.91	5.28	.18	.05L	.06
Tpi, Rhyolite of Packsaddle Mountain											
83E119A	D258676	74.30	12.70	.78	.18	1.03	4.14	4.45	.05	.05L	.16
83E119B	D258674	73.40	12.60	.79	.10L	.34	4.17	4.42	.05	.05L	.16
Tr, Rhyolite intrusive rocks, undivided											
83D73	D257290	76.00	11.70	.72	.19	.02L	.19	8.43	.08	.05L	.02L
83E78	D252465	73.60	12.30	1.89	.39	1.12	2.58	5.23	.36	.10	.05
Tkr, Rhyolite of Krentz Ranch											
82D190	D255395	73.80	12.80	.94	.14	.07	2.00	7.88	.15	.08	.04
82D191	D255396	72.40	12.00	.88	.16	.53	3.47	4.27	.14	.05L	.06
82R198	D257289	70.50	11.50	1.28	.39	2.10	3.52	3.28	.15	.05L	.07
83E83	D252466	77.10	11.50	.74	.10L	.13	1.84	6.37	.11	.05L	.02L
Trf, Rhyolite lava flows, undivided											
83E45	D252456	75.80	12.40	1.04	.10L	.67	3.58	4.68	.07	.05L	.03
Tir, Intrusive rhyolite											
83E42	D252455	76.40	12.30	1.08	.11	.20	3.31	4.77	.07	.05L	.08
Ts, Pyroclastic deposits of Swede Peak (vitrophyre)											
83E51A	D252458	71.90	12.20	1.27	.16	.75	3.65	3.89	.17	.05L	.04

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	LOI	FeO	H_2O^+	H_2O^-	CO_2	Rb	Sr	Y	Zr	Nb
QTb, Basalt of San Bernardino Valley										
82D127	1.62	3.62	1.21	0.57	0.05	-	-	-	-	-
82D45	1.68	4.62	1.24	.67	.01L	-	-	-	-	-
83D46	1.16	6.18	1.14	.54	.04	-	-	-	-	-
QTbc, Cinder-cone deposits										
83E101	0.55	5.71	.50	.24	.02	21	606	20	146	32
83E102	1.99	5.26	1.39	.85	.03	36	2308	29	178	42
83E103A	1.44	1.39	.88	.41	.06	12	724	24	175	39
QTbi, Intrusive dikes and plugs										
E-92-83	0.92	.01L	.54	.31	.01L	383	3	52	361	44
Tpi, Rhyolite of Packsaddle Mountain										
83E119A	1.18	.00B	.00B	.00B	.B	888	1	64	137	104
83E119B	3.20	.00B	.00B	.00B	.B	1024	0	67	164	115
Tr, Rhyolite intrusive rocks, undivided										
83D73	0.99	.10	.71	.07	.01L	437	86	37	112	36
83E78	1.49	.20	.79	.51	.01L	283	214	51	292	32
Tkr, Rhyolite of Krentz Ranch										
82D190	0.52	.02	.45	.13	.01L	-	-	-	-	-
82D191	4.23	.11	3.58	.60	.01L	-	-	-	-	-
82R198	5.89	.21	4.32	1.08	.01L	314	114	50	167	25
83E83	1.29	.02	.69	.12	.01L	402	17	34	129	22
Trf, Rhyolite lava flows, undivided										
83E45	0.50	.22	.20	.09	.01L	639	3	121	157	77
Tir, Intrusive rhyolite										
83E42	0.68	.02	.39	.12	.01L	648	0	18	155	70
Ts, Pyroclastic deposits of Swede Peak (vitrophyre)										
83E51A	5.33	.24	4.18	.44	.01L	429	14	66	217	39

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	Lab No.	SiO_2	Al_2O_3	$FeTO_3$	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO
Tsg, Tuff of Shake Gulch											
83E50	D252457	74.50	11.60	1.78	.32	.95	3.00	4.72	.21	.05L	.03
83E75	D252463	76.50	11.90	1.63	.13	.08	2.61	5.02	.15	.05L	.05
83E76	D252464	76.30	11.80	1.52	.15	.10	3.06	4.79	.12	.05L	.03
83E84	D252467	76.70	11.40	1.41	.13	.16	2.67	5.58	.10	.05L	.03
Tp, Welded tuff of Price Canyon											
83E57	D252460	70.90	14.50	1.50	0.21	0.19	1.94	8.32	0.37	0.05L	0.02L
83E65	D252461	70.80	14.40	1.63	.27	.29	2.33	7.84	.36	.06	.03
83E67	D252462	70.80	14.00	2.41	.26	.32	2.12	7.82	.51	.05L	.02L
Tbn, Tuff of Bruno Peak, nonwelded member											
83D32	D255403	73.40	12.50	1.84	.20	.50	3.57	5.50	.16	.16	.08
83D61	D257283	78.70	9.46	1.57	.11	.05	.41	7.48	.14	.05L	.04
Tba, Tuff of Bruno Peak, densely welded member											
83A53	D255405	74.50	11.60	1.75	.10L	.05	1.43	8.13	.16	.05	.05
83D143	D257284	75.00	11.80	1.70	.32	.39	3.28	4.73	.16	.05L	.08
83E141	D256948	74.10	12.50	7.90	.20	.23	3.17	5.12	.19	.05L	.07
83E22	D252448	76.20	12.10	1.52	.11	.07	3.18	5.17	.11	.05L	.06
83E29	D252450	76.70	11.60	1.45	.15	.17	3.20	4.81	.11	.05L	.05
83E37	D252453	76.70	11.50	1.64	.11	.04	2.92	4.86	.11	.07	.08
83E39	D252454	76.70	11.50	1.51	.10L	.05	2.85	5.63	.11	.05L	.05
Trr, Welded tuff of Rucker Canyon											
83D51	D255393	73.	11.80	.91	.17	.60	3.51	3.93	.12	.05L	.07
83D52	D255394	73.20	13.00	1.07	.19	.43	3.79	5.15	.17	.05L	.05
83D54	D255406	78.20	9.70	1.28	.13	.12	.76	6.88	.09	.05L	.04
83E128	D256944	71.10	13.70	11.00	.31	.26	1.99	8.03	.34	.05L	.05
83E20	D252447	72.00	13.80	1.50	.39	1.14	2.70	5.29	.25	.05L	.04
83E35	D252451	73.20	13.60	1.45	.30	1.02	2.92	4.91	.23	.05L	.02L
83E36	D252452	70.30	14.20	1.60	.35	1.16	3.44	5.89	.36	.06	.06
Tju, Rhyolite of Joe Glenn Ranch, upper member											
82D113	D255397	71.60	13.10	.98	.34	1.06	3.80	3.52	.16	.05L	.05
82D114	D255398	74.40	13.00	.80	.23	.61	3.02	5.27	.12	.05L	.02
83E133	D256946	73.40	13.20	8.90	.30	.83	2.62	5.36	.23	.05L	.02L
Tjm, Rhyolite of Joe Glenn Ranch, middle member											
82D125	D255399	72.10	14.10	1.75	.28	1.23	3.29	4.93	.26	.08	.04

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	LOI	FeO	H_2O^+	H_2O^-	CO_2	Rb	Sr	Y	Zr	Nb
Tsg, Tuff of Shake Gulch										
83E50	1.81	.06	.50	.64	.14	253	34	46	337	34
83E75	0.89	.01L	.69	.13	.01L	368	11	64	268	45
83E76	0.71	.01L	.45	.25	.01L	390	12	56	273	52
83E84	0.97	.01L	.34	.19	.01L	491	6	65	255	60
Tp, Welded tuff of Price Canyon										
83E57	1.14	0.06	0.81	0.18	0.01L	522	55	51	423	28
83E65	1.09	.01L	.57	.34	.01L	477	32	39	402	25
83E67	0.92	.15	.68	.14	.01L	470	78	35	453	28
Tbn, Tuff of Bruno Peak, nonwelded member										
83D32	0.69	.01L	.46	.11	.01	402	7	73	344	50
83D61	0.52	.12	.36	.10	.01L	513	35	41	278	34
Tba, Tuff of Bruno Peak, densely welded member										
83A53	0.41	.01L	.27	.06	.01L	589	18	71	367	40
83D143	1.31	.01L	.56	.37	.06	349	20	62	345	45
83E141	0.90	.01L	.62	.11	.01	401	35	64	367	42
83E22	0.50	.01L	.38	.16	.01L	447	11	60	286	58
83E29	0.69	.02	.42	.18	.01L	396	25	75	279	50
83E37	0.92	.01L	.46	.24	.01L	464	3	57	297	57
83E39	0.76	.04	.32	.20	.01L	526	4	77	298	62
Trr, Welded tuff of Rucker Canyon										
83D51	4.25	.18	3.66	.57	.01L	-	-	-	-	-
83D52	0.96	.02	.46	.19	.02	-	-	-	-	-
83D54	0.90	.02	.69	.20	.01L	-	-	-	-	-
83E128	1.01	.01L	.61	.19	.01	523	35	45	409	20
83E20	1.77	.13	1.04	.48	.01L	2	106	19	138	11
83E35	1.01	.13	.65	.27	.01L	197	103	25	143	13
83E36	1.71	.04	.60	.33	.36	270	54	54	439	26
Tju, Rhyolite of Joe Glenn Ranch, upper member										
82D113	3.57	.18	3.08	.44	.01L	-	-	-	-	-
82D114	1.28	.08	.76	.18	.01L	-	-	-	-	-
83E133	1.01	.02	.88	.09	.01	214	113	32	141	7
Tjm, Rhyolite of Joe Glenn Ranch, middle member										
82D125	0.88	.03	.58	.21	.01L	-	-	-	-	-

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	Lab No.	SiO_2	Al_2O_3	$FeTO_3$	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO
Tjl, Rhyolite of Joe Glenn Ranch, lower member											
82D187	D257288	70.00	14.00	1.95	.36	.13	.89	9.22	.23	.05L	.02L
83B144	D257286	69.50	13.90	1.98	.59	1.79	2.08	5.37	.27	.09	.02L
83D135	D257287	71.80	12.30	.96	.52	1.19	1.65	5.99	.14	.05	.02L
Td, Andesite of Devils Canyon											
82D188	D255391	59.90	18.60	5.43	1.15	5.17	4.04	2.88	.74	.28	.06
83D131	D257292	65.50	16.20	3.35	.51	2.64	4.44	3.77	.51	.22	.06
83E106	D257295	56.90	18.20	6.43	2.62	6.22	3.57	2.08	.64	.17	.13
83E95	D256939	58.90	17.60	7.60	2.56	5.39	3.80	2.02	.75	.23	.10
Tdu, Andesite of Devils Canyon, upper member											
83E19	D252446	60.80	17.00	5.69	2.07	5.04	3.50	2.95	0.82	0.25	0.10
83E24	D252449	60.00	16.80	5.61	1.67	3.79	3.22	3.65	.73	.24	.09
Thl, Rhyolite of High Lonesome Canyon											
82R128	D255400	75.00	10.90	.85	.75	.67	1.25	7.35	.10	.09	.05
83D17	D257294	77.30	10.80	.58	.17	.06	.72	8.23	.10	.05L	.02L
Th, Aphanitic lava flows											
82D186	D255390	56.60	16.20	5.68	2.23	7.00	3.72	2.18	.69	.25	.16
83E55	D252459	55.70	16.00	7.58	3.38	6.06	3.18	2.97	1.34	.52	.10
Tmu, Rhyolite of Mud Spring, upper member											
83D104	D255402	69.90	14.30	2.11	.55	1.71	3.46	4.80	.31	.12	.10
83D107A	D255407	76.00	11.30	1.52	.13	.13	3.30	5.02	.10	.05L	.07
83D107B	D255408	75.80	11.80	1.59	.18	.08	3.75	4.99	.11	.05L	.06
83D99	D255401	71.50	13.20	1.03	.31	1.10	4.16	3.34	.17	.05L	.04
Kh, Andesite of Hunt Canyon											
83D91	D255392	55.80	17.80	6.40	1.68	7.37	2.95	1.48	.86	.39	.10

Table 1. *Analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	LOI	FeO	H_2O^+	H_2O^-	CO_2	Rb	Sr	Y	Zr	Nb
Tjl, Rhyolite of Joe Glenn Ranch, lower member										
82D187	1.41	.20	1.	.16	.01L	492	80	13	154	3
83B144	2.48	.18	.96	1.18	.40	282	116	14	136	4
83D135	4.54	.13	2.25	1.45	.01L	359	329	27	90	8
Td, Andesite of Devils Canyon										
82D188	1.04	.21	.49	.58	.01	-	-	-	-	-
83D131	0.90	.07	.51	.16	.03	-	-	-	-	-
83E106	1.72	.53	.96	.63	.01	102	502	27	140	5
83E95	1.74	2.69	1.51	.23	.01L	130	508	23	205	6
Tdu, Andesite of Devils Canyon, upper member										
83E19	1.46	2.09	1.35	0.19	0.01L	192	432	33	206	13
83E24	3.29	.09	.93	1.89	.01L	177	419	29	185	10
Thl, Rhyolite of High Lonesome Canyon										
82R128	1.70	.02	.94	.35	.23	-	-	-	-	-
83D17	0.59	.02	.40	.07	.01L	-	-	-	-	-
Th, Aphanitic lava flows										
82D186	4.10	.74	1.76	.05	2.42	-	-	-	-	-
83E55	2.51	1.19	.91	1.06	.54	106	604	36	287	15
Tmu, Rhyolite of Mud Spring, upper member										
83D104	1	.05	.58	.34	.04	196	154	46	167	15
83D107A	0.65	.01	.48	.11	.01L	-	-	-	-	-
83D107B	0.55	.01L	.44	.06	.01L	467	5	106	286	60
83D99	3.44	.23	3.08	.29	.01L	-	-	-	-	-
Kh, Andesite of Hunt Canyon										
83D91	3.71	3.07	1.87	.33	2.02	-	-	-	-	-

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*

[All elements in ppm; lld, lower limit of detection; L, less than value indicated; G, greater than value indicated; B, not analyzed. Analysts, N. Conklin and M. Malcolm]

Field No.	Lab No.	Ag	As	Au	B	Ba	Be	Bi	Cd	Co	Cr	Cu	Mo
lld		(0.5)	(200)	(10)	(10)	(20)	(1)	(10)	(20)	(10)	(10)	(5)	(5)
QTb, Basalt of San Bernardino Valley													
82D127	D255389	.5L	1000L	20L	20L	700	3	10L	50L	100	500	100	3L
82D45	D255388	.5L	1000L	20L	20L	700	3	10L	50L	70	500	150	3L
83D46	D255387	.5L	1000L	20L	20L	700	2	10L	50L	100	300	150	3L
QTbc, Cinder-cone deposits													
83E101	D256940	.5L	1000L	20L	20L	500	1L	10L	50L	100	500	100	3L
83E102	D256941	.5L	1000L	20L	20L	500	1L	10L	50L	70	300	100	3L
83E103A	D256942	.5L	1000L	20L	20L	500	1L	10L	50L	50	200	100	3L
QTbi, Intrusive dikes and plugs													
83E92	D256938	.5L	1000L	20L	20L	70	7	10L	50L	3L	1L	7	3L
Tpi, Rhyolite of Packsaddle Mountain													
83E119A	D258676	.5L	1000L	20L	20L	20	20	10L	50L	3L	1L	3	7
83E119B	D258674	.5L	1000L	20L	30	30	15	10L	50L	3L	1L	1.5	10
Tr, Rhyolite intrusive rocks, undivided													
83D73	D257290	.5L	1000L	20L	20	1500	1.5	10L	50L	3L	1L	1	3L
83E78	D252465	.5L	1000L	20L	20L	500	5	10L	50L	B	1.5	1.5	3L
Tkr, Rhyolite of Krentz Ranch													
82D190	D255395	.5L	1000L	20L	30	150	7	10L	50L	3L	1L	3	5
82D191	D255396	.5L	1000L	20L	30	70	7	10L	50L	3L	1L	3	7
82R198	D257289	.5L	1000L	20L	20L	20	3	10L	50L	3L	1L	1	3
83E83	D252466	.5L	1000L	20L	20L	70	3	10L	50L	H	1L	2	3
Trf, Rhyolite lava flows, undivided													
83E45	D252456	.5L	1000L	20L	20L	15	15	10L	50L	83	1L	1	7
Tir, Intrusive rhyolite													
83E42	D252455	.5L	1000L	20L	20L	15	15	10L	50L	26	1L	3	7
Ts, Pyroclastic deposits of Swede Peak (vitrophyre)													
83E51A	D252458	.5L	1000L	20L	20L	100	7	10L	50L	58	1L	2	5

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*--Continued

Field No.	Lab No.	Ag	As	Au	B	Ba	Be	Bi	Cd	Co	Cr	Cu	Mo
lld		(0.5)	(200)	(10)	(10)	(20)	(1)	(10)	(20)	(10)	(10)	(5)	(5)
Tsg, Tuff of Shake Gulch													
83E50	D252457	.5L	1000L	20L	20L	100	3	10L	50L	20	1.5	3	3L
83E75	D252463	.5L	1000L	20L	20L	70	7	10L	50L	79	2	3	3
83E76	D252464	.5L	1000L	20L	20L	30	7	10L	50L	58	1L	2	3
83E84	D252467	.5L	1000L	20L	20L	30	7	10L	50L	H	1	3	5
Tp, Welded tuff of Price Canyon													
83E57	D252460	.5L	1000L	20L	20L	500	3	10L	50L	110	1L	2	3L
83E65	D252461	.5L	1000L	20L	20L	500	5	10L	50L	30	1L	3	3L
83E67	D252462	.5L	1000L	20L	20L	1500	3	10L	50L	60	1.5	3	3L
Tbn, Tuff of Bruno Peak, nonwelded member													
83D32	D255403	.5L	1000L	20L	30	70	7	10L	50L	3L	1	5	3L
83D61	D257283	.5L	1000L	20L	20L	300	1.5	10L	50L	3L	1L	3	3L
Tba, Tuff of Bruno Peak, densely welded member													
83A53	D255405	.5L	1000L	20L	30	300	3	10L	50L	3L	1.5	5	3L
83D143	D257284	.5L	1000L	20L	20L	100	5	10L	50L	3L	1	5	3L
83E141	D256948	.5L	1000L	20L	20L	100	5	10L	50L	3L	1	5	3L
83E22	D252448	.5L	1000L	20L	30	70	7	10L	50L	40	1L	1.5	3L
83E29	D252450	.5L	1000L	20L	20L	50	7	10L	50L	28	1L	1.5	3L
83E37	D252453	.5L	1000L	20L	20L	50	7	10L	50L	190	1	7	3
83E39	D252454	.5L	1000L	20L	20L	70	7	10L	50L	77	3	1.5	3
Trr, Welded tuff of Rucker Canyon													
83D51	D255393	.5L	1000L	20L	30	200	7	10L	50L	3L	1	3	7
83D52	D255394	.5L	1000L	20L	30	300	7	10L	50L	3L	1.5	7	3L
83D54	D255406	.5L	1000L	20L	30	300	3	10L	50L	3L	1.5	7	3L
83E128	D256944	.5L	1000L	20L	20L	700	5	10L	50L	3L	1	5	3L
83E20	D252447	.5L	1000L	20L	20L	700	1	10L	50L	78	1	3	3L
83E35	D252451	.5L	1000L	20L	20L	700	3	10L	50L	120	1L	2	3L
83E36	D252452	.5L	1000L	20L	20L	700	3	10L	50L	86	1L	3	3L
Tju, Rhyolite of Joe Glenn Ranch, upper member													
82D113	D255397	.5L	1000L	20L	30	700	5	10L	50L	3L	1	3	3
82D114	D255398	.5L	1000L	20L	30	500	3	10L	50L	3L	1	3	3L
83E133	D256946	.5L	000L	20L	20L	700	1L	10L	50L	3L	1	7	3L

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	Lab No.	Ag	As	Au	B	Ba	Be	Bi	Cd	Co	Cr	Cu	Mo
lld		(0.5)	(200)	(10)	(10)	(20)	(1)	(10)	(20)	(10)	(10)	(5)	(5)
Tjm, Rhyolite of Joe Glenn Ranch, middle member													
82D125	D255399	.5L	1000L	20L	30	1500	3	10L	50L	3	1.5	7	3L
Tjl, Rhyolite of Joe Glenn Ranch, lower member													
82D187	D257288	.5L	1000L	20L	20L	2000	1L	10L	50L	3	1L	5	3L
83B144	D257286	.5L	1000L	20L	20L	1500	1.5	10L	50L	5	1	3	3L
83D135	D257287	.5L	1000L	20L	20L	150	2	10L	50L	3L	1.5	7	3L
Td, Andesite of Devils Canyon													
82D188	D255391	.7	1000L	20L	20L	1500	3	10L	50L	15	3	15	3L
83D131	D257292	.5L	1000L	20L	20L	1500	1.5	10L	50L	3	1L	5	3L
83E106	D257295	.5L	1000L	20L	20L	700	1L	10L	50L	20	20	30	3L
83E95	D256939	.5L	1000L	20L	20L	1000	1L	10L	50L	30	3	30	3L
Tdu, Andesite of Devils Canyon, upper member													
83E19	D252446	.5L	1000L	20L	20L	700	1.5	10L	50L	140	1	7	3L
83E24	D252449	.5L	1000L	20L	20L	1000	3	10L	50L	27	1	7	3L
Thl, Rhyolite of High Lonesome Canyon													
82R128	D255400	.5L	1000L	20L	30	700	3	10L	50L	3L	3	15	3L
83D17	D257294	.5L	1000L	20L	20L	700	1L	10L	50L	3L	1	1.5	3L
Th, Aphanitic lava flows													
82D186	D255390	.5L	1000L	20L	20	1500	2	10L	50L	30	150	70	3L
83E55	D252459	.5L	1000L	20L	20	1500	2	10L	50L	81	70	50	3L
Tmu, Rhyolite of Mud Spring, upper member													
83D104	D255402	.5L	1000L	20L	30	1500	7	10L	50L	7	1	30	3L
83D107A	D255407	1.5	1000L	20L	30	150	15	10L	50L	3L	1	7	3
83D107B	D255408	.5L	1000L	20L	30	70	15	10L	50L	3L	1	15	5
83D99	D255401	.5L	1000L	20L	30	700	3	10L	50L	3L	1.5	7	3
Kh, Andesite of Hunt Canyon													
83D91	D255392	.5L	1000L	20L	20	1000	1.5	10L	50L	20	3	30	3L

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No.	Ni	Pb	Sc	Sn	Th	V	W	Zn	Latitude	Longitude
lld	(5)	(10)	(5)	(10)	(100)	(10)	(20)	(200)		
QTb, Basalt of San Bernardino Valley										
82D127	300	10L	50	10L	200L	300	100L	300L	31°34'27"	109°20'40"
82D45	300	10L	30	10L	200L	300	100L	300L	31°37'21"	109°20'02"
83D46	300	10L	50	10L	200L	300	100L	300L	31°43'37"	109°28'58"
QTbc, Cinder-cone deposits										
83E101	300	20	30	70	200L	300	100L	300L	31°37'05"	109°15'50"
83E102	150	15	30	10L	200L	300	100L	300L	31°32'10"	109°17'22"
83E103A	150	20	30	10L	200L	200	100L	300L	31°30'57"	109°17'38"
QTbi, Intrusive dikes and plugs										
83E92	3L	100	5L	10L	200L	15	100L	300L	31°40'25"	109°25'26"
Tpi, Rhyolite of Packsaddle Mountain										
83E119A	3L	50	5L	10L	200L	7L	100L	300L	31°36'09"	109°24'54"
83E119B	3L	50	5L	10	200L	7L	100L	300L	31°36'23"	109°24'55"
Tr, Rhyolite intrusive rocks, undivided										
83D73	3L	15	5L	10L	200L	7L	100L	300L	31°32'23"	109°23'16"
83E78	3L	30	5L	10L	200L	15	100L	300L	31°43'53"	109°16'28"
Tkr, Rhyolite of Krentz Ranch										
82D190	3L	70	5	10L	200L	7L	100L	300L	31°40'23"	109°17'48"
82D191	3L	70	5L	10L	200L	7L	100L	300L	31°40'23"	109°17'39"
82R198	3L	30	5L	10L	200L	7L	100L	300L	31°40'07"	109°17'20"
83E83	3L	30	5L	10L	200L	7	100L	300L	31°41'38"	109°16'19"
Trf, Rhyolite lava flows, undivided										
83E45	3L	70	5L	10L	200L	7L	100L	300L	31°44'35"	109°17'58"
Tir, Intrusive rhyolite										
83E42	3	70	5L	10L	200L	7L	100L	300L	31°43'30"	109°18'09"
Ts, Pyroclastic deposits of Swede Peak (vitrophyre)										
83E51A	3L	50	5L	10	200L	7L	100L	300L	31°44'05"	109°16'07"

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*–Continued

Field No. lld	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Th (100)	V (10)	W (20)	Zn (200)	Latitude	Longitude
Tsg, Tuff of Shake Gulch										
83E50	3L	30	7	10L	200L	15	100L	300L	31°44'00"	109°15'57"
83E75	3L	30	5L	10L	200L	7	100L	300L	31°42'47"	109°16'20"
83E76	3L	50	5L	10L	200L	7	100L	300L	31°42'13"	109°15'42"
83E84	3L	30	5L	10	200L	7	100L	300L	31°42'02"	109°16'42"
Tp, Welded tuff of Price Canyon										
83E57	3L	70	7	10L	200L	15	100L	300L	31°43'46"	109°15'47"
83E65	3L	30	7	10L	200L	15	100L	300L	31°43'20"	109°15'39"
83E67	3L	30	7	10L	200L	30	100L	300L	31°43'19"	109°15'50"
Tbn, Tuff of Bruno Peak, nonwelded member										
83D32	3L	30	7	10L	200L	7L	100L	300L	31°41'22"	109°26'01"
83D61	3L	10	5L	10L	200L	10	100L	300L	31°33'59"	109°23'06"
Tba, Tuff of Bruno Peak, densely welded member										
83A53	3L	70	7	10L	200L	30	100L	300L	31°34'33"	109°22'23"
83D143	3L	30	5L	10L	200L	7	100L	300L	31°35'52"	109°23'50"
83E141	3L	30	5L	10L	200L	10	100L	300L	31°35'55"	109°24'10"
83E22	3L	50	5L	10L	200L	15	100L	300L	31°44'09"	109°23'32"
83E29	3L	30	5L	10L	200L	7	100L	300L	31°42'41"	109°25'07"
83E37	3L	30	5L	10	200L	7	100L	300L	31°43'24"	109°23'18"
83E39	3L	50	5L	10	200L	7	100L	300L	31°40'03"	109°24'47"
Trr, Welded tuff of Rucker Canyon										
83D51	3L	70	5	10	200L	7	100L	300L	31°34'50"	109°21'57"
83D52	3	70	7	10L	200L	20	100L	300L	31°34'54"	109°22'11"
83D54	3L	100	5L	10L	200L	7	100L	300L	31°34'37"	109°22'23"
83E128	3L	50	5	10L	200L	30	100L	300L	31°37'11"	109°25'00"
83E20	3L	30	5L	10L	200L	30	100L	300L	31°44'17"	109°23'25"
83E35	3L	30	5L	10L	200L	30	100L	300L	31°43'07"	109°23'07"
83E36	3L	70	7	10L	200L	15	100L	300L	31°43'22"	109°23'10"
Tju, Rhyolite of Joe Glenn Ranch, upper member										
82D113	3L	50	5	10L	200L	15	100L	300L	31°35'52"	109°22'13"
82D114	3	70	5L	10L	200L	15	100L	300L	31°35'50"	109°22'12"
83E133	3	50	5L	10L	200L	30	100L	300L	31°37'17"	109°23'42"

Table 2. *Semiquantitative spectrographic analyses of volcanic rocks from the Pedregosa Mountains, Cochise County, Arizona*--Continued

Field No. lld	Ni (5)	Pb (10)	Sc (5)	Sn (10)	Th (100)	V (10)	W (20)	Zn (200)	Latitude	Longitude
Tjm, Rhyolite of Joe Glenn Ranch, middle member										
82D125	3	50	7	10L	200L	30	100L	300L	31°34'54"	109°21'20"
Tjl, Rhyolite of Joe Glenn Ranch, lower member										
82D187	3L	20	5	10L	200L	30	100L	300L	31°42'30"	109°22'13"
83B144	3L	15	5	10L	200L	30	100L	300L	31°38'13"	109°23'47"
83D135	3	20	5L	10L	200L	7L	100L	300L	31°37'04"	109°22'49"
Td, Andesite of Devils Canyon										
82D188	7	30	30	10L	200L	150	100L	300L	31°42'22"	109°22'50"
83D131	3L	20	5	10L	200L	30	100L	300L	31°38'01"	109°25'08"
83E106	15	10	15	10L	200L	150	100L	300L	31°39'39"	109°23'34"
83E95	10	30	15	10L	200L	200	100L	300L	31°39'16"	109°26'20"
Tdu, Andesite of Devils Canyon, upper member										
83E19	3L	20	15	10L	200L	150	100L	300L	31°44'50"	109°23'45"
83E24	3L	15	15	10L	200L	150	100L	300L	31°44'59"	109°23'22"
Thl, Rhyolite of High Lonesome Canyon										
82R128	7	50	7	10L	200L	20	100L	300L	31°35'11"	109°20'21"
83D17	3L	10	5L	10L	200L	7L	100L	300L	31°44'01"	109°22'10"
Th, Aphanitic lava flows										
82D186	70	30	20	10L	200L	200	100L	300L	31°41'56"	109°21'37"
83E55	70	20	30	H	200L	150	100L	300L	31°44'42"	109°15'23"
Tmu, Rhyolite of Mud Spring, upper member										
83D104	3	30	15	10L	200L	30	100L	300L	31°31'09"	109°29'52"
83D107A	3	150	5L	15	200L	70	100L	300L	31°30'17"	109°29'46"
83D107B	3L	70	5L	15	200L	30	100L	300L	31°30'17"	109°29'46"
83D99	7	70	7	10L	200L	15	100L	300L	31°31'25"	109°28'51"
Kh, Andesite of Hunt Canyon										
83D91	7	30	20	10L	200L	150	100L	300L	31°32'10"	109°26'32"

Table 3. *Additional analyses for rhyolite of Packsaddle Mountain, Cochise County, Arizona*

[Specific ion electrode analysis for F (weight percent) by E. Brandt; lld, lower limit of determination. Delayed neutron activation analysis for U and Th (parts per million) by R.B. Vaughan]

Field No.	Lab No.	F	U	Th
lld		(0.01)	(0.05)	(0.05)
Tpi, Rhyolite of Packsaddle Mountain				
83E119A	D258676	0.31	23.8	50.4
83E119B	D258674	0.44	22.7	55.5