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Analyses of Selected Rock Samples from the Lime Peak Area, Circle C-6 Quadrangle, Alaska

BY

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Introduction

Analytical data for 270 rock samples from the Lime Peak area, Circle C-6 quadrangle, Alaska, are presented in Table 1 and the sample locations are shown on plate 1. The samples were collected primarily by W.D. Menzie, B.L. Reed, H.L. Foster and G.W. Cushing during June 1984 as part of an investigation of the geology of tin occurrences near Lime Peak.

The Lime Peak area is mostly underlain by granitic rocks that intrude the grit, quartzite and argillite unit (PzpCgq) of Foster and others (1983). As described by Menzie and others (1986) the main rock types present in the area are (1) coarse-grained equigranular biotite granite, (2) porphyritic biotite granite with a fine-grained groundmass, (3) quartz-feldspar porphyry, (4) intermediate dike rocks, (5) quartzose country rocks which are hornfelsed adjacent to the pluton and (6) rocks which have been intensely hydrothermally altered. Table 1 of this report presents analyses of samples of these six rock types and for miscellaneous samples including intrusive breccia, limestone and veins. Assignment of rocks to one of the six types was based upon hand-specimen identification and field relationships. Table 2 presents the number of samples and summary statistics, the median, lower quartile and upper quartile, for selected elements for each rock type. The rock samples analyzed were mostly 5-kg grab samples. Analytical results of other rock samples from the Lime Peak area are presented in Foster and others (1984) and Burton and others (1985).

Preparation and methods of analyses

The rock samples were crushed to -6.35 mm using a chipmunk crusher. The crushed rock was split with a Jones splitter and ground to -150 mesh using a vertical pulverizer with ceramic plates. Samples were analyzed by a six-step, DC-arc semiquantative emission spectrographic method described by Grimes and Marranzino (1968) and 31 elements were determined. All samples were analyzed in the laboratories of the Branch of Exploration Geochemistry, U.S. Geological Survey. The analysts was S.J. Sutley.

Reporting of data

Iron, magnesium, calcium and titanium values are reported in percent; all others are reported in parts per million (ppm).

Semiquantative spectrographic analyses are reported as the approximate midpoints of geometric class intervals whose boundaries are 1, Ø.7, Ø.5, 1.2, Ø.83, Ø.56, Ø.38, Ø.26, Ø.18, Ø.12, etc. The corresponding midpoints are 1, Ø.7,Ø.5, Ø.3, Ø.2, Ø.15, Ø.1, etc. The precision of a reported value is approximately plus or minus one reporting step or interval at 68 percent confidence and two reporting steps or intervals at 95 precent confidence (Motooka and Grimes, 1976). The approximate lower limits of determination for those elements reported in percentage are iron, Ø.Ø5; magnesium, Ø.Ø2; calcium, Ø.Ø5; and titanium, Ø.ØØ2; for those elements reported in parts per million, manganese, 1Ø; silver, Ø.5; arsenic, 2ØØ; gold, 1Ø; boron, 1Ø; barium, 2Ø; beryllium, 1; bismuth, 1Ø; cadmium, 2Ø; cobalt, 5; chromium, 1Ø; copper, 5; lanthanum, 2Ø; molybdenum, 5; niobium, 2Ø; nickel, 5; lead, 1Ø; antimony, 1ØØ; scandium, 5; tin, 1Ø; strontium, 1ØØ; thorium, 1ØØ; vanadium, 1Ø; tungsten, 5Ø; yttrium, 1Ø; zinc, 2ØØ; and zirconium, 1Ø.

Samples in table 1 are grouped by rock type. Each sample is listed by sample number which can be used to locate the sample on plate 1.

Discussion of results

The samples in the present report provide a basis for interpretation of results of stream sediment surveys and of geologic mapping. Because the data are based upon hand specimen identification of grab samples, caution should be exercised in the interpretation of results. For example, it is evident from the data in table 1 that some of the samples of porphyritic biotite granite and quartz-feldspar porphyry are mineralized and therefore are probably hydrothermally altered. Such samples might be more appropriately grouped with the intensely altered rocks. Nevertheless the median values of the elements (see table 2) are unlikely to be influenced by such samples and therefore provide a basis for interpretation. As described by Menzie and others (1986) the Lime Peak pluton is composed of two main phases: (1) an early coarse-grained equigranular biotite granite, and (2) a later chiefly porphyritic biotite granite with a fine-grained groundmass. The quartz-feldspar porphyries may represent a minor third phase. The data presented in this report support this interpretation. The three types of granitic rocks show a progressive enrichment in B, Be, Nb and Sn. The intermediate dikes show an enrichment in a number of major (Mg, Ca, Ti, and Mn) and trace elements (Co, Cr, Sc, Sr, and V) which reflect their more mafic composition. The hornfels are enriched in B, Bi, Co, Cu, Ni, and V. The enrichment of the hornfels and country rocks in boron suggests that some of the volatiles associated with the granitic rocks escaped into the surrounding country rocks. The intensely altered rocks are enriched in Fe, Mn, Ag, B, Be, Cu, Pb, Sn, and Zn.

References cited

Burton, F.J., Warner, J.D., and Barker, J.C., 1985, Reconnaissance investigation of tin occurrences at Rocky Mountain (Lime Peak), east-central Alaska: U.S. Bureau of Mines Open-File Report 31-85, 44p.

Foster, H.L., Laird, Jo, Keith, T.E.C., Cushing, G.W. and Menzie, W.D., 1983, Preliminary geologic map of the Circle quadrangle, Alaska: U.S. Geological Survey Open-file Report 83-107A.

Foster, H.L., O'Leary, R.M, McDougal, C.M., and Menzie, W.D., 1984, Analyses of rock samples from the Circle quadrangle, Alaska: U.S. Geological Survey Open-file Report 84-479, 121p.

Grimes, D.J. and Marranzino, A.P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantative analyses of geologic materials: U.S. Geological Survey Circular 591, 6p.

Menzie, W.D., Reed, B.L., and Keith, T.E.C., 1986, Lime Peak--an evolved granite with tin-enriched alteration, in Bartsch-Winkler, Susan, and Reed, K.M., eds, The U.S. Geological Survey in Alaska: Accomplishments During 1985: U.S. Geological Survey Circular 978, p. A25-A27.

Motooka, J.M., and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analysis: U.S. Geological Survey Circular 738.

Table 1.--Analyses of selected rock samples from the Lime Peak area, Circle C-6 quadrangle, Alaska. Analyses given in parts per million for all elements except Fe, Mg, Ca, and Ti which are given in percent. Zeros to the right of the decimal point may or may not be significant. N, element not detected; G, element detected at a level greater than the amount indicated; L, element detected at a level less than the amount indicated at the top of the table.

Coarse-grained Equigranular Biotite Granite

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR00010A	0.7	0.07	0.05	0.05	200	N	N	N	10	70	5	N	N	N	N	N	100	N	L	N	20	N	5	L	L
4FR00310	2	0.1	0.1	0.15	300	N	N	N	10	300	2	N	N	N	N	N	100	N	20	N	20	N	10	15	N
4FR00320A	1.5	0.07	0.3	0.07	100	N	N	N	700	L	30	N	N	N	N	N	300	N	L	N	20	N	5	10	N
4FR00430A	1	0.05	0.1	0.03	200	N	N	N	20	20	3	N	N	N	N	N	70	N	L	N	15	N	5	10	N
4FR00430B	1	0.05	0.07	0.1	200	N	N	N	15	100	3	N	N	N	N	N	100	N	L	N	20	N	5	10	N
4FR00440A	0.7	0.05	L	0.07	300	N	N	N	10	500	2	N	N	N	N	7	100	N	L	N	70	N	5	L	N
4FR00600	3	0.3	2	0.2	1000	N	N	N	15	100	1	N	N	10	L	5	300	N	30	N	15	N	10	N	N
4FR00640A	1.5	0.15	L	1.5	150	L	N	N	10	500	1	N	N	20	L	7	100	N	L	L	15	N	10	L	100
4FR40410	1	0.07	0.2	0.03	7000	N	N	N	L	150	10	N	N	20	N	N	100	N	L	N	30	N	5	L	100
4MZ00016A	2	0.05	0.1	0.1	200	N	N	N	10	L	5	N	N	N	N	L	100	N	30	N	20	N	7	7	N
4MZ00025A	0.5	0.05	0.1	0.05	100	N	N	N	15	20	1.5	N	N	N	N	N	70	N	L	N	30	N	L	L	N

Porphyritic Biotite Granite

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR00010B	0.7	0.07	0.07	0.03	200	N	N	N	20	20	15	N	N	N	N	N	100	N	20	N	70	N	5	10	N
4FR00011A	1	0.03	0.05	0.015	200	0.5	N	N	15	20	10	N	N	N	N	N	50	N	20	N	30	N	7	10	N
4FR00011B	1	0.05	0.05	0.01	300	N	N	N	10	L	15	N	N	N	L	5	70	N	20	N	30	N	5	10	N
4FR00012B	0.7	0.05	0.05	0.015	150	L	N	N	10	50	2	N	N	N	N	N	70	N	L	N	50	N	35	L	N
4FR00017A	1.5	0.05	L	0.01	500	1	N	N	10	50	5	N	N	N	N	10	30	N	L	N	20	N	5	L	N
4FR00017E	0.7	0.03	L	0.05	70	N	N	N	50	70	2	N	N	N	N	5	70	N	L	N	10	N	L	N	N
4FR00018A	0.7	L	L	0.002	500	N	L	N	30	N	3	N	N	N	N	N	N	N	N	N	L	N	5	N	N
4FR0033A	0.5	0.03	0.05	0.015	100	N	N	N	20	L	5	N	N	N	N	L	50	N	L	N	20	N	L	10	N
4FR0034B	1	0.15	0.07	0.1	150	N	N	N	20	500	5	N	N	N	N	N	100	N	N	N	10	N	5	N	N
4FR0036B	1	0.07	0.2	0.03	100	N	N	N	20	50	5	N	N	N	N	L	100	N	20	N	50	N	5	10	N
4FR0039A	1	0.05	0.05	0.05	200	N	N	N	30	30	7	N	N	N	N	N	100	N	20	N	20	N	7	L	N
4FR0039F	0.7	0.07	0.1	0.05	500	N	N	N	100	200	15	N	N	N	N	N	100	N	20	N	20	N	5	15	N
4FR0041A	1.5	0.03	0.1	0.1	200	N	N	N	20	30	5	N	N	N	N	L	200	N	20	N	50	N	5	L	N
4FR0041C	1	0.05	0.15	0.03	150	N	N	N	50	L	7	N	N	N	N	L	100	N	30	N	50	N	7	10	N
4FR0045	2	0.05	0.1	0.07	200	L	N	N	200	100	7	N	N	N	N	L	150	N	20	N	70	N	7	30	N
4FR0046A	1	0.05	0.2	0.05	200	N	N	N	50	70	3	N	N	N	N	L	150	N	L	N	50	N	5	15	N
4FR0046B	1	0.05	0.2	0.07	200	N	N	N	30	50	5	N	N	N	N	L	200	N	L	N	30	N	5	10	N
4FR0046C	0.7	0.05	0.1	0.05	150	N	N	N	30	L	5	N	N	N	N	L	100	N	20	N	30	N	5	10	N
4FR0047A	3	0.1	0.15	0.07	300	N	N	N	20	L	7	N	N	N	N	N	70	N	30	N	20	N	10	15	N
4FR0047C	1	0.05	1	0.03	150	N	N	N	20	50	2	N	N	N	N	L	70	N	L	N	70	N	5	10	N
4FR0050C	0.7	0.05	L	0.01	100	N	N	N	10	100	5	N	N	N	N	5	N	70	20	N	50	N	7	10	N
4FR0050D	0.7	0.02	0.07	0.02	150	N	N	N	20	20	7	N	N	N	N	N	70	50	50	N	50	N	7	L	N
4FR0050F	1.5	0.05	0.1	0.05	200	N	N	N	15	30	5	N	N	N	N	L	150	20	20	N	50	N	10	L	N
4FR0050G	0.3	0.02	0.05	0.002	100	L	N	N	10	100	7	N	N	N	N	N	N	20	20	N	70	N	N	N	N
4FR0053A	1	0.03	L	0.05	1000	L	N	N	10	300	2	N	L	N	N	L	100	N	L	N	100	N	5	15	L
4FR0053B	1	0.05	L	0.05	700	N	N	N	10	300	1.5	N	N	N	N	L	N	N	L	N	150	N	5	30	N
4FR0061D	1.5	0.1	0.1	0.1	700	L	N	N	15	70	3	N	N	N	N	L	150	N	L	N	50	N	7	10	N
4FR0069A	1	0.1	0.1	0.1	200	N	N	N	15	200	10	N	N	N	N	N	150	N	20	N	20	N	5	L	L
4FR0072A	0.7	0.05	0.1	0.05	150	N	N	N	20	50	3	N	N	N	N	N	150	N	20	N	20	N	5	L	N
4FR0073A	1	0.1	0.1	0.07	200	N	N	N	30	700	5	N	N	N	N	N	70	N	20	N	20	N	5	10	L
4FR0078	1.5	0.02	L	0.005	500	N	N	N	50	L	5	10	N	N	N	7	N	10	30	N	50	N	L	700	N
4FR0081A	1	0.03	0.07	0.03	500	N	N	N	30	50	10	N	N	N	N	N	200	N	30	N	50	N	7	30	N
4FR0082B	1	L	L	0.005	100	N	200	N	2000	N	5	L	N	N	N	10	N	L	50	N	10	N	L	50	N
4FR4004C	1.5	0.15	0.1	0.07	200	N	N	N	200	500	5	N	N	N	N	N	150	N	30	N	30	N	10	20	N
4FR4020C	1	0.2	0.1	0.03	1500	2	N	N	1000	20	30	L	N	N	L	L	70	7	30	L	100	N	10	30	N
4FR4027C	0.5	0.05	L	0.03	300	N	N	N	20	200	2	N	N	N	N	L	100	N	20	N	30	N	7	L	N
4FR4028A	0.7	0.02	0.1	0.02	200	L	N	N	50	50	10	N	N	N	N	N	20	N	30	N	70	N	L	20	N
4FR4029	0.7	0.05	0.15	0.05	1000	L	N	N	50	50	50	15	N	N	N	7	150	N	30	N	70	N	5	15	N
4FR4037D	0.5	0.02	0.05	0.015	300	N	N	N	10	N	3	N	N	20	N	N	50	N	20	N	50	N	7	15	N
4FR4039A	0.7	0.05	0.05	0.07	200	N	N	N	10	150	3	N	N	20	N	N	200	N	20	N	50	N	7	10	N
4MZ00010A	1	0.03	0.07	0.05	200	N	N	N	15	L	7	N	N	N	N	N	100	N	20	N	50	N	5	L	N
4MZ00012B	1	0.1	0.1	0.1	200	N	N	N	15	150	5	N	N	N	N	N	100	N	L	N	50	N	5	5	N
4MZ00013B	1.5	0.02	L	0.01	200	L	N	N	10	L	10	N	N	N	N	5	50	N	30	N	100	N	5	5	N
4MZ00016B	1.5	L	0.15	0.03	150	N	N	N	15	L	3	N	N	N	N	L	70	N	50	N	20	N	7	7	N
4MZ0005B	0.5	L	0.05	0.002	100	N	N	N	10	N	5	N	N	N	N	N	N	N	50	N	15	N	5	N	N
4MZ0005C	0.7	0.02	0.07	0.02	100	N	N	N	15	N	5	N	N	N	N	N	50	N	L	N	50	N	L	L	N
4MZ0005D	0.5	0.02	0.07	0.015	100	N	N	N	10	N	15	N	N	N	N	N	70	N	20	N	50	N	L	L	N
4MZ0018A	0.7	0.02	0.1	0.01	150	N	N	N	50	N	3	N	N	N	N	L	50	N	L	N	L	N	7	10	N
4MZ0038A	0.7	0.02	0.1	0.01	100	N	N	N	700	L	5	N	N	N	N	N	N	N	L	N	20	N	N	L	N
4MZ0038B	1	0.05	0.05	0.03	200	N	N	N	50	50	3	N	N	N	N	N	N	N	20	N	15	N	L	N	N
4MZ0042A	1	0.05	0.1	0.03	50	N	N	N	10	200	10	N	N	100	N	L	N	N	N	N	10	N	L	L	N
4MZ0069B	1.5	0.05	0.2	0.02	500	N	N	N	15	500	2	N	N	N	N	5	30	20	L	7	10	N	5	L	N
4MZ0070A	2	0.02	L	0.03	200	N	N	N	30	50	3	N	N	N	N	L	20	N	30	L	30	N	N	20	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
L	N	100	N	100	N
N	N	150	N	70	N
L	N	150	N	100	N
N	N	50	N	100	N
L	N	100	N	50	N
L	N	50	N	70	N
L	N	10	N	20	N
L	N	50	N	50	N
15	N	50	N	200	N
L	N	200	N	100	N
N	N	100	N	100	N
10	N	70	N	70	N
N	N	100	N	200	N
N	N	150	N	50	N
L	N	150	N	50	N
L	N	150	N	150	N
L	N	100	N	50	N
L	N	70	N	100	N
L	N	200	N	200	N
L	N	30	N	70	N
N	N	30	N	100	N
N	N	70	N	100	N
N	N	100	N	70	N
N	N	70	N	100	N
N	N	100	500	50	N
L	N	30	200	30	N
L	N	70	200	100	N
10	N	70	N	200	N
L	N	50	N	70	N
10	N	50	N	200	N
N	N	70	N	150	N
N	N	200	N	100	N
N	N	100	N	100	N
L	N	200	N	500	N
L	N	100	N	100	N
10	N	100	N	100	N
10	N	100	N	100	N
10	L	70	N	50	N
L	N	50	N	70	N
10	N	50	N	100	N
N	N	50	N	100	N
N	N	50	N	100	N
N	L	150	N	100	N
N	N	150	N	100	N
N	N	15	N	30	N
N	N	15	N	70	N
N	N	100	N	20	N
N	N	150	N	200	N
N	N	70	N	30	N
N	N	20	N	150	N
N	N	150	N	100	N
N	N	100	L	70	N
N	N	100	N	100	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
L	N	70	N	50	N
N	N	70	N	70	N
10	N	200	N	70	N
L	N	50	N	70	N
L	N	70	N	100	N
L	N	70	N	70	N
30	N	100	N	1000	N
10	N	70	N	100	N
L	N	70	N	70	N
N	N	100	N	30	N
N	N	30	N	200	N

Quartz Feldspar Porphyry

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR0037A	1	L	N	0.02	100	N	N	N	50	L	10	N	N	N	N	N	N	N	30	N	20	N	N	30	N
4FR0039C	1.5	0.5	0.05	0.5	500	L	N	N	30	200	10	N	N	N	30	100	100	N	20	L	70	N	7	15	L
4FR0040F	1	0.07	0.1	0.03	100	N	N	N	15	L	5	N	N	N	N	N	70	N	L	N	50	N	5	L	N
4FR0049A	0.7	0.05	L	0.03	500	N	N	N	20	70	15	N	N	N	N	N	50	N	20	N	50	N	5	30	N
4FR0055A	1	0.07	0.5	0.02	300	N	N	N	100	70	20	N	N	N	N	N	70	N	30	N	20	N	7	50	100
4FR0055B	1	0.05	L	0.02	200	L	N	N	50	200	7	N	N	N	N	N	30	7	20	N	50	N	7	30	N
4FR0063A	1	0.05	0.05	0.05	500	L	N	N	10	70	5	N	N	200	N	L	50	N	20	N	200	N	7	20	N
4FR0064B	1	0.3	0.1	0.1	300	N	N	N	30	500	5	N	N	2	20	N	100	N	20	5	20	N	10	20	L
4FR0075A	1	0.05	L	0.05	300	N	N	N	15	70	1.5	N	N	N	N	L	100	N	30	N	70	N	5	20	N
4FR0076A	0.7	0.02	L	0.002	200	N	N	N	100	L	10	N	N	N	N	N	N	N	20	N	15	N	5	50	N
4FR0077A	1	0.05	0.07	0.05	300	N	N	N	20	50	15	N	N	N	N	L	70	N	30	N	50	N	5	15	N
4FR0077B	3	0.03	0.05	0.005	1000	0.7	N	N	70	70	20	N	N	N	N	L	70	N	30	N	150	N	7	300	N
4FR0084	1	0.03	L	0.02	300	N	N	N	15	70	2	N	N	N	N	N	N	N	20	N	20	N	7	50	N
4FR0090	7	0.05	N	0.07	2000	30	N	N	L	L	1.5	50	N	N	N	150	100	5	L	N	700	N	7	1000	N
4FR4006B	0.7	L	0.1	0.02	100	N	N	N	15	L	10	N	N	N	N	N	30	N	50	N	10	N	5	L	N
4FR4016A	0.7	2	0.1	0.02	700	N	N	N	50	100	15	N	N	N	N	N	70	N	20	N	70	N	7	20	N
4FR4017A	1	0.3	0.1	0.67	1000	N	N	N	10	100	15	N	N	N	10	L	70	N	20	N	200	N	7	20	N
4FR4024A	1.5	0.1	0.1	0.03	300	L	N	N	30	100	2	N	N	N	L	L	70	N	20	L	10	N	10	70	N
4FR4025B	0.7	0.1	0.05	0.05	150	N	N	N	50	200	7	N	N	N	N	N	100	N	20	N	50	N	7	20	N
4FR4032B	0.7	0.02	0.1	0.02	300	N	N	N	20	50	10	N	N	N	N	L	50	N	30	N	70	N	L	50	N
4FR4032D	0.7	0.03	0.1	0.02	100	N	N	N	50	50	7	N	N	20	N	N	N	N	30	N	50	N	L	20	N
4MZ00015B	0.5	0.05	N	0.005	700	0.5	N	N	50	150	7	N	N	N	N	L	N	N	20	N	20	N	5	5	N
4MZ00015C	0.5	0.1	L	0.002	500	1	N	N	50	100	10	N	N	N	N	N	N	N	L	N	30	N	5	5	N
4MZ0037A	1	0.15	L	0.07	150	N	N	N	20	100	10	N	N	N	N	N	L	N	L	20	10	N	L	10	N
4MZ0038D	1	0.03	0.05	0.02	150	N	N	N	100	30	15	N	N	N	N	N	70	N	20	N	20	N	5	10	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
L	N	30	N	70	N
20	N	100	200	100	N
N	N	70	N	100	N
L	N	70	N	70	N
L	N	100	N	100	N
L	N	100	N	70	N
L	N	70	200	100	N
10	N	100	N	100	N
L	N	100	N	300	N
N	N	100	N	70	N
L	N	100	N	100	N
N	N	200	L	100	N
N	N	150	N	70	N
10	N	70	500	200	N
N	N	100	N	100	N
10	N	100	N	100	N
10	N	100	N	70	N
L	N	150	N	70	N
10	N	100	N	100	N
N	N	70	N	100	N
N	N	70	N	100	N
N	N	100	N	50	N
N	N	100	N	30	N
L	N	50	N	70	N
N	N	50	N	70	N

Intermediate Dikes

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR0039E	5	0.07	1.5	0.5	1000	N	N	N	L	200	L	N	N	50	200	30	N	N	N	20	15	N	20	N	200
4FR0052A	5	3	1	0.3	1500	N	N	N	10	300	N	N	N	30	200	10	100	5	30	100	50	N	10	70	1500
4FR0062	3	2	2	0.5	1500	N	N	N	50	500	L	N	N	N	30	L	30	N	N	20	N	N	20	N	300
4FR0063B	3	2	1	0.3	500	N	N	N	L	500	L	N	N	L	200	7	N	N	N	10	10	N	20	N	200
4FR0064C	3	2	1.5	0.3	1500	N	N	N	N	300	1	N	N	N	2	7	N	N	N	15	L	N	20	N	5
4FR4004B	3	1.5	1	0.2	1000	N	N	N	15	300	3	N	N	30	150	10	N	N	N	10	L	N	15	N	200
4FR4015C	3	0.7	1.5	0.3	300	N	N	N	L	100	1	N	N	30	150	50	100	N	N	15	15	N	20	N	300
4FR4016C	3	0.05	1	0.3	300	N	N	N	L	300	L	N	N	30	200	10	N	N	N	15	20	N	20	N	300
4FR4017B	3	3	2	0.5	200	N	N	N	N	500	L	N	N	50	200	7	50	N	N	20	20	N	20	N	500
4MZ0037B	5	2	2	0.5	1000	N	N	N	L	150	1.5	N	N	50	150	7	N	N	N	N	50	N	20	20	300

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
70	N	30	N	100	N
50	N	20	300	70	N
100	N	50	N	100	N
100	N	30	N	70	N
100	N	50	N	70	N
100	N	70	N	70	N
100	N	30	L	70	N
100	N	50	L	100	N
100	N	70	N	70	N
100	N	15	N	100	N

Hornfels and Quartzose Country Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR00014A	3	1	L	0.3	700	5	N	N	70	700	1	N	N	N	150	100	100	N	N	50	30	N	30	20	N
4FR00014B	3	1	0.05	0.3	700	1	N	N	700	500	1.5	N	N	20	200	30	100	N	N	50	10	N	20	100	N
4FR0008B	5	1.5	L	0.7	200	N	N	N	200	500	L	N	N	50	150	100	50	N	20	70	30	N	30	N	L
4FR0009D	3	1.5	0.15	0.3	1000	N	N	N	50	100	1	N	N	30	150	70	70	N	L	50	20	N	20	N	100
4FR0009E	5	1.5	L	0.5	700	N	N	N	2000	500	7	N	N	30	200	L	100	N	20	70	50	N	20	20	300
4FR0009F	0.5	0.1	L	0.15	700	N	N	N	15	100	L	N	N	N	10	10	N	N	N	N	100	N	5	N	L
4FR00190	3	1	L	0.2	200	N	N	N	50	300	1	N	N	15	70	15	50	N	N	50	N	N	10	10	L
4FR0020B	3	1	0.1	0.2	500	N	N	N	20	70	L	N	N	15	70	30	30	7	L	50	L	N	10	N	150
4FR0022	2	0.5	L	0.07	500	N	N	N	L	70	N	N	N	7	10	7	N	N	N	30	10	N	5	N	N
4FR0034A	0.5	0.02	0.07	0.01	70	L	N	N	20	70	7	N	N	N	N	L	N	N	L	N	30	N	N	10	N
4FR4011B	1.5	0.5	L	0.15	200	N	N	N	100	500	2	N	N	7	70	20	50	N	N	20	L	N	10	L	L
4FR4012B	2	0.2	L	0.1	1500	3	N	N	L	L	L	L	N	N	15	15	N	N	N	L	70	N	5	70	N
4FR4012C	2	0.5	0.05	0.3	500	N	N	N	200	700	1	N	N	15	150	N	150	N	L	30	50	N	20	10	150
4FR4012D	2	0.7	L	0.2	200	N	N	N	70	500	1.5	N	N	20	100	50	100	N	L	50	50	N	15	L	L
4FR4013A	2	0.7	L	0.3	200	N	N	N	70	700	1	N	N	7	150	20	100	N	L	15	L	N	15	L	L
4FR4013B	2	0.7	L	0.3	150	N	N	N	100	700	1.5	N	N	5	150	30	150	N	L	10	50	N	20	10	L
4FR4014	2	0.7	L	0.3	1000	N	N	N	70	500	1	N	N	5	150	50	100	N	N	10	100	N	20	N	L
4MZ0026B	2	0.3	0.05	0.2	200	N	N	N	70	300	1	N	N	5	50	7	N	N	N	N	N	N	5	N	N
4MZ0040A	1.5	0.3	L	0.07	200	N	N	N	L	50	1	N	N	N	L	7	N	N	N	15	N	N	N	N	N
4MZ0040B	2	0.7	L	0.2	70	N	N	N	50	700	1	N	N	L	100	50	100	N	N	50	20	N	10	N	N
4MZ0044A	2	0.7	0.2	0.2	200	N	N	N	L	300	1	N	N	N	30	70	N	N	N	N	N	N	5	10	L
4MZ0069A	3	0.5	L	0.15	300	20	N	N	100	300	3	N	20	30	100	700	L	L	N	70	2000	N	5	50	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
100	L*	30	L	100	N
100	[illegible]	50	N	100	N
150	N	50	L	150	N
100	N	30	N	100	N
100	N	30	L	100	N
20	N	10	L	300	N
50	N	20	N	200	N
70	N	30	N	200	N
50	N	10	N	100	N
L	N	100	N	70	N
70	N	15	N	70	N
20	N	20	300	200	N
100	N	30	N	200	N
70	N	30	L	70	N
70	N	30	N	150	N
100	N	30	N	100	N
100	N	30	N	100	N
50	N	10	N	300	N
N	N	L	N	100	N
100	N	20	N	100	N
50	N	L	N	100	N
1000	N	15	N	150	N

Intensely Altered Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4AR0001A	3	0.05	L	0.07	1000	1.5	N	N	1000	50	2	10	N	N	N	5	100	N	20	N	100	N	10	70	N
4AR0001B	5	0.07	L	0.05	1500	3	N	N	10	70	10	10	N	N	N	200	150	N	20	N	500	N	10	700	N
4AR0001C	3	0.05	L	0.15	1000	N	N	N	10	100	5	N	N	N	N	L	100	N	20	N	20	N	7	70	N
4AR0001D	2	0.1	L	0.07	500	1	N	N	50	100	7	L	L	N	N	100	150	L	20	N	100	N	7	50	N
4AR0001E	3	0.15	L	0.05	700	2	N	N	70	50	7	10	L	N	N	150	200	5	L	N	100	N	5	100	N
4AR0001F	5	0.1	L	0.1	1000	10	N	N	10	150	5	30	L	N	N	300	100	N	N	N	300	N	5	50	N
4AR0001G	5	0.15	L	0.05	1500	3	N	N	50	30	7	N	L	N	N	70	150	7	L	N	150	N	7	100	N
4AR0001H	7	0.1	L	0.15	2000	L	N	N	L	100	3	N	L	10	N	7	150	N	L	N	200	N	7	10	N
4AR0002A	2	0.05	L	0.2	700	0.5	N	N	10	100	7	N	N	N	N	L	30	N	L	N	20	N	5	20	N
4AR0002B	2	0.05	0.05	0.1	1500	1	N	N	50	L	5	10	N	N	N	100	100	10	L	N	300	N	7	50	N
4AR0002C	1.5	0.07	0.15	0.05	500	0.7	N	N	10	70	1.5	50	N	N	N	L	100	10	N	N	150	N	5	15	N
4AR0002D	3	0.1	0.2	0.07	1500	5	N	N	30	L	10	30	N	N	N	150	100	20	L	N	1000	N	7	100	N
4AR0002E	3	0.1	0.07	0.1	1000	5	N	N	30	L	5	30	N	N	N	150	200	10	L	N	500	N	7	70	N
4AR0002F	3	0.1	0.2	0.05	2000	1.5	700	N	30	L	3	15	N	N	N	100	100	20	L	N	1000	N	5	100	N
4AR0002G	3	0.05	L	0.05	1000	30	N	N	200	L	1	50	N	N	N	70	100	30	L	N	200	N	5	150	N
4AR0002H	3	0.07	1	0.02	2000	0.5	N	N	50	N	5	300	N	N	N	500	150	50	L	N	300	N	5	100	N
4AR0002K	3	0.07	7	0.015	2000	100	N	N	20	L	2	1000	N	N	N	700	200	20	20	N	1500	N	7	70	N
4AR0002L	5	0.1	0.3	0.07	3000	30	N	N	50	20	10	500	20	7	N	700	150	70	L	N	5000	N	7	100	N
4AR0003A	5	0.03	L	0.005	3000	5	700	N	L	50	1.5	70	50	N	N	150	20	30	N	N	2000	N	L	G1000	N
4AR0003B	5	0.03	L	0.015	1500	5	L	N	15	50	5	30	L	N	N	100	100	15	N	N	700	N	5	500	N
4AR0003C	7	0.02	N	0.015	300	1	L	N	10	L	2	N	N	N	N	30	50	7	N	N	200	N	L	70	N
4AR0012A	3	1	0.1	0.07	2000	3	N	N	20	100	3	15	L	N	N	10	100	5	20	N	150	N	10	70	N
4AR0012B	10	0.05	0.5	0.02	5000	20	N	N	20	L	3	300	L	7	N	100	100	20	30	N	200	N	15	100	N
4AR0012C	5	0.07	L	0.1	1500	0.7	N	N	50	20	5	N	L	L	N	30	100	N	20	N	100	N	7	50	N
4AR0012D	5	0.07	0.07	0.1	5000	10	N	N	50	20	5	10	30	N	N	100	150	10	L	N	700	N	7	70	N
4AR0012E	5	0.07	0.1	0.1	5000	7	N	N	50	L	7	10	L	N	N	50	100	7	20	N	200	N	7	100	N
4AR0012F	5	0.07	L	0.15	5000	30	N	N	70	20	7	30	L	N	N	50	150	10	20	N	300	N	10	150	N
4AR0012G	3	0.05	N	0.07	3000	5	N	N	70	50	5	20	L	N	N	30	100	20	20	N	300	N	5	50	N
4AR0012H	2	0.05	0.5	0.02	1000	2	N	N	15	L	5	15	N	N	N	20	100	10	L	N	150	N	5	50	N
4AR0012I	5	0.07	1	0.05	3000	20	N	N	30	30	5	50	L	N	N	150	100	30	L	N	200	N	7	100	N
4AR0012J	1.5	0.05	0.05	0.07	2000	3	N	N	30	200	5	10	L	N	N	20	100	7	20	N	500	N	L	30	N
4AR0012K	5	0.07	0.05	0.1	2000	7	N	N	30	50	7	10	N	N	N	15	100	30	20	N	300	N	5	70	N
4AR0012L	5	0.07	0.05	0.1	2000	5	N	N	30	70	5	15	L	N	N	20	100	30	20	N	200	N	7	100	N
4AR0012M	3	0.07	0.1	0.1	3000	10	N	N	70	L	5	15	L	N	N	50	100	15	L	N	500	N	5	100	N
4AR0012N	5	0.05	L	0.07	2000	3	N	N	50	L	5	15	L	N	N	50	150	7	L	N	300	N	7	70	N
4AR0012P	5	0.07	0.15	0.05	2000	20	N	N	50	N	5	50	N	N	N	200	150	7	L	N	200	N	7	300	N
4AR0012Q	2	0.07	0.05	0.07	2000	5	N	N	100	150	5	L	20	N	N	30	150	5	L	N	500	N	5	50	N
4AR0012R	3	0.07	0.07	0.1	2000	2	N	N	20	20	5	10	L	N	N	50	150	N	L	N	300	N	10	70	N
4AR0012S	3	0.05	0.15	0.07	2000	7	N	N	30	20	5	20	L	N	N	100	100	20	L	N	150	N	5	200	N
4AR0013A	3	0.05	0.05	0.05	1500	2	N	N	200	70	3	L	N	N	N	100	70	30	L	N	200	N	5	50	N
4AR0013B	10	0.07	L	0.07	3000	5	N	N	200	20	3	10	N	N	N	100	100	100	L	N	200	N	7	150	N
4AR0013C	3	0.07	0.07	0.05	1000	L	N	N	10	L	1.5	N	N	N	N	L	70	20	L	N	20	N	7	20	N
4AR0013D	3	0.05	0.2	0.1	1000	0.5	N	N	10	70	2	100	L	N	N	70	100	50	20	N	70	N	10	30	N
4AR0013E	5	0.1	0.05	0.1	2000	1.5	N	N	50	20	7	L	N	N	N	15	100	10	20	N	200	N	7	70	N
4AR0013F	3	0.03	L	0.1	1500	L	N	N	50	L	5	N	N	N	N	L	100	N	L	N	50	N	5	50	N
4AR0013G	10	0.05	N	0.07	3000	7	N	N	20	N	1.5	10	N	N	N	150	100	10	L	N	500	N	5	500	N
4AR0013H	10	0.15	5	0.05	2000	30	N	N	50	20	3	70	N	N	N	150	100	10	L	N	500	N	5	500	N
4AR0013I	10	0.1	2	0.02	2000	30	N	N	50	L	2	50	N	N	N	150	N	5	N	N	500	N	5	200	N
4AR0013J	7	0.07	0.7	0.07	2000	30	N	N	100	L	5	50	N	N	N	100	50	N	L	N	200	N	7	500	N
4AR0013K	5	0.05	L	0.1	1500	10	N	N	10	L	2	50	N	N	N	200	70	7	20	N	300	N	5	100	N
4AR0013L	5	0.03	L	0.02	1500	50	500	N	15	L	2	70	L	N	N	200	N	10	L	N	700	N	5	500	N
4AR0013M	5	0.05	N	0.03	1500	5	N	N	50	N	3	N	L	N	N	10	30	50	20	N	200	N	5	100	N

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(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
L	N	70	200	100	N
L	N	70	500	100	N
L	[illegible]	100	200	150	N
15	N	70	1500	150	N
10	L*	150	2000	70	N
L	L*	50	1500	70	N
10	N	100	3000	100	N
L	L*	50	1000	100	N
L	N	70	N	70	N
10	N	70	700	100	N
L	L*	70	N	100	N
L	L	50	500	100	N
10	L*	70	200	150	N
10	L	70	300	200	N
10	L*	50	300	100	N
10	N	100	500	100	N
10	2000	5	200	30	N
10	L	70	1000	70	N
10	L*	15	2000	10	N
10	N	100	1000	20	N
L	N	30	500	70	N
10	L	50	300	200	N
10	2000	70	700	10	L
10	L	50	500	100	N
10	L	50	1000	70	N
10	N	70	300	70	N
L	L	100	500	200	N
L	N	50	500	70	N
10	70	20	L	150	N
L	L	100	700	150	N
L	N	50	200	100	N
L	L	20	200	150	N
L	L	100	300	100	N
L	N	50	500	100	N
10	N	50	700	300	N
10	N	50	500	70	N
L	N	70	700	200	N
10	N	100	300	100	N
L	N	50	500	100	N
10	N	30	500	100	N
10	N	70	700	100	N
L	L	20	N	100	N
10	N	50	L	100	N
10	L	50	500	200	N
10	N	30	L	70	N
10	N	70	700	70	N
L	50	100	300	100	N
L	N	30	500	L	N
10	L	30	500	70	N
L	N	70	500	200	N
L	N	50	500	30	N
L	N	100	300	100	N

Intensely Altered Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4AR0013P	7	0.1	L	0.07	2000	30	N	N	30	20	2	50	L	N	N	100	100	10	L	N	500	N	5	300	N
4AR0013Q	7	0.07	0.5	0.015	2000	20	N	N	20	L	2	50	L	N	N	100	30	20	L	N	500	N	5	100	N
4AR0013R	7	0.1	L	0.1	2000	2	N	N	20	N	1	L	N	N	N	100	150	N	L	N	300	N	5	150	N
4AR0013S	0.5	N	N	L	700	0.7	N	N	N	N	L	N	N	N	N	30	N	N	N	N	100	N	N	70	N
4AR0013T	10	0.07	N	0.07	3000	1	N	N	10	N	2	N	N	N	N	150	100	N	N	N	150	N	5	1000	N
4AR0015A	5	0.07	0.5	0.15	1500	1.5	N	N	15	70	1.5	L	50	N	N	500	200	L	20	N	500	N	5	500	N
4FR00016A	3	0.05	N	0.01	1000	L	N	N	L	150	5	N	N	20	N	15	N	7	L	N	15	N	7	50	L
4FR00016B	5	0.07	N	0.07	2000	2	N	N	L	50	5	N	N	N	N	50	100	N	L	N	700	N	10	100	N
4FR00016C	5	0.02	N	0.015	2000	N	N	N	10	50	5	N	N	N	N	7	N	N	L	N	10	N	10	30	100
4FR00016D	5	0.05	N	0.01	2000	N	N	N	20	30	10	N	N	N	N	7	50	N	L	N	20	N	10	70	L
4FR00017C	1.5	0.05	0.05	0.05	500	0.5	N	N	L	150	5	N	N	N	N	N	100	N	L	N	30	N	5	15	L
4FR00018B	5	0.07	0.5	0.05	1500	3	N	N	30	20	1.5	N	N	N	N	50	150	N	30	N	L	N	30	200	N
4FR00019A	1.5	0.3	L	0.05	300	0.7	L	N	500	20	1	N	N	5	L	150	N	N	N	5	N	N	5	15	N
4FR0027A	3	0.05	N	0.015	1500	7	N	N	30	L	20	N	N	N	N	30	50	N	30	N	300	N	5	100	N
4FR0027B	5	0.03	L	0.01	1000	0.5	N	N	50	70	20	N	N	N	N	5	N	N	30	N	150	N	5	100	N
4FR0027C	1	0.02	0.1	0.01	200	N	N	N	300	N	3	N	N	N	N	L	N	N	20	N	50	N	5	20	N
4FR0032C	1	0.03	0.05	0.01	100	N	N	N	50	20	3	N	N	N	N	N	N	N	L	N	30	N	5	10	N
4FR0032D	3	0.05	0.05	0.07	200	L	N	N	G1000	N	15	15	N	N	N	50	150	N	L	N	20	N	10	30	N
4FR0036A	5	0.07	N	0.1	2000	1.5	N	N	L	500	5	N	N	N	N	15	100	10	L	N	700	N	5	100	N
4FR0039B	5	2	2	0.15	1000	N	N	N	L	300	L	N	N	50	200	20	70	N	N	20	L	N	20	N	300
4FR0040C	5	0.05	L	0.07	5000	N	N	N	L	70	10	N	N	N	N	50	100	N	20	N	100	N	10	30	L
4FR0040D	5	0.03	L	0.1	5000	N	N	N	L	200	15	N	L	N	N	10	200	N	20	N	200	N	7	150	N
4FR0042	3	0.05	0.1	0.1	1500	0.7	N	N	20	70	20	N	N	N	N	15	200	N	20	N	150	N	7	100	N
4FR0044B	3	0.1	0.05	0.05	1500	0.5	N	N	50	50	5	N	N	N	N	10	100	N	L	N	200	N	5	150	N
4FR0050A	2	0.7	0.1	0.3	500	N	N	N	150	300	5	N	N	7	N	10	50	10	L	20	10	N	10	N	70
4FR0051B	5	0.5	0.2	0.2	1000	L	N	N	L	150	3	N	N	10	100	15	50	N	L	20	150	N	10	50	L
4FR0061A	3	0.1	1.5	0.1	2000	0.5	N	N	50	30	7	N	N	N	N	70	100	N	L	N	300	N	5	150	N
4FR0061B	3	0.15	0.3	0.1	2000	0.7	N	N	70	50	10	N	N	N	N	70	150	N	L	N	300	N	7	200	N
4FR0061C	3	0.1	0.5	0.15	2000	3	N	N	50	100	15	N	N	N	N	100	150	N	20	N	700	N	7	200	N
4FR0074A	2	0.05	L	0.05	1000	0.5	N	N	20	200	7	N	N	N	N	5	150	N	L	N	150	N	5	100	N
4FR0076B	5	0.05	N	0.1	2000	0.7	N	N	50	50	2	N	N	N	N	150	150	N	20	N	500	N	7	700	N
4FR0077C	5	0.03	N	0.02	1000	N	N	N	15	L	2	N	N	N	N	100	50	N	20	N	50	N	7	70	N
4FR0082A	3	0.02	0.7	0.02	1000	15	N	N	50	70	2	N	N	N	N	100	50	10	L	N	100	N	7	1000	N
4FR0085	1	0.07	0.1	0.05	150	N	N	N	100	200	3	N	N	N	N	N	70	N	20	N	30	N	7	15	N
4FR4001C	5	0.05	L	0.05	500	2	1000	N	200	100	15	50	N	N	N	150	200	N	L	N	50	N	5	200	N
4FR4007A	5	0.07	L	0.02	2000	N	N	N	L	50	30	N	N	N	N	L	50	N	L	N	50	N	5	100	N
4FR4030A	3	0.05	L	0.05	2000	N	N	N	70	L	3	N	N	N	N	10	100	10	20	N	50	N	7	100	N
4FR4030B	3	0.07	0.1	0.07	2000	N	N	N	50	50	3	N	N	N	N	7	100	30	L	N	200	N	5	100	N
4FR4031B	1	0.03	L	0.1	300	N	N	N	15	300	3	N	N	7	N	N	150	N	20	N	50	N	10	10	L
4FR4031C	2	0.03	0.2	0.02	700	L	N	N	100	20	10	N	N	N	N	7	50	N	20	N	70	N	L	100	N
4FR4035A	5	0.05	0.15	0.03	2000	3	N	N	150	300	15	L	L	20	N	50	150	N	L	N	150	N	10	100	100
4FR4036A	3	0.05	L	0.02	1500	0.7	N	N	50	200	10	N	N	20	N	5	70	N	N	N	70	N	7	70	N
4FR4037A	7	0.05	0.7	0.03	5000	0.7	N	N	L	100	20	N	N	20	N	5	100	N	L	N	150	N	7	1000	100
4FR4037B	10	0.03	1.5	0.03	5000	N	N	N	10	L	15	N	N	20	N	L	30	10	L	N	150	N	7	100	150
4FR4037C	10	0.03	N	0.015	5000	1	N	N	L	L	10	N	N	20	N	150	30	N	N	N	300	N	7	700	N
4FR4040A	3	0.05	0.2	0.03	5000	1	N	N	L	20	150	L	L	20	N	7	100	N	L	N	300	N	7	100	300
4FR4040B	5	0.05	5	0.03	5000	1	N	N	L	L	20	N	N	20	N	7	150	N	L	N	300	N	7	100	300
4FR4041B	1.5	0.07	L	0.005	2000	1.5	N	N	10	30	10	L	L	20	N	15	70	N	N	N	100	N	7	150	N
4FR4042A	7	0.07	L	0.07	5000	0.7	N	N	L	150	15	N	N	20	N	70	200	N	L	N	500	N	10	70	L
4FR4042B	5	0.05	0.15	0.05	5000	N	N	N	15	L	10	N	N	20	N	15	500	N	L	N	70	N	7	100	N
4FR4043A	5	0.07	L	0.07	1500	N	N	N	15	100	10	N	N	20	N	10	200	N	L	N	100	N	7	150	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
10	L	70	700	100	N
L	N	100	1000	50	N
L	N	100	1000	100	N
L	N	N	N	10	N
L	N	50	1000	100	N
10	N	70	1500	200	N
N	N	70	L	30	N
10	N	100	700	70	N
L	N	70	L	50	N
L	N	100	L	50	N
L	N	70	N	300	N
L	N	300	L	70	N
15	N	10	N	50	N
30	N	100	500	150	N
N	N	150	500	100	N
N	N	100	N	50	N
L	N	100	N	20	N
L	L	100	N	100	N
10	N	50	1000	150	N
100	N	70	N	150	N
10	N	50	1000	100	N
10	N	100	1000	100	N
N	N	150	500	70	N
L	N	50	200	100	N
70	N	30	L	200	N
50	N	30	1000	200	N
10	N	50	200	300	N
10	N	70	200	200	N
15	L	100	200	200	N
L	N	100	200	200	N
L	N	150	700	100	N
N	N	100	L	100	N
N	N	150	500	50	N
N	N	200	N	150	N
L	N	150	N	50	N
N	N	150	500	70	N
10	N	100	L	700	N
10	N	70	500	100	N
15	N	30	N	300	N
N	N	100	500	100	N
10	N	100	500	150	N
L	N	70	L	50	N
10	N	100	700	70	N
L	N	150	500	100	N
L	N	100	1500	70	N
L	N	70	7	100	N
L	N	100	1000	70	N
10	N	50	500	30	N
L	N	200	2000	70	N
L	N	70	700	500	N
10	N	100	500	100	N

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Intensely Altered Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4AR0001A	3	0.05	L	0.07	1000	1.5	N	N	1000	50	2	10	N	N	N	5	100	N	20	N	100	N	10	70	N
4AR0001B	5	0.07	L	0.05	1500	3	N	N	10	70	10	10	N	N	N	200	150	N	20	N	500	N	10	700	N
4AR0001C	3	0.05	L	0.15	1000	N	N	N	10	100	5	N	N	N	N	L	100	N	20	N	20	N	7	70	N
4AR0001D	2	0.1	L	0.07	500	1	N	N	50	100	7	L	L	N	N	100	150	L	20	N	100	N	7	50	N
4AR0001E	3	0.15	L	0.05	700	2	N	N	70	50	7	10	L	N	N	150	200	5	L	N	100	N	5	100	N
4AR0001F	5	0.1	L	0.1	1000	10	N	N	10	150	5	30	L	N	N	300	100	N	N	N	300	N	5	50	N
4AR0001G	5	0.15	L	0.05	1500	3	N	N	50	30	7	N	L	N	N	70	150	7	L	N	150	N	7	100	N
4AR0001H	7	0.1	L	0.15	2000	L	N	N	L	100	3	N	L	10	N	7	150	N	L	N	200	N	7	10	N
4AR0002A	2	0.05	L	0.2	700	0.5	N	N	10	100	7	N	N	N	N	L	30	N	L	N	20	N	5	20	N
4AR0002B	2	0.05	0.05	0.1	1500	1	N	N	50	L	5	10	N	N	N	100	100	10	L	N	300	N	7	50	N
4AR0002C	1.5	0.07	0.15	0.05	500	0.7	N	N	10	70	1.5	50	N	N	N	L	100	10	N	N	150	N	5	15	N
4AR0002D	3	0.1	0.2	0.07	1500	5	N	N	30	L	10	30	N	N	N	150	100	20	L	N	1000	N	7	100	N
4AR0002E	3	0.1	0.07	0.1	1000	5	N	N	30	L	5	30	N	N	N	150	200	10	L	N	500	N	7	70	N
4AR0002F	3	0.1	0.2	0.05	2000	1.5	700	N	30	L	3	15	N	N	N	100	100	20	L	N	1000	N	5	100	N
4AR0002G	3	0.05	L	0.05	1000	30	N	N	200	L	1	50	N	N	N	70	100	30	L	N	200	N	5	150	N
4AR0002H	3	0.07	1	0.02	2000	0.5	N	N	50	N	5	300	N	N	N	500	150	50	L	N	300	N	5	100	N
4AR0002K	3	0.07	7	0.015	2000	100	N	N	20	L	2	1000	N	N	N	700	200	20	20	N	1500	N	7	70	N
4AR0002L	5	0.1	0.3	0.07	3000	30	N	N	50	20	10	500	20	7	N	700	150	70	L	N	5000	N	7	100	N
4AR0003A	5	0.03	L	0.005	3000	5	700	N	L	50	1.5	70	50	N	N	150	20	30	N	N	2000	N	L	61000	N
4AR0003B	5	0.03	L	0.015	1500	5	L	N	15	50	5	30	L	N	N	100	100	15	N	N	700	N	5	500	N
4AR0003C	7	0.02	N	0.015	300	1	L	N	10	L	2	N	N	N	N	30	50	7	N	N	200	N	L	70	N
4AR0012A	3	1	0.1	0.07	2000	3	N	N	20	100	3	15	L	N	N	10	100	5	20	N	150	N	10	70	N
4AR0012B	10	0.05	0.5	0.02	5000	20	N	N	20	L	3	300	L	7	N	100	100	20	30	N	200	N	15	100	N
4AR0012C	5	0.07	L	0.1	1500	0.7	N	N	50	20	5	N	L	L	N	30	100	N	20	N	100	N	7	50	N
4AR0012D	5	0.07	0.07	0.1	5000	10	N	N	50	20	5	10	30	N	N	100	150	10	L	N	700	N	7	70	N
4AR0012E	5	0.07	0.1	0.1	5000	7	N	N	50	L	7	10	L	N	N	50	100	7	20	N	200	N	7	100	N
4AR0012F	5	0.07	L	0.15	5000	30	N	N	70	20	7	30	L	N	N	50	150	10	20	N	300	N	10	150	N
4AR0012G	3	0.05	N	0.07	3000	5	N	N	70	50	5	20	L	N	N	30	100	20	20	N	300	N	5	50	N
4AR0012H	2	0.05	0.5	0.02	1000	2	N	N	15	L	5	15	N	N	N	20	100	10	L	N	150	N	5	50	N
4AR0012I	5	0.07	1	0.05	3000	20	N	N	30	30	5	50	L	N	N	150	100	30	L	N	200	N	7	100	N
4AR0012J	1.5	0.05	0.05	0.07	2000	3	N	N	30	200	5	10	L	N	N	20	100	7	20	N	500	N	L	30	N
4AR0012K	5	0.07	0.05	0.1	2000	7	N	N	30	50	7	10	N	N	N	15	100	30	20	N	300	N	5	70	N
4AR0012L	5	0.07	0.05	0.1	2000	5	N	N	30	70	5	15	L	N	N	20	100	30	20	N	200	N	7	100	N
4AR0012M	3	0.07	0.1	0.1	3000	10	N	N	70	L	5	15	L	N	N	50	100	15	L	N	500	N	5	100	N
4AR0012N	5	0.05	L	0.07	2000	3	N	N	50	L	5	15	L	N	N	50	150	7	L	N	300	N	7	70	N
4AR0012P	5	0.07	0.15	0.05	2000	20	N	N	50	N	5	50	N	N	N	200	150	7	L	N	200	N	7	300	N
4AR0012Q	2	0.07	0.05	0.07	2000	5	N	N	100	150	5	L	20	N	N	30	150	5	L	N	500	N	5	50	N
4AR0012R	3	0.07	0.07	0.1	2000	2	N	N	20	20	5	10	L	N	N	50	150	N	L	N	300	N	10	70	N
4AR0012S	3	0.05	0.15	0.07	2000	7	N	N	30	20	5	20	L	N	N	100	100	20	L	N	150	N	5	200	N
4AR0013A	3	0.05	0.05	0.05	1500	2	N	N	200	70	3	L	N	N	N	100	70	30	L	N	200	N	5	50	N
4AR0013B	10	0.07	L	0.07	3000	5	N	N	200	20	3	10	N	N	N	100	100	100	L	N	200	N	7	150	N
4AR0013C	3	0.07	0.07	0.05	1000	L	N	N	10	L	1.5	N	N	N	N	L	70	20	L	N	20	N	7	20	N
4AR0013D	3	0.05	0.2	0.1	1000	0.5	N	N	10	70	2	100	L	N	N	70	100	50	20	N	70	N	10	30	N
4AR0013E	5	0.1	0.05	0.1	2000	1.5	N	N	50	20	7	L	N	N	N	15	100	10	20	N	200	N	7	70	N
4AR0013F	3	0.03	L	0.1	1500	L	N	N	50	L	5	N	N	N	N	L	100	N	L	N	50	N	5	50	N
4AR0013G	10	0.05	N	0.07	3000	7	N	N	20	N	1.5	10	N	N	N	150	100	10	L	N	500	N	5	500	N
4AR0013H	10	0.15	5	0.05	2000	30	N	N	50	20	3	70	N	N	N	150	100	10	L	N	500	N	5	500	N
4AR0013I	10	0.1	2	0.02	2000	30	N	N	50	L	2	50	N	N	N	150	N	5	N	N	500	N	5	200	N
4AR0013J	7	0.07	0.7	0.07	2000	30	N	N	100	L	5	50	N	N	N	100	50	N	L	N	200	N	7	500	N
4AR0013K	5	0.05	L	0.1	1500	10	N	N	10	L	2	50	N	N	N	200	70	7	20	N	300	N	5	100	N
4AR0013L	5	0.03	L	0.02	1500	50	500	N	15	L	2	70	L	N	N	200	N	10	L	N	700	N	5	500	N
4AR0013M	5	0.05	N	0.03	1500	5	N	N	50	N	3	N	L	N	N	10	30	50	20	N	200	N	5	100	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
L	N	70	200	100	N
L	N	70	500	100	N
L	N	100	200	150	N
15	N	70	1500	150	N
10	L*	150	2000	70	N
L	L*	50	1500	70	N
10	N	100	3000	100	N
L	L*	50	1000	100	N
L	N	70	N	70	N
10	N	70	700	100	N
L	L*	70	N	100	N
L	L	50	500	100	N
10	L*	70	200	150	N
10	L	70	300	200	N
10	L*	50	300	100	N
10	N	100	500	100	N
10	2000	5	200	30	N
10	L	70	1000	70	N
10	L*	15	2000	10	N
10	N	100	1000	20	N
L	N	30	500	70	N
10	L	50	300	200	N
10	2000	70	700	10	L
10	L	50	500	100	N
10	L	50	1000	70	N
10	N	70	300	70	N
L	L	100	500	200	N
L	N	50	500	70	N
10	70	20	L	150	N
L	L	100	700	150	N
L	N	50	200	100	N
L	L	20	200	150	N
L	L	100	300	100	N
L	N	50	500	100	N
10	N	50	700	300	N
10	N	50	500	70	N
L	N	70	700	200	N
10	N	100	300	100	N
L	N	50	500	100	N
10	N	30	500	100	N
10	N	70	700	100	N
L	L	20	N	100	N
10	N	50	L	100	N
10	L	50	500	200	N
10	N	30	L	70	N
10	N	70	700	70	N
L	50	100	300	100	N
L	N	30	500	L	N
10	L	30	500	70	N
L	N	70	500	200	N
L	N	50	500	30	N
L	N	100	300	100	N

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Intensely Altered Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(1000) Sb	(5) Sc	(10) Sn	(100) Sr
4AR0013P		0.1	L	0.07	2000	30	N	N	30	20	2	50	L	N	N	100	100	10	L	N	500	N	5	300	N
4AR0013Q	5	0.07	0.5	0.015	2000	20	N	N	20	L	2	50	L	N	N	100	30	20	L	N	500	N	5	100	N
4AR0013R	7	0.1	L	0.1	2000	2	N	N	20	N	1	L	N	N	N	100	150	N	L	N	300	N	5	150	N
4AR0013S	0.5	N	N	L	700	0.7	N	N	N	N	L	N	N	N	N	30	N	N	N	N	100	N	N	70	N
4AR0013T	10	0.07	N	0.07	3000	1	N	N	10	N	2	N	N	N	N	150	100	N	N	N	150	N	5	1000	N
4AR0015A	5	0.07	0.5	0.15	1500	1.5	N	N	15	70	1.5	L	50	N	N	500	200	L	20	N	500	N	5	500	N
4FR00016A	3	0.05	N	0.01	1000	L	N	N	L	150	5	N	N	20	N	15	N	7	L	N	15	N	7	50	L
4FR00016B	5	0.07	N	0.07	2000	2	N	N	L	50	5	N	N	N	N	50	100	N	L	N	700	N	10	100	N
4FR00016C	5	0.02	N	0.015	2000	N	N	N	10	50	5	N	N	N	N	7	N	N	L	N	10	N	10	30	100
4FR00016D	5	0.05	N	0.01	2000	N	N	N	20	30	10	N	N	N	N	7	50	N	L	N	20	N	10	70	L
4FR00017C	1.5	0.05	0.05	0.05	500	0.5	N	N	L	150	5	N	N	N	N	N	100	N	L	N	30	N	5	15	L
4FR00018B	5	0.07	0.5	0.05	1500	3	N	N	30	20	1.5	N	N	N	N	50	150	N	30	N	L	N	30	200	N
4FR00019A	1.5	0.3	L	0.05	300	0.7	L	N	500	20	1	N	N	5	L	150	N	N	N	5	N	N	5	15	N
4FR0027A	3	0.05	N	0.015	1500	7	N	N	30	L	20	N	N	N	N	30	50	N	30	N	300	N	5	100	N
4FR0027B	5	0.03	L	0.01	1000	0.5	N	N	50	70	20	N	N	N	N	5	N	N	30	N	150	N	5	100	N
4FR0027C	1	0.02	0.1	0.01	200	N	N	N	300	N	3	N	N	N	N	L	N	N	20	N	50	N	5	20	N
4FR0032C	1	0.03	0.05	0.01	100	N	N	N	50	20	3	N	N	N	N	N	N	N	L	N	30	N	5	10	N
4FR0032D	3	0.05	0.05	0.07	200	L	N	N	G1000	N	15	15	N	N	N	50	150	N	L	N	20	N	10	30	N
4FR0036A	5	0.07	N	0.1	2000	1.5	N	N	L	500	5	N	N	N	N	15	100	10	L	N	700	N	5	100	N
4FR0039B	5	2	2	0.15	1000	N	N	N	L	300	L	N	N	50	200	20	70	N	N	20	L	N	20	N	300
4FR0040C	5	0.05	L	0.07	5000	N	N	N	L	70	10	N	N	N	N	50	100	N	20	N	100	N	10	30	L
4FR0040D	5	0.03	L	0.1	5000	N	N	N	L	200	15	N	L	N	N	10	200	N	20	N	200	N	7	150	N
4FR0042	3	0.05	0.1	0.1	1500	0.7	N	N	20	70	20	N	N	N	N	15	200	N	20	N	150	N	7	100	N
4FR0044B	3	0.1	0.05	0.05	1500	0.5	N	N	50	50	5	N	N	N	N	10	100	N	L	N	200	N	5	150	N
4FR0050A	2	0.7	0.1	0.3	500	N	N	N	150	300	5	N	N	7	N	10	50	10	L	20	10	N	10	N	70
4FR0051B	5	0.5	0.2	0.2	1000	L	N	N	L	150	3	N	N	10	100	15	50	N	L	20	150	N	10	50	L
4FR0061A	3	0.1	1.5	0.1	2000	0.5	N	N	50	30	7	N	N	N	N	70	100	N	L	N	300	N	5	150	N
4FR0061B	3	0.15	0.3	0.1	2000	0.7	N	N	70	50	10	N	N	N	N	70	150	N	L	N	300	N	7	200	N
4FR0061C	3	0.1	0.5	0.15	2000	3	N	N	50	100	15	N	N	N	N	100	150	N	20	N	700	N	7	200	N
4FR0074A	2	0.05	L	0.05	1000	0.5	N	N	20	200	7	N	N	N	N	5	150	N	L	N	150	N	5	100	N
4FR0076B	5	0.05	N	0.1	2000	0.7	N	N	50	50	2	N	N	N	N	150	150	N	20	N	500	N	7	700	N
4FR0077C	5	0.03	N	0.02	1000	N	N	N	15	L	2	N	N	N	N	100	50	N	20	N	50	N	7	70	N
4FR0082A	3	0.02	0.7	0.02	1000	15	N	N	50	70	2	N	N	N	N	100	50	10	L	N	100	N	7	1000	N
4FR0085	1	0.07	0.1	0.05	150	N	N	N	100	200	3	N	N	N	N	N	70	N	20	N	30	N	7	15	N
4FR4001C	5	0.05	L	0.05	500	2	1000	N	200	100	15	50	N	N	N	150	200	N	L	N	50	N	5	200	N
4FR4007A	5	0.07	L	0.02	2000	N	N	N	L	50	30	N	N	N	N	L	50	N	L	N	50	N	5	100	N
4FR4030A	3	0.05	L	0.05	2000	N	N	N	70	L	3	N	N	N	N	10	100	10	20	N	50	N	7	100	N
4FR4030B	3	0.07	0.1	0.07	2000	N	N	N	50	50	3	N	N	N	N	7	100	30	L	N	200	N	5	100	N
4FR4031B	1	0.03	L	0.1	300	N	N	N	15	300	3	N	N	7	N	N	150	N	20	N	50	N	10	10	L
4FR4031C	2	0.03	0.2	0.02	700	L	N	N	100	20	10	N	N	N	N	7	50	N	20	N	70	N	L	100	N
4FR4035A	5	0.05	0.15	0.03	2000	3	N	N	150	300	15	L	L	20	N	50	150	N	L	N	150	N	10	100	100
4FR4036A	3	0.05	L	0.02	1500	0.7	N	N	50	200	10	N	N	20	N	5	70	N	N	N	70	N	7	70	N
4FR4037A	7	0.05	0.7	0.03	5000	0.7	N	N	L	100	20	N	N	20	N	5	100	N	L	N	150	N	7	1000	100
4FR4037B	10	0.03	1.5	0.03	5000	N	N	N	10	L	15	N	N	20	N	L	30	10	L	N	150	N	7	100	150
4FR4037C	10	0.03	N	0.015	5000	1	N	N	L	L	10	N	N	20	N	150	30	N	N	N	300	N	7	700	N
4FR4040A	3	0.05	0.2	0.03	5000	1	N	N	L	20	150	L	L	20	N	7	100	N	L	N	300	N	7	100	300
4FR4040B	5	0.05	5	0.03	5000	1	N	N	L	L	20	N	N	20	N	7	150	N	L	N	300	N	7	100	300
4FR4041B	1.5	0.07	L	0.005	2000	1.5	N	N	10	30	10	L	L	20	N	15	70	N	N	N	100	N	7	150	N
4FR4042A	7	0.07	L	0.07	5000	0.7	N	N	L	150	15	N	N	20	N	70	200	N	L	N	500	N	10	70	L
4FR4042B	5	0.05	0.15	0.05	5000	N	N	N	15	L	10	N	N	20	N	15	500	N	L	N	70	N	7	100	N
4FR4043A	5	0.07	L	0.07	1500	N	N	N	15	100	10	N	N	20	N	10	200	N	L	N	100	N	7	150	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
10	L	70	700	100	N
L	N	100	1000	50	N
L	N	100	1000	100	N
L	N	N	N	10	N
L	N	50	1000	100	N
10	N	70	1500	200	N
N	N	70	L	30	N
10	N	100	700	70	N
L	N	70	L	50	N
L	N	100	L	50	N
L	N	70	N	300	N
L	N	300	L	70	N
15	N	10	N	50	N
30	N	100	500	150	N
N	N	150	500	100	N
N	N	100	N	50	N
L	N	100	N	20	N
L	L	100	N	100	N
10	N	50	1000	150	N
100	N	70	N	150	N
10	N	50	1000	100	N
10	N	100	1000	100	N
N	N	150	500	70	N
L	N	50	200	100	N
70	N	30	L	200	N
50	N	30	1000	200	N
10	N	50	200	300	N
10	N	70	200	200	N
15	L	100	200	200	N
L	N	100	200	200	N
L	N	150	700	100	N
N	N	100	L	100	N
N	N	150	500	50	N
N	N	200	N	150	N
L	N	150	N	50	N
N	N	150	500	70	N
10	N	100	L	700	N
10	N	70	500	100	N
15	N	30	N	300	N
N	N	100	500	100	N
10	N	100	500	150	N
L	N	70	L	50	N
10	N	100	700	70	N
L	N	150	500	100	N
L	N	100	1500	70	N
L	N	70	7	100	N
L	N	100	1000	70	N
10	N	50	500	30	N
L	N	200	2000	70	N
L	N	70	700	500	N
10	N	100	500	100	N

Intensely Altered Rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR4043B	5	0.07	L	0.07	2000	2	N	N	10	50	7	N	N	20	N	70	150	N	L	N	300	N	7	150	N
4FR4045A	3	0.05	L	0.05	2000	3	N	N	L	30	1.5	20	20	20	N	1000	200	N	L	N	500	N	L	150	N
4FR4045B	3	0.07	0.3	0.1	100	2	N	N	30	L	1	N	10	20	N	1000	150	N	L	N	500	N	7	70	N
4MZ00010B	3	0.02	L	0.02	300	7	2000	N	100	L	5	70	N	N	N	200	200	7	L	N	1000	N	L	5	N
4MZ00012A	15	0.03	N	0.07	2000	1	N	N	L	100	2	N	N	N	N	200	300	N	L	N	200	N	5	5	N
4MZ00013A	10	0.03	N	0.05	500	N	N	N	10	50	2	N	N	N	N	10	100	N	L	N	15	N	5	5	N
4MZ00006A	5	0.02	0.5	0.02	1000	0.7	N	N	10	L	7	L	N	N	N	50	50	N	L	N	50	N	5	5	N
4MZ00006B	15	0.02	N	0.03	5000	0.7	N	N	L	L	5	L	20	N	N	100	50	N	L	N	1500	N	5	5	N
4MZ00017C	5	0.03	L	0.05	1000	L	L	N	200	200	5	N	N	N	N	100	100	N	100	N	N	N	7	200	N
4MZ00017D	5	0.02	L	0.02	200	5	1000	N	61000	L	10	300	N	N	N	200	100	N	100	N	150	N	5	200	N
4MZ00018C	2	L	0.07	0.05	1500	1.5	N	N	150	L	2	L	N	N	N	150	200	N	L	N	100	N	L	30	N
4MZ00020AA	3	0.05	0.07	0.05	1500	2	N	N	L	200	10	10	N	N	N	30	200	N	L	15	700	N	7	30	30
4MZ00020D	3	0.05	0.07	0.03	1500	10	N	N	50	50	15	20	L	10	N	200	150	N	L	N	300	N	7	70	N
4MZ00020H	10	0.05	L	0.02	5000	1	N	N	L	50	7	N	L	N	N	200	100	5	L	N	1000	N	7	150	N
4MZ00020I	10	0.05	L	0.03	5000	0.7	N	N	10	150	10	N	L	N	N	100	100	N	L	N	1000	N	7	50	N
4MZ00020J	10	0.05	L	0.03	5000	0.7	N	N	10	200	7	N	20	N	N	100	100	N	L	N	700	N	10	10	N
4MZ00020L	10	0.05	N	0.02	5000	5	N	N	L	L	5	50	L	7	N	500	150	N	N	N	1000	N	7	500	N
4MZ00020M	5	0.02	N	0.015	2000	0.5	N	N	150	20	5	N	N	N	N	300	N	N	L	N	200	N	5	30	N
4MZ00020O	7	0.05	N	0.05	5000	L	N	N	10	50	10	N	N	N	N	50	70	N	30	N	150	N	7	70	N
4MZ00020P	10	0.05	N	0.03	2000	L	N	N	L	L	10	N	N	N	N	70	100	N	L	N	100	N	7	20	N
4MZ00020R	5	0.05	L	0.07	2000	0.5	N	N	15	50	10	N	N	N	N	30	150	L	20	N	700	N	7	70	N
4MZ00020S	3	0.03	N	0.02	1000	1	N	N	150	L	15	N	N	N	N	100	50	N	20	N	150	N	7	100	N
4MZ00020U	3	0.05	L	0.07	1500	2	N	N	15	50	15	N	N	N	N	150	70	5	20	N	700	N	7	70	N
4MZ00020V	3	0.05	L	0.07	1500	0.5	N	N	20	30	20	N	N	N	N	70	100	N	20	N	100	N	7	50	N
4MZ00020W	5	0.05	L	0.07	2000	0.7	N	N	20	70	15	L	N	N	N	70	100	N	30	N	1000	N	7	70	N
4MZ00020Y	5	0.05	L	0.07	2000	L	N	N	20	30	20	L	N	N	N	20	100	7	20	N	700	N	7	70	N
4MZ00020Z	1	0.02	L	0.02	700	1	N	N	N	100	7	N	N	N	N	L	N	N	N	N	100	N	L	L	L
4MZ00032A	10	0.05	1.5	0.05	5000	N	N	N	50	70	5	N	N	N	N	N	100	N	L	N	10	N	5	700	N
4MZ00033A	10	0.05	L	0.07	1000	N	N	N	20	200	10	N	N	L	N	L	100	N	20	N	10	N	5	100	N
4MZ00034A	10	0.1	L	0.1	2000	L	N	N	10	500	15	N	N	N	N	L	200	N	L	N	50	N	7	100	N
4MZ0035	10	0.1	N	0.1	2000	1	N	N	50	30	2	N	N	N	N	10	100	N	L	N	100	N	N	200	N
4MZ00037C	10	0.1	L	0.05	3000	L	N	N	20	150	3	N	20	10	N	10	150	N	L	N	700	N	5	50	N
4MZ00045A	3	0.1	N	0.05	5000	1	N	N	10	50	1.5	N	30	30	N	200	70	5	N	N	300	N	N	30	N
4MZ00048D	3	0.05	N	0.015	1500	N	N	N	50	20	20	N	N	N	N	L	N	N	30	N	70	N	N	150	N
4MZ00050A	5	0.05	0.5	0.1	500	N	N	N	61000	20	7	N	N	N	N	7	100	5	L	N	L	N	5	200	N
4MZ00050B	7	0.07	N	0.01	2000	5	700	N	10	100	15	10	N	N	N	150	N	N	L	N	150	N	5	500	N
4MZ00050C	5	0.03	0.5	0.03	5000	15	N	N	L	50	7	15	L	N	N	20	30	500	20	N	1500	N	5	20	N
4MZ0067	1	0.03	L	0.05	300	L	N	N	20	150	3	N	N	N	N	L	50	N	50	N	10	N	5	100	N
4MZ0068	7	0.1	0.07	0.02	3000	7	N	N	N	30	10	50	N	5	N	70	N	7	N	N	700	N	5	200	N

(10) V	(50) W	(10) Y	(200) Zn	(10) Zr	(100) Th
10	N	100	1000	100	N
L	[illegible]	70	2000	100	N
L	N	100	L	100	N
N	15L	150	700	70	N
N	N	150	1500	100	N
N	N	100	L	50	N
N	N	70	500	15	N
N	N	70	2000	100	N
N	N	100	200	150	N
N	N	100	N	200	N
N	N	50	500	200	N
N	N	100	500	700	N
N	N	100	2000	30	N
N	N	150	2000	100	N
N	N	100	1500	70	N
N	N	100	2000	100	N
N	N	100	3000	200	N
N	N	30	700	30	N
N	N	100	700	200	N
N	N	100	1500	100	N
N	L*	100	300	70	150
N	N	100	300	50	N
N	L*	100	200	150	N
N	N	100	L	300	N
N	N	100	200	70	L
N	L*	100	500	50	L
N	N	20	L	100	N
N	N	200	300	150	N
N	N	70	200	100	N
10	N	200	200	300	N
N	N	50	300	70	N
N	N	70	1500	50	N
10	N	15	2000	100	N
N	N	100	L	150	N
N	N	300	500	70	N
N	N	150	1000	30	N
N	N	150	N	150	N
N	N	50	1000	100	N
N	N	70	1500	100	N

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Intrusive Breccia

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR0050E	2	0.1	L	0.01	150	0.7	N	N	15	200	5	N	N	N	N	N	N	200	20	N	50	N	5	L	N
4FR0052B	1	0.3	L	0.07	300	N	N	N	10	30	1	N	N	5	10	L	N	N	N	L	L	N	N	N	N
4MZ000150	1	0.07	L	0.02	500	0.5	N	N	30	300	7	N	N	N	N	L	50	N	L	N	70	N	7	7	N

(10)	(50)	(10)	(200)	(10)	(100)
V	W	Y	Zn	Zr	Th
N	N	50	N	50	N
15	[illegible]	L	N	100	N
N	N	150	N	70	N

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Limestone

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(100) Sb	(5) Sc	(10) Sn	(100) Sr
4FR0055C	0.2	0.5	20	0.02	100	N	N	N	20	20	N	N	N	N	N	L	N	N	N	N	50	N	N	N	1000
4FR0055D	3	2	5	0.5	2000	L	N	N	15	150	1	N	N	20	N	L	30	N	L	70	30	N	20	100	1000

(1ø)	(5ø)	(1ø)	(2øø)	(1ø)	(1øø)
V	W	Y	Zn	Zr	Th
L	N	L	N	1ø	N
1øø	N	2ø	N	5ø	N

Veins and other rocks

	(.05) Fe %	(.02) Mg %	(.05) Ca %	(.002) Ti %	(10) Mn	(.5) Ag	(200) As	(10) Au	(10) B	(20) Ba	(1) Be	(10) Bi	(20) Cd	(5) Co	(10) Cr	(5) Cu	(20) La	(5) Mo	(20) Nb	(5) Ni	(10) Pb	(1000) Sb	(5) Sc	(10) Sn	(100) Sr
4MI9701R	5	0.05	0.15	0.02	2000	7	N	N	20	20	50	20	20	N	N	50	100	20	30	N	300	N	10	150	N
4FR4011F	0.5	0.1	L	0.05	100	N	N	N	L	20	N	N	N	N	L	7	N	N	N	5	N	N	L	N	N

(10)	(50)	(10)	(200)	(10)	(100)
V	W	Y	Zn	Zr	Th
N	N	150	1000	100	N
10	N	L	N	20	N

Table 2.-- Summary statistics of selected elements for the six main rock types from the Lime Peak area. Number of samples. n; lower quartile, lq; median, m; upper quartile uq. Units are parts per million for all elements except Fe, Mg, Ca and Ti which are percent.

Coarse-grained Equigranular Biotite Granite

n=11	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	0.7	0.05	0.05	0.05	150	N	10
m.	1	0.07	0.1	0.07	200	N	10
u.q.	2	1	0.2	0.15	300	N	15

n=11	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	20	1.5	N	N	N	N	100
m.	100	2	N	N	N	N	100
u.q.	300	5	N	10	N	5	100

n=11	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	L	N	15	5	L	N
m.	N	L	N	20	5	L	N
u.q.	N	20	N	30	10	10	L

n=11	V	Y	Zn	Zr
l.q.	N	50	N	70
m.	L	70	N	70
u.q.	10	100	N	100

Porphyritic Biotite Granite

n=53	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	0.7	0.02	L	0.01	100	N	10
m.	1	0.05	0.07	0.03	200	N	20
u.q.	1.5	0.07	0.1	0.05	500	L	50

n=53	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	L	3	N	N	N	N	20
m.	50	5	N	N	N	L	70
u.q.	150	10	N	N	N	L	150

n=53	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	L	N	20	L	L	N
m.	N	20	N	50	5	10	N
u.q.	N	30	N	50	7	15	N

n=53	V	Y	Zn	Zr
l.q.	N	50	N	50
m.	L	100	N	100
u.q.	L	150	N	100

Quartz Feldspar Porphyry

n=25	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	0.7	0.03	L	0.02	150	N	15
m.	1	0.05	0.05	0.02	300	N	30
u.q.	1	0.1	0.1	0.05	500	L	50

n=25	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	50	5	N	N	N	N	L
m.	70	10	N	N	N	N	50
u.q.	100	15	N	N	N	L	70

n=25	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	20	N	20	5	15	N
m.	N	20	N	50	5	20	N
u.q.	N	30	N	70	7	50	N

n=25	V	Y	Zn	Zr
l.q.	N	70	N	70
m.	L	100	N	100
u.q.	L	100	N	100

Intermediate Dikes

n=10	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	3	0.07	1	0.3	300	N	N
m.	3	2	1.5	0.3	1000	N	L
u.q.	3	3	2	0.5	1500	N	15

n=10	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	150	L	N	N	150	7	N
m.	300	L	N	30	150-200	7-10	N
u.q.	500	1.5	N	50	200	30	100

n=10	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	N	10	L	15	N	5
m.	N	N	15	15	20	N	200
u.q.	N	N	20	50	20	20	300

n=10	V	Y	Zn	Zr
l.q.	70	20	N	70
m.	100	30-50	N	70
u.q.	100	70	L	100

Hornfels and Quartzose Country Rocks

n=22	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	2	0.5	L	0.15	200	N	20
m.	2	0.7	L	0.2	300	N	70
u.q.	3	1	0.05	0.3	700	N	100

n=22	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	100	1	1	N	30	10	N
m.	300	1	1	5	70	30	50
u.q.	500	1.5	1.5	15	150	70	100

n=22	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	N	10	L	5	N	N
m.	N	N	30	30	10	L	L
u.q.	N	L	50	50	20	10	L

n=22	V	Y	Zn	Zr
l.q.	50	15	N	100
m.	100	30	N	100
u.q.	150	30	L	200

Intensely Altered Rocks

n=142	Fe	Mg	Ca	Ti	Mn	Ag	B
l.q.	3	0.05	L	0.02	1000	L	10
m.	5	0.05	L	0.05	2000	1	20
u.q.	5	0.07	0.1	0.07	2000	5	50

n=142	Ba	Be	Bi	Co	Cr	Cu	La
l.q.	L	3	N	N	N	10	70
m.	30	5	N	N	N	50	100
u.q.	70	10	15	N	N	100	150

n=142	Mo	Nb	Ni	Pb	Sc	Sn	Sr
l.q.	N	L	N	100	5	50	N
m.	N	L	N	200	7	100	N
u.q.	10	20	N	500	7	150	N

n=142	V	Y	Zn	Zr
l.q.	N	50	200	70
m.	L	70	500	100
u.q.	10	100	700	150