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Analyses of samples from the Lava Creek mining district,  
Blaine and Butte Counties, Idaho

By

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## Location of study area

The Lava Creek mining district is just north of Craters of the Moon National Monument in the southern Pioneer Mountains, central Idaho (fig. 1). The district consists of two main mined areas, one along Lava and South Lava Creeks, and the other along Champagne Creek, plus some mines south, southwest, and northwest of these areas.

## Purpose and description of sampling program

A reconnaissance sampling program was undertaken as part of a study of the geology of the Grouse 15-minute topographic quadrangle (Betty Skipp, unpub. data, 1981), to provide current analytical data for this mining district. At the time this sampling program was done (1979), no data were available. The mining activities, geologic setting, and mineralogy of the district were described by A. L. Anderson (1929) more than 50 years ago.

## Sample media and localities

A total of 93 samples were collected from 85 sites (pl. 1). Eighty-seven were rock, three were soil, two were panned concentrates of stream sediments, and one was drill cuttings. The sample sites were chosen in two ways. In the Champagne Creek area, samples were collected about 1,000 ft apart along two traverses trending north and N. 45° W. These traverses extended across the apparent longest dimensions of the mined area north of Champagne Creek. For control, some samples of soil (79-BH-9, 15, and 17) and apparently unmineralized rock were collected on the traverses and from areas around some of the mines, approximately 1,000 ft away from them. Samples of highly mineralized and altered rock (as indicated by the presence of pyrite, galena, chalcopyrite, sphalerite, and other metallic minerals, and iron staining and bleaching of country rock) were sought in mine dumps and prospect pits throughout the district. A mine in the St. Louis Group (Champagne Creek area) was active at the time of sample collection, and several samples were obtained in the mine (79-BH-33 to 36, 39). Two rock samples (79-BH-37, 38) were obtained from a tunnel south of this mine in the St. Louis Group. The drill-cuttings sample (79-BH-21) came from about the 120-ft level in an exploratory hole being drilled at the Reliance Mine (Group) property. Two stream-sediment samples (79-BH-23, 44) were taken from dry stream beds below the Reliance and Golden Chariot mines.

## Sample preparation and analysis

The rock samples were reduced to minus 6 mm in a jaw crusher, split using a Jones<sup>1</sup> splitter, and ground to minus 0.15 mm in a vertical pulverizer equipped with ceramic plates. The stream-sediment and soil samples were air dried in cloth bags and sieved to minus 0.18 mm using stainless steel sieves. The samples were analyzed for 31 elements by an emission

<sup>1</sup>Use of trade names is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

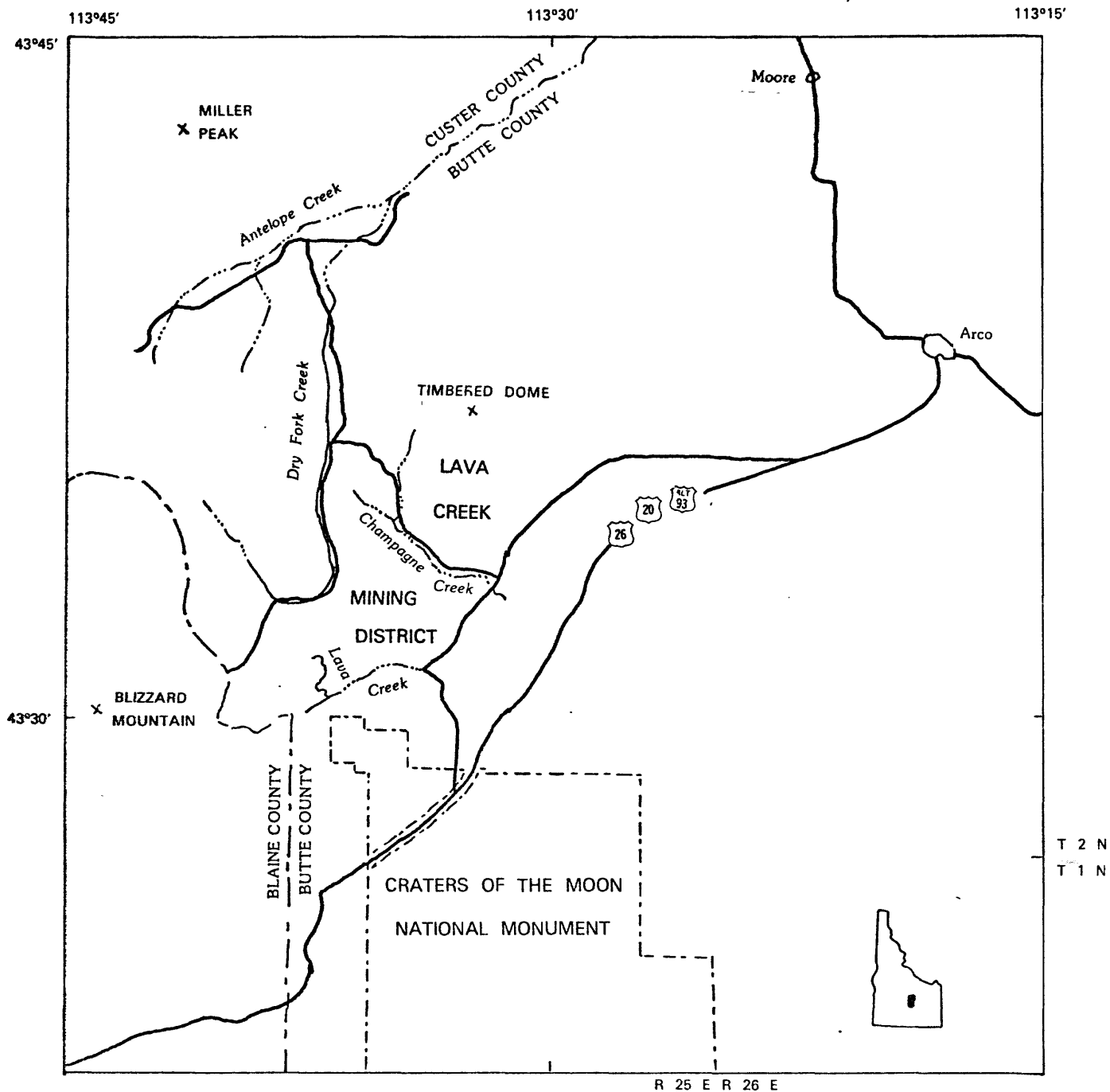


Figure 1. Index map showing the location of the Lava Creek mining district, Idaho

spectrographic method (Grimes and Marranzino, 1968) and for gold, cadmium, bismuth, zinc, and antimony by an atomic-absorption method (Ward and others, 1969), and for mercury by a vapor-detector technique (Vaughn and McCarthy, 1964).

The semiquantitative spectrographic analytical values in tables 1 and 2 are reported in six steps for each order of magnitude. These steps are 10, 7, 5, 3, 2, and 1.5 and so forth. The precision of the method has been shown to be within one step 83 percent of the time, and within two steps 96 percent of the time (Motooka and Grimes, 1976). The lower limits of determination of the spectrographic method for the elements reported in tables 1 and 2 are:

Calcium....	0.05 percent	Cadmium.....	20 ppm	Niobium.....	20 ppm
Iron.....	0.05 percent	Chromium.....	10 ppm	Scandium....	5 ppm
Magnesium..	0.02 percent	Cobalt.....	5 ppm	Silver.....	0.5 ppm
Titanium...	0.002 percent	Copper.....	5 ppm	Strontium...	100 ppm
Antimony...	100 ppm	Gold.....	10 ppm	Tin.....	10 ppm
Arsenic....	200 ppm	Lanthanum.....	20 ppm	Thorium.....	100 ppm
Barium.....	20 ppm	Lead.....	10 ppm	Tungsten....	50 ppm
Beryllium..	1 ppm	Manganese.....	10 ppm	Vanadium....	10 ppm
Bismuth....	10 ppm	Molybdenum....	5 ppm	Yttrium.....	10 ppm
Boron.....	10 ppm	Nickel.....	5 ppm	Zinc.....	200 ppm
.....		.....		Zirconium...	10 ppm

The lower limit of determination of the atomic-absorption technique for gold is 0.05 ppm; for cadmium, 0.05 ppm; for bismuth, 1 ppm; for zinc, 1 ppm; and for antimony, 1 ppm. The lower limit of mercury determination by vapor detector is 0.02 ppm.

All analytical data are stored in the U.S. Geological Survey RASS (Rock Analysis Storage System) computer file (VanTrump and Miesch, 1977).

#### REFERENCES CITED

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- Ward, F. N., Nakagawa, H. M., Harms, T. F., and Van Sickle, G. H., 1969, Atomic-absorption methods of analysis useful in geochemical exploration: U.S. Geological Survey Bulletin 1289, 45 p.

Table 1.--Analytical data for rock samples from the Lava Creek mining district, Idaho

[s, spectrographic analyses; aa, atomic-absorption analyses; inst, vapor-detector analyses; ppm, parts per million; pct., percent; <, detected, but below limit of determination or value shown; >, greater than value shown; N, not detected at level of detection. Spectrographic analyses by D. J. Grimes, atomic-absorption analyses of Au, Cd, Bi, and Zn by Robert Vaughn, atomic-absorption analyses of Sb by Belinda Arbogast, and vapor-detector analyses by Robert Vaughn]

Table 2.--Analytical data for samples of soils, stream sediments, and drill cuttings from the Lava Creek mining district, Idaho

[s, spectrographic analyses; aa, atomic-absorption analyses; inst, vapor-detector analyses; ppm, parts per million; pct., percent; <, detected but below limit of determination or value shown; N, not detected at level of detection]

Table 1.--Analytical data for samples from the Lava Creek mining district, Idaho

Sample	Latitude	Longitude	Fe-pct. S	Mg-pct. S	Ca-pct. S	Ti-pct. S	Mn-ppm S	Ag-ppm S	As-ppm S	Au-ppm S	R-ppm S	Ba-ppm S
Rocks												
79BH1	43 35 18	113 34 13	2.00	.10	.30	.200	150	.5	N	N	20	1,000
79BH2	43 35 21	113 34 28	5.00	<.02	.05	.300	20	70.0	200	N	N	300
79BH3	43 35 34	113 34 17	1.50	<.02	.05	.700	15	7.0	N	N	N	700
79BH4	43 35 17	113 34 28	5.00	<.02	<.05	.200	50	1.0	200	N	N	300
79BH5	43 36 6	113 34 25	7.00	.02	.05	.150	70	100.0	N	N	10	2,000
79BH6	43 36 3	113 34 24	.70	<.02	<.05	.500	15	.30.0	N	N	N	200
79BH7	43 35 8	113 34 29	.70	.02	.30	.500	20	<.5	N	N	10	1,500
79BH8	43 34 59	113 34 27	1.50	.15	.50	.300	100	<.5	N	N	20	1,500
79BH10A	43 35 48	113 34 20	1.50	<.02	.07	.500	10	100.0	N	N	N	700
79BH10B	43 35 48	113 34 20	5.00	<.02	.05	.500	15	300.0	N	N	<10	1,500
79BH11	43 35 56	113 34 8	5.00	.70	2.00	.300	1,000	2.0	N	N	N	1,500
79BH12	43 35 59	113 34 27	15.00	.07	.15	.050	1,500	10.0	<200	N	N	>5,000
79BH13A	43 35 22	113 34 44	1.50	<.02	<.05	.700	50	15.0	N	N	N	200
79BH13B	43 35 22	113 34 44	15.00	N	N	.100	30	200.0	300	<10	<10	>5,000
79BH14	43 35 32	113 34 26	2.00	.70	1.50	.500	700	2.0	N	N	10	1,000
79BH16	43 35 47	113 34 15	2.00	<.02	.07	.700	15	50.0	N	N	N	1,000
79BH18	43 36 26	113 34 19	2.00	.70	1.50	.300	500	N	N	N	20	1,000
79BH19	43 36 6	113 35 28	3.00	1.00	1.00	.500	700	N	N	N	<10	1,000
79BH20	43 36 4	113 35 25	.30	.20	<.05	.300	30	.7	N	N	50	700
79BH22	43 35 59	113 35 11	3.00	1.50	.15	.700	1,000	N	N	N	<10	100
79BH24	43 35 51	113 35 7	5.00	1.00	2.00	.700	700	.5	N	N	<10	1,000
79BH25	43 35 48	113 34 58	.70	.15	.10	.700	70	1.5	N	N	50	300
79BH26	43 35 43	113 34 59	5.00	<.02	.10	.500	30	7.0	<200	N	15	300
79BH27A	43 35 42	113 34 58	2.00	.30	.70	.500	500	1.0	N	N	70	300
79BH27B	43 35 42	113 34 58	15.00	1.00	3.00	.007	>5,000	<.5	N	N	N	70
79BH28	43 35 40	113 35 17	1.50	.30	.05	.500	700	.5	N	N	30	700
79BH29	43 35 34	113 35 15	2.00	1.00	.20	.700	700	<.5	N	N	10	1,500
79BH30A	43 35 35	113 35 17	1.50	.15	<.05	.020	1,500	1,000.0	1,500	N	200	50
79BH30B	43 35 35	113 35 17	3.00	.02	<.05	.500	20	10.0	<200	N	10	150
79BH31	43 35 34	113 34 56	2.00	1.00	2.00	.500	700	<.5	N	N	<10	1,000
79BH32	43 36 14	113 33 45	3.00	.70	1.00	.500	700	<.5	N	N	10	700
79BH33	43 35 40	113 35 17	5.00	1.00	1.50	.500	1,000	.5	N	N	20	700
79BH34	43 35 40	113 35 17	10.00	1.00	3.00	.100	3,000	700.0	700	N	N	200
79BH35	43 35 40	113 35 17	10.00	.70	2.00	.100	3,000	500.0	700	N	N	200
79BH36	43 35 40	113 35 17	1.50	1.50	3.00	.020	3,000	1,000.0	1,000	N	N	50
79BH37	43 35 37	113 35 16	1.00	<.02	<.05	.100	100	700.0	300	N	N	500
79BH38	43 35 37	113 35 17	1.50	.15	.30	.150	500	500.0	300	N	N	150
79BH39	43 35 41	113 35 17	1.00	.70	1.50	.020	1,500	1,000.0	300	N	15	100
79BH40	43 35 41	113 35 17	7.00	1.00	2.00	.500	5,000	5.0	<200	N	10	700
79BH41	43 30 9	113 34 56	2.00	.50	3.00	.150	5,000	20.0	N	N	20	700

Table 1.--Continued

Sample	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sb-ppm s	Sc-ppm s
Rocks													
79BH1	1.5	N	N	<5	70	30	30	N	N	5	100	N	7
79BH2	<1.0	N	N	<5	150	300	50	5	N	<5	7,000	<100	15
79BH3	<1.0	10	N	<5	200	50	70	N	<20	N	200	N	10
79BH4	<1.0	N	20	7	50	100	30	N	N	10	2,000	<100	10
79BH5	<1.0	N	N	<5	70	300	50	N	N	<5	5,000	N	15
79BH6	N	N	30	<5	70	50	100	N	N	<5	3,000	N	15
79BH7	1.5	N	N	N	N	5	100	N	N	N	100	N	7
79BH8	2.0	N	N	7	<10	10	70	N	N	5	70	N	7
79BH10A	<1.0	20	N	5	100	50	30	7	N	5	200	<100	15
79BH10B	<1.0	30	N	20	70	300	50	15	N	50	500	100	15
79BH11	1.5	N	N	10	300	50	50	N	N	50	50	N	15
79BH12	1.0	N	70	30	20	70	<20	10	N	50	1,500	N	10
79BH13A	<1.0	<10	30	10	200	30	50	<5	N	15	3,000	<100	15
79BH13B	<1.0	150	N	<5	50	700	30	N	N	15	500	300	5
79BH14	1.5	N	N	15	10	20	30	N	N	7	50	N	10
79BH16	N	<10	N	7	50	70	50	20	N	<5	300	N	15
79BH18	1.5	N	N	10	100	70	30	N	N	20	30	N	10
79BH19	1.0	N	N	30	500	50	30	N	N	70	10	N	20
79BH20	1.0	N	N	N	10	N	50	<5	N	<5	100	N	5
79BH22	1.0	N	N	50	300	50	50	N	N	100	10	N	20
79BH24	1.0	N	N	30	300	100	30	N	N	70	30	N	15
79BH25	1.0	N	N	N	150	<5	50	N	N	N	150	N	15
79BH26	<1.0	N	N	N	150	150	70	N	N	<5	2,000	N	10
79BH27A	1.0	N	N	10	150	50	50	N	N	20	200	N	15
79BH27B	N	N	N	30	70	30	<20	N	N	50	100	N	30
79BH28	1.5	N	N	7	50	30	30	7	<20	<5	15	N	7
79BH29	1.0	N	N	20	15	20	30	N	N	30	20	N	10
79BH30A	N	N	>500	<5	<10	2,000	<20	N	N	N	>20,000	2,000	N
79BH30B	N	<10	20	20	200	100	50	N	N	70	2,000	N	15
79BH31	1.5	N	N	20	200	70	30	N	N	50	100	N	15
79BH32	1.0	N	N	15	300	70	30	N	N	70	100	N	15
79BH33	1.0	N	N	50	300	50	30	10	N	70	70	N	20
79BH34	N	700	20	30	150	10,000	30	15	N	70	>20,000	1,000	10
79BH35	<1.0	500	30	50	150	7,000	30	20	N	100	>20,000	1,500	10
79BH36	N	>1,000	300	10	20	3,000	<20	N	N	15	>20,000	1,500	<5
79BH37	N	10	>500	<5	30	5,000	20	N	N	10	>20,000	1,000	<5
79BH38	N	300	>500	7	30	1,500	<20	5	N	15	>20,000	500	5
79BH39	<1.0	700	>500	N	15	2,000	<20	10	N	<5	>20,000	1,500	N
79BH40	1.0	N	N	50	500	50	30	5	N	100	700	N	30
79BH41	2.0	N	100	15	30	50	20	N	N	5	20,000	N	7

Table 1. --Continued

Sample	Sn-ppm	Sr-ppm	V-ppm	W-ppm	Y-ppm	Zn-ppm	Zr-ppm	Th-ppm	Au-ppm	Hg-ppm	Zn-ppm	Cd-ppm	Bi-ppm	Sb-ppm
	S	S	S	S	S	S	S	S	aa	inst	aa	aa	aa	aa
Rocks														
79BH1	N	500	70	N	10	N	100	N	N	.12	15	.10	N	2
79BH2	N	2,000	150	N	30	N	150	N	.60	2.50	40	.05	1	34
79BH3	15	1,000	100	N	15	N	150	N	<.05	.26	5	<.05	8	8
79BH4	N	700	70	N	20	3,000	100	N	.65	2.00	2,500	19.00	1	29
79BH5	N	700	200	N	20	1,000	150	N	.05	>10.00	1,200	8.00	1	32
79BH6	N	1,000	150	N	30	2,000	150	N	N	>10.00	1,500	23.00	1	10
79BH7	N	300	20	N	20	N	200	N	N	.14	35	.20	N	2
79BH8	N	200	30	N	30	N	150	N	N	.04	60	.15	N	1
79BH10A	<10	1,000	70	N	15	N	150	N	.20	.75	5	.10	35	25
79BH10B	70	1,000	70	N	15	N	150	N	.15	6.00	20	1.20	40	38
79BH11	N	500	100	N	20	N	150	N	N	.10	100	.15	1	1
79BH12	N	150	70	N	50	>10,000	20	N	.05	.40	20,000	28.00	N	7
79BH13A	20	1,500	200	N	20	5,000	150	N	.15	.28	4,200	27.00	4	35
79BH13B	100	1,000	20	N	<10	N	20	N	1.50	>10.00	120	1.10	200	270
79BH14	N	500	100	N	30	N	100	N	N	.20	90	.30	1	4
79BH16	<10	1,000	150	N	20	N	150	N	.50	2.50	35	.10	6	25
79BH18	N	500	100	N	20	N	100	N	N	.22	100	.10	1	1
79BH19	N	150	100	N	20	N	100	N	N	.10	65	.15	N	1
79BH20	<10	<100	30	N	15	N	100	N	N	.14	30	.10	1	2
79BH22	N	N	100	N	30	200	150	N	N	.08	175	.25	1	2
79BH24	N	700	100	N	30	N	150	N	N	.08	60	.05	N	2
79BH25	N	100	100	N	20	N	200	N	N	.65	N	.05	3	2
79BH26	N	1,500	100	N	15	<200	150	N	N	.35	140	3.00	3	7
79BH27A	N	100	100	N	15	200	100	N	N	.35	180	1.00	2	4
79BH27B	N	100	150	N	30	500	N	N	N	.40	350	1.70	N	2
79BH28	N	N	70	N	15	<200	100	N	N	.04	130	1.10	N	2
79BH29	N	100	100	N	30	700	150	N	N	.22	740	10.00	N	2
79BH30A	70	N	N	N	N	>10,000	70	N	.05	.40	40,000	350.00	1	770
79BH30B	N	500	100	N	30	2,000	150	N	N	1.20	3,300	30.00	10	15
79BH31	N	500	100	N	30	N	150	N	N	.65	70	.60	N	3
79BH32	N	300	100	N	20	N	100	N	N	.06	80	1.30	N	2
79BH33	N	150	150	N	20	N	70	N	N	.35	80	.55	1	7
79BH34	500	1,000	150	N	100	1,500	30	N	.25	6.50	1,100	60.00	350	1,400
79BH35	500	1,000	100	N	100	2,000	30	N	.30	1.20	2,200	55.00	420	1,800
79BH36	500	700	70	N	100	>10,000	<10	N	N	>10.00	28,000	270.00	400	390
79BH37	10	500	50	N	10	>10,000	30	N	.10	>10.00	17,000	470.00	12	410
79BH38	70	300	70	N	15	>10,000	50	N	.25	>10.00	35,000	430.00	250	280
79BH39	50	200	50	N	20	>10,000	10	N	.25	>10.00	40,000	420.00	370	770
79BH40	N	150	150	N	30	300	50	N	.10	.60	230	6.80	4	9
79BH41	N	150	50	N	20	10,000	100	N	N	.16	26,000	40.00	5	13



Table 1.---Continued

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s	B-ppm s	Ba-ppm s
79BH42	43 30 9	113 34 56	1.50	.50	.70	.300	1,000	1.5	N	N	10	1,500
79BH43	43 30 11	113 34 55	15.00	.15	.30	.150	500	5.0	N	N	50	700
79BH45	43 30 13	113 36 37	2.00	.50	.50	.300	500	.7	N	N	10	1,000
79BH46	43 30 5	113 36 52	2.00	.70	.10	.500	700	.7	N	N	10	700
79BH47	43 30 5	113 36 53	1.50	.10	.10	.200	1,000	1.0	N	N	10	500
79BH48A	43 30 6	113 36 49	1.00	.15	.05	.200	1,000	5.0	N	N	15	1,000
79BH48B	43 30 6	113 36 49	3.00	.10	<.05	.150	100	150.0	<200	N	10	700
79BH48C	43 30 6	113 36 49	.30	.15	<.05	.300	50	20.0	N	N	<10	1,000
79BH49	43 30 8	113 37 1	3.00	.70	5.00	.150	>5,000	200.0	<200	N	10	500
79BH50	43 30 15	113 34 57	1.00	.15	.10	.500	1,000	15.0	<200	N	<10	1,000
79BH51	43 30 8	113 35 17	1.50	.07	.07	.150	300	5.0	200	N	N	1,500
79BH52	43 30 0	113 35 28	1.50	.70	1.00	.500	500	<.5	N	N	10	700
79BH53	43 30 3	113 35 24	1.50	.50	1.00	.300	300	<.5	N	N	N	1,000
79BH54	43 31 36	113 36 30	.30	.07	.05	.070	20	1.0	700	N	30	150
79BH55	43 31 36	113 36 30	.20	.20	15.00	.030	150	.7	<200	N	N	200
79BH56	43 30 33	113 36 26	3.00	.30	.05	.300	200	5.0	200	N	50	500
79BH57	43 30 33	113 36 54	2.00	.30	1.50	.070	>5,000	1,000.0	300	N	20	150
79BH58	43 30 37	113 36 48	1.00	.07	.05	.050	>5,000	50.0	<200	N	10	200
79BH59	43 30 37	113 36 47	1.50	.30	.10	.300	700	2.0	200	N	70	300
79BH60	43 30 38	113 36 43	1.00	.20	.70	.150	500	.5	N	N	20	1,000
79BH61	43 30 43	113 36 49	3.00	.20	<.05	.300	500	7.0	1,000	N	30	700
79BH62	43 30 45	113 36 55	1.50	.50	.70	.200	300	N	N	N	10	1,000
79BH63	43 30 29	113 36 45	1.50	.30	.10	.200	200	N	N	N	10	700
79BH64	43 29 12	113 35 25	7.00	.70	2.00	.100	>5,000	200.0	5,000	<10	15	500
79BH65	43 29 13	113 35 21	1.00	.50	.15	.150	300	N	N	N	<10	700
79BH66	43 28 59	113 35 24	1.00	.30	.50	.200	200	N	N	N	15	1,000
79BH67	43 28 43	113 39 10	1.00	.20	.50	.100	300	.7	N	N	10	700
79BH68	43 28 43	113 39 11	1.50	.50	1.00	.300	500	<.5	N	N	<10	1,000
79BH69	43 28 33	113 39 11	.70	.15	<.05	.150	50	N	N	N	100	200
79BH70	43 28 53	113 39 38	1.50	.20	.20	.150	300	1.0	N	N	20	700
79BH71	43 28 53	113 39 36	10.00	.15	.05	.050	1,000	50.0	1,000	N	10	30
79BH72	43 28 51	113 39 32	15.00	.03	<.05	.015	1,000	70.0	200	N	15	50
79BH73	43 28 2	113 38 21	20.00	.03	.05	.015	700	70.0	2,000	N	<10	5,000
79BH74	43 28 2	113 38 21	1.00	.20	.10	.100	100	1.0	N	N	15	300
79BH75	43 35 36	113 39 53	1.50	.15	10.00	.050	>5,000	50.0	N	N	<10	150
79BH76	43 30 36	113 36 35	5.00	.03	.15	.010	200	30.0	1,500	N	<10	150
79BH77A	43 30 38	113 37 6	1.50	.10	.05	.100	>5,000	150.0	700	N	10	200
79BH77B	43 30 38	113 37 6	1.50	.05	.10	.015	>5,000	100.0	200	N	<10	150
79BH77C	43 30 38	113 37 6	2.00	.50	.70	.300	5,000	3.0	500	N	100	150
79BH78	43 30 43	113 38 18	.30	.20	<.05	.300	300	3.0	N	N	50	500
79BH79	43 30 43	113 38 18	1.50	.15	<.05	.200	200	150.0	300	N	15	300
79BH80	43 30 43	113 38 14	2.00	.20	.15	.150	500	3.0	300	N	20	500
79BH81	43 30 56	113 38 5	2.00	.30	.50	.300	2,000	2.0	3,000	N	30	700
79BH82	43 31 10	113 37 54	<.05	.20	20.00	.005	150	N	N	N	N	30
79BH83	43 31 10	113 37 51	1.50	.15	10.00	.030	>5,000	300.0	N	N	30	1,500
79BH84	43 30 40	113 37 16	2.00	.70	.15	.500	5,000	1.5	N	N	10	700
79BH85	43 30 40	113 37 14	3.00	.70	7.00	.050	>5,000	20.0	500	N	<10	70

Table 1. --Continued

Sample	Be-ppm S	Bi-ppm S	Cd-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S	La-ppm S	Mo-ppm S	Nb-ppm S	Ni-ppm S	Pb-ppm S	Sb-ppm S	Sc-ppm S
79BH42	1.5	N	N	7	30	20	30	N	N	5	300	N	10
79BH43	1.0	N	N	20	30	700	30	N	N	7	150	N	5
79BH45	1.0	N	N	15	70	20	30	N	N	20	100	N	10
79BH46	1.5	N	N	15	100	30	30	N	<20	50	150	N	10
79BH47	1.5	N	N	7	50	15	20	5	N	10	50	N	5
79BH48A	1.5	N	N	<5	<10	30	50	N	N	N	100	N	5
79BH48B	1.0	<10	N	N	<10	1,000	30	15	N	N	5,000	<100	<5
79BH48C	1.0	N	N	N	20	3,000	30	20	N	N	1,500	N	5
79BH49	1.0	70	30	15	10	7,000	20	<5	N	N	>20,000	150	<5
79BH50	<1.0	N	N	7	20	20	30	N	N	5	150	N	7
79BH51	1.0	N	N	<5	15	50	20	<5	N	<5	200	N	5
79BH52	<1.0	N	N	15	70	20	20	N	N	20	30	N	10
79BH53	1.0	N	N	15	15	15	30	N	N	10	50	N	7
79BH54	<1.0	N	N	N	50	7	<20	N	N	20	15	<100	<5
79BH55	N	N	N	N	70	5	<20	N	N	10	20	100	N
79BH56	2.0	N	N	10	20	20	50	5	N	5	150	N	7
79BH57	1.5	N	N	5	20	700	20	7	N	5	3,000	150	<5
79BH58	<1.0	N	N	<5	20	30	<20	5	N	15	100	N	<5
79BH59	1.5	N	N	10	15	7	50	N	N	<5	30	N	7
79BH60	1.5	N	N	7	10	7	50	N	N	<5	30	N	7
79BH61	<1.0	N	<20	<5	100	50	30	7	N	N	1,500	N	15
79BH62	1.0	N	N	7	30	15	50	N	N	15	30	N	7
79BH63	1.5	N	N	5	15	10	30	N	N	<5	30	N	7
79BH64	1.0	15	30	15	15	150	50	20	N	15	1,500	<100	<5
79BH65	1.0	N	N	7	10	10	30	N	N	10	20	N	5
79BH66	1.5	N	N	5	<10	5	30	N	N	<5	30	N	5
79BH67	1.0	N	N	7	<10	150	30	N	N	<5	50	N	5
79BH68	1.0	N	N	10	30	30	20	N	N	10	30	N	10
79BH69	1.0	N	N	<5	70	10	20	N	N	5	15	N	5
79BH70	1.5	N	N	<5	15	50	30	N	N	5	150	N	<5
79BH71	<1.0	20	150	<5	20	1,000	N	N	N	7	5,000	N	N
79BH72	<1.0	30	300	50	<10	1,500	<20	N	N	15	1,000	N	N
79BH73	1.0	50	N	15	15	700	<20	30	N	5	150	100	N
79BH74	1.5	N	N	<5	<10	20	20	<5	<20	<5	20	N	<5
79BH75	<1.0	N	<20	7	20	30	<20	N	N	10	1,500	N	5
79BH76	1.0	N	N	N	<10	50	20	7	N	<5	30	N	N
79BH77A	1.0	N	N	N	<10	100	20	5	N	<5	150	N	<5
79BH77B	1.0	N	N	N	<10	100	<20	20	N	<5	300	N	N
79BH77C	2.0	N	N	10	50	15	<20	N	N	15	30	N	10
79BH78	1.5	N	N	N	20	5	50	N	N	N	1,000	N	7
79BH79	1.0	15	N	N	15	300	30	20	N	<5	>20,000	<100	5
79BH80	1.0	N	N	7	30	100	50	5	N	10	1,500	N	7
79BH81	2.0	N	N	15	50	100	30	N	N	15	150	<100	10
79BH82	N	N	N	N	30	N	<20	N	N	<5	30	N	N
79BH83	<1.0	N	<20	<5	30	50	20	7	N	20	150	N	7
79BH84	1.5	N	N	20	70	30	50	N	N	50	30	N	10
79BH85	<1.0	N	N	N	20	70	20	20	N	<5	500	N	N

Table 1.--Continued

Sample	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Au-ppm aa	Hg-ppm inst	Zn-ppm aa	Cd-ppm aa	Bi-ppm aa	Sb-ppm aa
79BH42	N	500	70	N	20	300	150	N	N	.30	250	2.30	2	2
79BH43	N	100	50	N	15	1,000	100	N	.15	.12	1,100	.55	N	7
79BH45	N	200	70	N	20	N	100	N	N	.12	75	.15	N	2
79BH46	N	100	70	N	20	700	100	N	N	2.50	520	2.00	1	2
79BH47	N	<100	50	N	15	200	100	N	N	.08	240	7.00	N	3
79BH48A	N	150	30	N	15	700	150	N	N	.04	470	9.50	N	2
79BH48B	N	100	30	N	10	700	100	N	N	.14	610	8.00	4	46
79BH48C	N	150	30	N	10	300	100	N	N	.04	200	6.50	1	3
79BH49	N	300	20	N	15	7,000	70	N	N	.06	7,500	10.00	60	45
79BH50	N	200	30	N	15	N	100	N	.05	.16	40	4.40	N	4
79BH51	N	150	30	N	15	300	100	N	.15	.30	290	8.00	N	13
79BH52	N	500	70	N	15	<200	100	N	N	.10	35	3.00	N	1
79BH53	N	500	50	N	15	N	100	N	N	.02	15	3.50	N	1
79BH54	N	N	50	N	20	N	50	N	N	.10	30	5.50	N	47
79BH55	N	300	20	N	15	N	15	N	N	.06	25	7.00	N	180
79BH56	N	100	30	N	15	300	100	N	N	.08	240	2.00	2	4
79BH57	N	N	20	N	15	2,000	70	N	.20	.14	2,200	10.00	N	87
79BH58	N	<100	15	N	10	500	50	N	<.05	.06	350	9.00	1	21
79BH59	N	N	30	N	15	N	150	N	N	.12	40	4.10	N	4
79BH60	N	150	20	N	20	N	100	N	N	.04	30	3.60	N	2
79BH61	N	300	50	N	20	700	100	N	N	.04	460	10.00	N	10
79BH62	N	300	50	N	15	N	100	N	N	.06	75	4.70	N	1
79BH63	N	300	30	N	20	N	100	N	N	.02	25	3.20	N	1
79BH64	N	100	20	N	15	7,000	30	N	4.00	.04	6,500	10.00	30	29
79BH65	N	150	30	N	10	200	50	N	N	.10	105	6.50	N	1
79BH66	N	300	30	N	15	N	150	N	N	.04	15	2.70	N	1
79BH67	N	200	20	N	10	N	50	N	N	.02	130	5.00	N	1
79BH68	N	500	70	N	15	N	100	N	N	.02	45	1.10	N	1
79BH69	N	N	100	N	10	N	150	N	N	.06	50	2.50	N	3
79BH70	N	200	20	N	20	200	70	N	N	.02	155	1.60	1	1
79BH71	N	N	30	N	10	>10,000	20	N	N	.06	32,000	85.00	38	13
79BH72	N	N	15	N	10	>10,000	<10	N	N	.08	42,000	180.00	60	2
79BH73	N	100	30	N	<10	300	<10	N	.20	.10	160	4.50	55	72
79BH74	N	N	20	N	15	N	100	N	N	<.02	55	3.60	N	2
79BH75	20	300	20	N	15	500	20	N	N	.40	700	5.00	N	6
79BH76	N	N	<10	N	30	N	10	N	N	.08	55	2.90	N	21
79BH77A	N	<100	20	N	<10	N	100	N	N	.06	55	3.30	N	33
79BH77B	N	200	15	N	15	1,000	<10	N	N	.02	860	4.30	N	27
79BH77C	N	<100	50	N	20	N	100	N	.55	.02	55	2.30	N	3
79BH78	N	N	30	N	20	N	150	N	N	.02	55	2.60	N	2
79BH79	N	N	30	N	15	500	150	N	<.05	.16	150	4.00	10	36
79BH80	N	N	30	N	15	1,500	100	N	N	.04	1,650	5.00	N	4
79BH81	N	N	100	N	20	500	150	N	.10	.04	450	5.00	1	29
79BH82	N	500	10	N	20	N	N	N	N	.04	50	4.00	N	1
79BH83	N	500	70	N	20	700	15	N	N	.02	65	5.00	N	26
79BH84	N	150	70	N	15	<200	100	N	N	.08	60	2.50	N	2
79BH85	N	150	30	N	15	500	20	N	.05	.02	800	4.50	N	8

Table 2.

Sample	Latitude	Longitude	Fe-pct.	Mg-pct.	Ca-pct.	Ti-pct.	Mn-ppm	Ag-ppm	As-ppm	Au-ppm	B-ppm	Ba-ppm
			s	s	s	s	s	s	s	s	s	s
79BH9	43 35 25	113 34 38	2.00	.20	.20	.500	500	5.0	N	N	50	1,000
79BH15	43 35 53	113 34 29	3.00	.50	.10	.500	300	1.0	N	N	20	1,000
79BH17	43 36 20	113 34 30	3.00	.50	.70	.500	5,000	N	N	N	70	1,000
79BH21	43 35 59	113 35 14	3.00	1.00	1.50	.500	700	<.5	N	N	10	1,000
79BH23	43 35 49	113 35 24	5.00	.30	.30	.700	500	.7	N	N	20	1,500
79BH44	43 30 9	113 34 54	3.00	.30	.50	.700	1,000	.5	N	N	30	700

Sample	Be-ppm	Bi-ppm	Cd-ppm	Co-ppm	Cr-ppm	Cu-ppm	La-ppm	Mo-ppm	Nb-ppm	Ni-ppm	Pb-ppm	Sb-ppm	Sc-ppm
	s	s	s	s	s	s	s	s	s	s	s	s	s
79BH9	1.5	N	N	5	70	50	50	N	N	10	300	N	10
79BH15	1.0	N	N	10	300	20	50	N	N	15	200	N	15
79BH17	1.5	N	N	30	300	70	50	<5	N	70	70	N	15
79BH21	1.0	N	N	30	200	200	70	5	N	70	50	N	15
79BH23	1.5	N	N	30	100	100	100	10	<20	70	150	N	15
79BH44	1.5	N	N	15	50	50	50	N	<20	20	150	N	10

Sample	Sn-ppm	Sr-ppm	V-ppm	W-ppm	Y-ppm	Zn-ppm	Zr-ppm	Th-ppm	Au-ppm	Hg-ppm	Zn-ppm	Cd-ppm	Bi-ppm	Str-ppm
	s	s	s	s	s	s	s	s	aa	inst	aa	aa	aa	aa
79BH9	N	700	100	N	20	N	100	N	.10	.26	50	.35	2	2
79BH15	N	150	150	N	15	N	150	N	N	.28	110	.20	1	2
79BH17	N	300	100	N	20	N	150	N	N	.10	150	.80	1	1
79BH21	N	700	100	<50	20	N	150	N	N	.04	130	.40	3	1
79BH23	N	150	100	N	30	300	150	N	N	.16	420	2.10	2	4
79BH44	N	150	70	N	30	300	150	N	N	.22	370	4.10	1	2