UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical results and sample locality map of stream-sediment and heavy-mineral-concentrate samples from the Deep Creek Mountains Wilderness Study Area, Juab and Tooele Counties, Utah

by

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STUDIES RELATED TO WILDERNESS

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine their mineral values, if any. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Deep Creek Mountains Wilderness Study Area (UT-020-060/UT-050-020), Juab and Tooele Counties, Utah.

INTRODUCTION

In 1986 and 1988 the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Deep Creek Mountains Wilderness Study Area, Juab and Tooele Counties, Utah.

The Deep Creek Mountains Wilderness Study Area comprises about 68,910 acres, of which 57,384 were studied by the U.S. Geological Survey and U.S. Bureau of Mines at the request of the -U.S. Bureau of Land Management. The study area is in west-central Utah, in Juab and Tooele Counties, near the Utah-Nevada State line (fig. 1). It is about 90 mi (miles) northwest of Delta, Utah, and about 75 mi south of Wendover, Nevada, and can be reached from either town by paved roads that turn to gravel. The small towns or communities along the gravel roads at the edge of the study area are Callao and Trout Creek on the east side and Ibapah and Goshute on the west (fig. 1). Supplies can be obtained from Trout Creek and south of Ibapah. Access is by foot and by jeep trails, many of which lead to old mines and prospects and end at the study area boundary.

The study area includes most of the Deep Creek Range, a north-northeast-trending range that rises dramatically from the surrounding alluvium-filled basins. The highest peaks are in the center of the range and include Ibapah Peak, about 12,087 ft (feet). In comparison, the town of Callao, at the eastern base of the mountains, is about 4,400 ft. The range is dissected by east-trending, commonly steep-walled, narrow canyons. The semiarid climate supports such vegetation as sagebrush, pinion-juniper, and montane forest.

Much of the northern and southern parts of the study area consist of sedimentary and metamorphic rocks ranging from Proterozoic to Permian, and comprising a thickness of 13 km (Rogers, 1987). The sedimentary and metamorphic rocks have been repeatedly intruded or overlain by igneous rocks that range in age from Jurassic (north of the study area, in the Gold Hill mining district) to Tertiary. The central part of the study area includes the Ibapah stock, one of the largest intrusive bodies in the State. Structures in the range are complex, including many

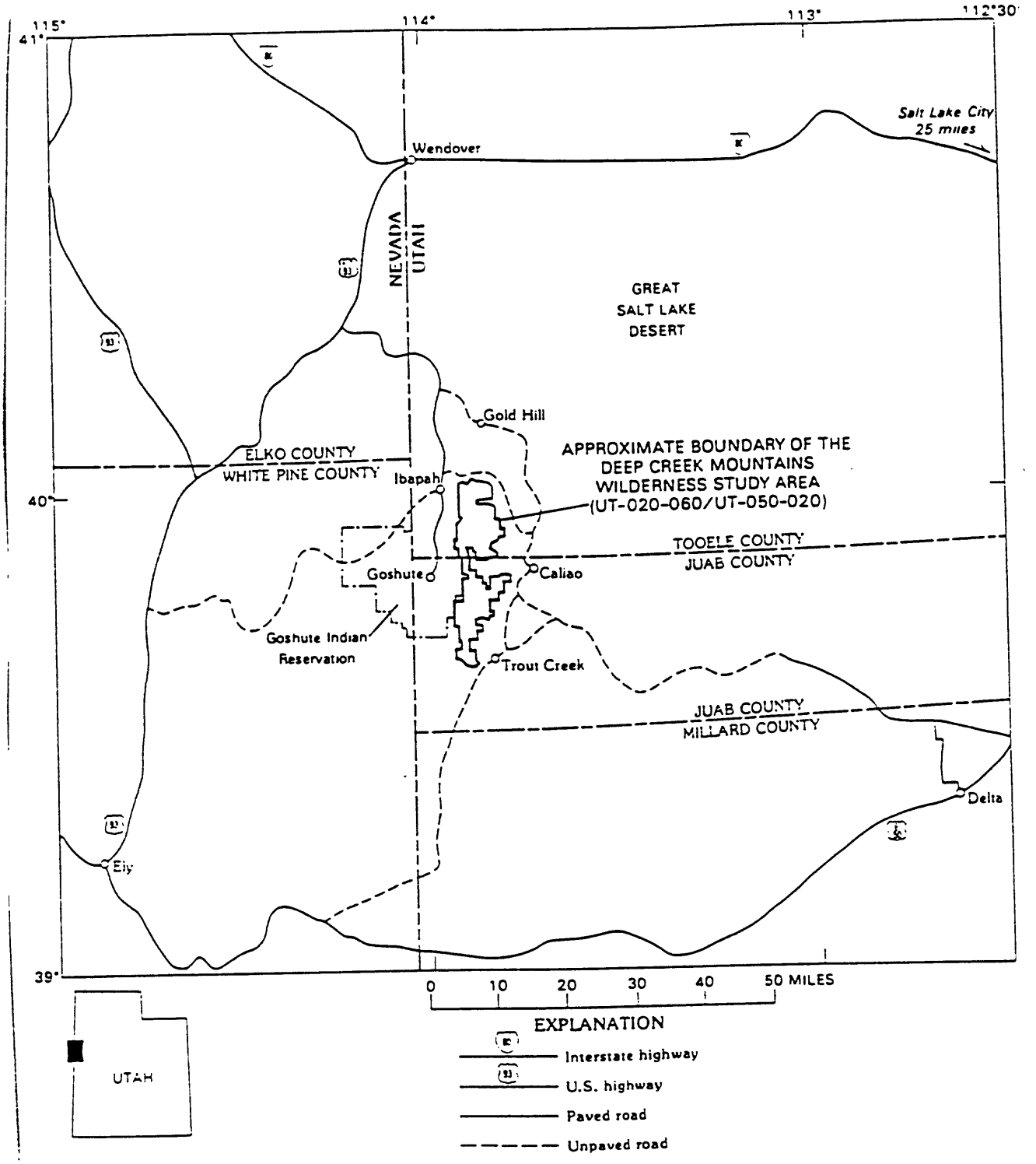

Figure 1--Index map showing location of Deep Creek Mountains Wilderness Study Area, Juab and Tooele Counties, Utah.

generations of high- and low-angle faulting. These features have been studied by Nolan (1935), Nelson (1966), and Rodgers (1987). The range contains a variety of mineral deposit types, including base-, lithophile-, and precious-metal vein and replacement deposits. These deposits have been studied by numerous workers, including Thomson (1973).

METHODS OF STUDY

Sample Media

Analyses of the stream-sediment samples represent the chemistry of the rock material eroded from the drainage basin upstream from each sample site. Such information is useful in identifying those basins which contain concentrations of elements that may be related to mineral deposits. Heavy-mineral concentrate samples provide information about the chemistry of certain minerals in rock material eroded from the drainage basin upstream from each sample site. The selective concentration of minerals, many of which may be ore related, permits determination of some elements that are not easily detected in stream-sediment samples.

Sample Collection

Samples were collected at 69 sites (plate 1). The samples represent a composite of the stream deposit, gathered along and across the stream channel, within 50 ft of the sample site shown on plate 1.

Stream-sediment samples

The stream-sediment samples consisted of active alluvium collected primarily from first-order (unbranched) and second-order (below the junction of two first-order) streams as shown on USGS topographic maps (scale = 1:24,000).

Heavy-mineral concentrate samples

Heavy-mineral concentrate samples were collected from the same active alluvium as the stream-sediment samples. Each bulk sample was screened with a 2.0-mm (10-mesh) screen to remove the coarse material. The less than 2.0-mm fraction was panned until most of the quartz, feldspar, organic material, and clay-sized material was removed.

Sample Preparation

The stream-sediment samples were air dried, then sieved using 80-mesh (0.17-mm) stainless-steel sieves. The portion of the sediment passing through the sieve was saved for analysis.

After air drying, bromoform (specific gravity 2.8) was used to remove the remaining quartz and feldspar from the heavy-mineral-concentrate samples that had been panned in the field. The resultant heavy-mineral sample was separated into three fractions using a large electromagnet (in this case a modified Frantz Isodynamic Separator). The most magnetic material, primarily magnetite, was not analyzed. The second fraction, largely ferromagnesian silicates and iron oxides, was saved for analysis/archival storage. The third fraction (the least magnetic material which may include the nonmagnetic ore minerals, zircon, sphene, etc.) was split using a Jones splitter. One split was hand ground for spectrographic analysis; the other split was saved for mineralogical analysis. These magnetic separates are the same separates that would be produced by using a Frantz Isodynamic Separator set at a slope of 15° and a tilt of 10° with a current of 0.2 ampere to remove the magnetite and ilmenite, and a current of 0.6 ampere to split the remainder of the sample into paramagnetic and nonmagnetic fractions.

Sample Analysis

Spectrographic method

The stream-sediment and heavy-mineral concentrate samples were analyzed for 31 elements (samples collected in 1986) or 35 elements (samples collected in 1988) using a semiquantitative, direct-current arc emission spectrographic method (Adrian and others, 1990). The elements analyzed and their lower limits of determination are listed in table 1. The two spectrographic lower determination limits for lanthanum, tungsten, and cobalt (see table 2) are due to a change in standard operating procedure that occurred during this project. The elements gallium, germanium, sodium, and phosphorus were added to the spectrographic method during the period of time latter analyses were determined. Spectrographic results were obtained by visual comparison of spectra derived from the sample against spectra obtained from standards made from pure oxides and carbonates. Standard concentrations are geometrically spaced over any given order of magnitude of concentration as follows: 100, 50, 20, 10, and so forth. Samples whose concentrations are estimated to fall between those values are assigned values of 70, 30, 15, and so forth. The precision of the analytical method is approximately plus or minus one reporting interval at the 83 percent confidence level and plus or minus two reporting intervals at the 96 percent confidence level (Motooka and Grimes, 1976). Values determined for the major elements (iron, magnesium, calcium, and titanium) are given in weight percent; all others are given in parts per million (micrograms/gram).

Other analytical methods

Other methods of analysis used on stream-sediment samples from the study area are summarized in table 2. Elements analyzed for include Au, As, Sb, Bi, Cd, and Zn; in addition, Hg and F were analyzed for in samples collected in 1988. Gold

analyses were obtained using an atomic absorption spectroscopy method described by O'Leary and Meier (1990). Arsenic, Sb, Bi, Cd, and Zn were analyzed by an inductively coupled plasma-atomic emission spectrometric method described by Crock and others (1987). Mercury was analyzed by a modification of the atomic absorption method described by O'Leary and others (1990). Fluorine was analyzed by an ion selective electrode method described by O'Leary and Hopkins (1990). Results of analyses for the stream-sediment samples are listed in table 3, results for the heavy-mineral concentrate samples are listed in table 4.

ROCK ANALYSIS STORAGE SYSTEM

Upon completion of all analytical work, the analytical results were entered into the Branch of Geochemistry's computer data base. This data base contains both descriptive geological information and analytical data. Any or all of this information may be retrieved and converted to a binary form (STATPAC) for computerized statistical analysis or publication (VanTrump and Miesch, 1977).

DESCRIPTION OF DATA TABLES

Tables 3 and 4 list the results of analyses for the samples of stream-sediment and heavy-mineral concentrate, respectively. The data in table 3 and 4 are arranged so that column 1 contains the USGS-assigned sample numbers. These numbers correspond to the numbers shown on the site location map (plate 1). Columns in which the element headings show the letter "S" below the element symbol are emission spectrographic analyses; "AA" in the column heading represents another method of analysis, as summarized in table 2. A letter "N" in the tables indicates that a given element was looked for but not detected at the lower limit of determination shown for that element in table 1. If an element was observed but was below the lowest reporting value, a "less than" symbol (<) was entered in the tables in front of the lower limit of determination. If an element was observed but was above the highest reporting value, a "greater than" symbol (>) was entered in the tables in front of the upper limit of determination. If an element was not looked for in a sample, two dashes (--) are entered in tables 3 and 4 in place of an analytical value. Because of the formatting used in the computer program that produced tables 3 and 4, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) carry one or more nonsignificant digits to the right of the significant digits. The analysts did not determine these elements to the accuracy suggested by the extra zeros.

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TABLE 1.--Limits of determination for the spectrographic analysis of stream-sediment samples, based on a 10-mg sample

[The spectrographic limits of determination for heavy-mineral concentrate samples are based on a 5-mg sample, and are therefore two reporting intervals higher than the limits given for stream-sediment samples. Lower limits in parentheses are the 1986 values.]

Elements	Lower determination limit	Upper determination limit
	Percent	
Calcium (Ca)	.05	20
Iron (Fe)	0.05	20
Magnesium (Mg)	.02	10
Sodium (Na)*	0.2	5
Phosphorus (P)*	0.2	10
Titanium (Ti)	.002	1
	Parts per million	
Silver (Ag)	0.5	5,000
Arsenic (As)	200	10,000
Gold (Au)	10	500
Boron (B)	10	2,000
Barium (Ba)	20	5,000
Beryllium (Be)	1	1,000
Bismuth (Bi)	10	1,000
Cadmium (Cd)	20	500
Cobalt (Co)	10 (5)	2,000
Chromium (Cr)	10	5,000
Copper (Cu)	5	20,000
Gallium (Ga)*	5	500
Germanium (Ge)*	10	100
Lanthanum (La)	50 (20)	1,000
Manganese (Mn)	10	5,000
Molybdenum (Mo)	5	2,000
Niobium (Nb)	20	2,000
Nickel (Ni)	5	5,000
Lead (Pb)	10	20,000
Antimony (Sb)	100	10,000
Scandium (Sc)	5	100
Tin (Sn)	10	1,000
Strontium (Sr)	100	5,000
Thorium (Th)	100	2,000
Vanadium (V)	10	10,000
Tungsten (W)	20 (50)	10,000
Yttrium (Y)	10	2,000
Zinc (Zn)	200	10,000
Zirconium (Zr)	10	1,000

*Not analyzed for in 1986

TABLE 2.--Chemical methods and lower limits of determination

[AA, atomic absorption; AACV, atomic absorption cold vapor; ICP, inductively coupled argon plasma-atomic emission spectrographic; ISE, ion selective electrode; all values in parts per million]

Element	Method	Limit of Determination	Reference
Gold (Au)	AA	0.05	O'Leary and Meier, 1990
Arsenic (As)	ICP	5	Crock and others, 1987
Antimony (Sb)	ICP	2	
Zinc (Zn)	ICP	2	
Bismuth (Bi)	ICP	2	
Cadmium (Cd)	ICP	.1	
Mercury (Hg)	AACV	0.02	O'Leary and others, 1990
Fluorine (F)	ISE	100	O'Leary and Hopkins, 1990

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

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
6AA0043S	39 59 40	113 55 2	3.0	3.0	3.00	.20	500	N	N	N
6XX0044S	40 0 31	113 55 6	1.5	5.0	5.00	.07	200	N	N	N
6XX0045S	40 1 35	113 54 55	1.0	5.0	5.00	.05	200	N	N	N
6XX0046S	40 2 2	113 55 4	2.0	3.0	3.00	.10	200	N	N	N
6XX0047S	40 2 50	113 55 5	2.0	7.0	5.00	.07	300	N	N	N
6XX0048S	40 3 45	113 55 6	5.0	3.0	5.00	.20	700	N	N	N
6XX0049S	40 5 24	113 53 42	2.0	2.0	3.00	.10	200	N	N	N
6XX0050S	40 5 9	113 54 58	2.0	2.0	5.00	.15	500	N	N	N
6AB0051S	39 58 11	113 49 16	5.0	1.0	.50	.20	1,000	N	N	N
6AB0052S	39 58 27	113 50 34	5.0	5.0	7.00	.10	700	N	N	N
6AB0053S	39 59 30	113 51 10	5.0	5.0	5.00	.30	500	N	N	N
6AB0054S	39 59 53	113 49 31	5.0	2.0	5.00	.20	700	N	N	N
6XX1038S	40 0 25	113 50 21	5.0	3.0	5.00	.20	1,000	N	N	N
6XX1039S	40 1 19	113 50 34	5.0	3.0	5.00	.20	700	N	N	N
6XX1040S	40 2 1	113 50 45	5.0	2.0	3.00	.30	700	N	N	N
6XX1041S	40 2 31	113 51 1	5.0	2.0	5.00	.30	700	N	N	N
6XX1042S	40 2 45	113 51 36	2.0	5.0	5.00	.10	500	N	N	N
6XX1043S	40 2 39	113 49 39	5.0	5.0	10.00	.20	1,000	N	N	N
6XX1044S	40 3 55	113 49 54	2.0	3.0	5.00	.20	700	N	N	N
6XX1045S	40 4 29	113 52 27	2.0	2.0	7.00	.30	700	N	N	N
6AB1046S	39 53 45	113 52 11	7.0	1.0	1.00	.70	1,000	N	N	N
6AB1047S	39 55 3	113 51 1	5.0	3.0	10.00	.20	700	N	N	N
6AB1048S	39 56 33	113 48 57	7.0	3.0	5.00	.30	1,500	N	N	N
6AB1049S	39 57 10	113 49 13	5.0	5.0	10.00	.20	1,000	N	N	N
6AA1054S	39 55 12	113 56 18	5.0	.7	.50	.50	500	N	N	N
6AA1055S	39 56 4	113 56 10	7.0	2.0	2.00	.50	1,000	N	N	N
6AA1056S	39 56 21	113 55 30	3.0	5.0	5.00	.15	700	N	N	N
6AA1057S	39 56 42	113 56 1	2.0	7.0	7.00	.15	500	N	N	N
6AA1058S	39 57 44	113 55 22	2.0	7.0	7.00	.20	500	N	N	N
6AA1059S	39 58 26	113 55 10	3.0	7.0	7.00	.20	700	N	N	N
8AA5500S	39 55 54	113 57 2	2.0	.5	.10	.20	700	N	N	N
8AA5501S	39 54 48	113 57 7	2.0	.5	.10	.20	700	N	N	N
8CA5511S	39 43 3	113 53 42	2.0	.5	.10	.50	500	N	N	N
8CA5512S	39 42 22	113 53 13	2.0	2.0	2.00	.15	300	N	N	N
8CA5513S	39 41 42	113 53 11	2.0	2.0	3.00	.15	300	N	N	N
8CA5514S	39 41 45	113 55 19	5.0	1.5	.20	.30	500	N	N	N
8CA5515S	39 41 53	113 56 38	5.0	1.5	.20	.30	700	N	N	N
8AA5519S	39 57 35	113 56 36	2.0	7.0	5.00	.10	300	N	N	N
8AA5520S	39 58 24	113 55 40	2.0	7.0	7.00	.15	1,000	N	N	N
8AA5521S	39 59 5	113 55 41	2.0	7.0	2.00	.15	500	N	N	N
8XX5522S	40 1 21	113 56 15	1.0	7.0	5.00	.10	300	N	N	N
8AB5540S	39 56 25	113 48 4	2.0	1.0	.20	.20	300	N	N	N
8AB5541S	39 57 30	113 49 0	3.0	1.0	.15	.50	500	1.0	N	N
8AB5542S	39 55 17	113 47 21	3.0	3.0	2.00	.20	500	N	N	N
8AB5543S	39 55 20	113 47 21	3.0	2.0	1.00	.20	500	N	N	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	B-ppm s	Ba-ppm s	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
6AA0043S	30	200	<1.0	N	N	10	50	20	20	N	N
6XX0044S	<10	50	N	N	N	5	20	15	N	N	N
6XX0045S	<10	100	<1.0	N	N	5	15	10	N	N	N
6XX0046S	10	500	N	N	N	5	20	15	N	N	N
6XX0047S	<10	500	N	N	N	5	20	10	N	N	N
6XX0048S	100	1,500	<1.0	N	N	15	50	20	<20	N	N
6XX0049S	30	200	<1.0	N	N	10	20	15	N	N	N
6XX0050S	50	200	<1.0	N	N	10	30	15	N	N	N
6AB0051S	70	500	<1.0	N	N	15	50	20	30	N	N
6AB0052S	30	200	<1.0	N	N	10	30	20	N	N	N
6AB0053S	100	300	<1.0	N	N	15	50	15	20	N	<20
6AB0054S	70	300	<1.0	N	N	15	50	20	<20	N	N
6XX1038S	<10	200	<1.0	N	N	10	50	50	N	N	N
6XX1039S	50	300	<1.0	N	N	15	30	20	N	N	N
6XX1040S	50	300	<1.0	N	N	20	50	20	20	N	N
6XX1041S	50	500	<1.0	N	N	15	30	20	20	N	N
6XX1042S	30	150	N	N	N	10	30	15	N	N	N
6XX1043S	100	2,000	<1.0	N	N	10	50	15	20	N	N
6XX1044S	100	500	<1.0	N	N	10	100	20	N	N	N
6XX1045S	70	1,000	<1.0	N	N	10	50	15	<20	N	N
6AB1046S	50	500	3.0	N	N	15	50	20	200	N	30
6AB1047S	100	300	<1.0	N	N	15	70	20	<20	N	N
6AB1048S	100	700	<1.0	N	N	15	70	100	N	N	N
6AB1049S	100	500	<1.0	N	N	15	50	20	<20	N	N
6AA1054S	100	700	2.0	N	N	15	50	30	100	N	N
6AA1055S	150	700	2.0	N	N	20	100	50	70	N	N
6AA1056S	50	300	<1.0	N	N	10	50	20	<20	N	N
6AA1057S	30	200	<1.0	N	N	7	30	20	<20	N	N
6AA1058S	50	200	<1.0	N	N	10	30	20	<20	N	N
6AA1059S	50	200	<1.0	N	N	7	20	15	<20	N	N
8AA5500S	50	500	1.0	N	N	15	20	30	<50	N	N
8AA5501S	100	300	2.0	N	N	20	20	30	<50	N	N
8CA5511S	100	200	1.0	N	N	<10	20	10	<50	N	N
8CA5512S	30	300	<1.0	N	N	<10	20	10	<50	N	N
8CA5513S	50	500	1.0	N	N	<10	30	15	<50	N	N
8CA5514S	100	500	1.5	N	N	15	50	20	<50	N	N
8CA5515S	100	300	1.0	N	N	20	50	30	<50	N	N
8AA5519S	30	300	<1.0	N	N	<10	15	10	<50	N	N
8AA5520S	50	500	<1.0	N	N	<10	20	15	N	N	N
8AA5521S	30	500	<1.0	N	N	<10	20	10	<50	N	N
8XX5522S	50	200	N	N	N	<10	30	10	<50	N	N
8AB5540S	50	300	<1.0	N	N	10	20	15	<50	N	N
8AB5541S	70	300	<1.0	N	N	<10	30	30	<50	N	N
8AB5542S	50	300	<1.0	N	N	10	30	20	<50	N	N
8AB5543S	50	300	<1.0	N	N	<10	50	20	<50	N	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	Ni-ppm s	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
6AA0043S	30	30	N	5	N	N	70	N	15	200	150	N
6XX0044S	10	20	N	N	N	N	20	N	N	<200	50	N
6XX0045S	7	10	N	N	N	N	15	N	N	200	70	N
6XX0046S	20	10	N	<5	N	N	20	N	N	<200	70	N
6XX0047S	10	20	N	N	N	N	15	N	<10	<200	50	N
6XX0048S	30	30	N	7	N	<100	70	N	20	<200	200	N
6XX0049S	20	10	N	<5	N	N	50	N	15	<200	100	N
6XX0050S	20	30	N	<5	N	N	50	N	10	N	100	N
6AB0051S	30	30	N	7	N	N	100	N	20	<200	200	N
6AB0052S	20	70	N	<5	N	<100	50	N	10	<200	70	N
6AB0053S	20	30	N	10	N	N	100	N	30	<200	200	N
6AB0054S	20	50	N	7	N	<100	70	N	20	<200	200	N
6XX1038S	20	50	N	5	N	<100	50	N	15	200	100	N
6XX1039S	20	30	N	5	N	<100	50	N	15	<200	100	N
6XX1040S	30	30	N	7	N	<100	100	N	20	<200	300	N
6XX1041S	30	30	N	10	N	100	70	N	20	<200	200	N
6XX1042S	20	30	N	<5	N	N	30	N	10	<200	50	N
6XX1043S	50	30	N	5	N	150	70	N	20	<200	200	N
6XX1044S	20	30	N	7	N	N	70	N	20	<200	150	N
6XX1045S	20	20	N	5	N	100	100	N	15	<200	200	N
6AB1046S	20	30	N	10	N	N	100	N	70	<200	>1,000	N
6AB1047S	30	20	N	7	N	100	70	N	20	<200	100	N
6AB1048S	20	50	N	7	N	N	70	N	20	<200	200	N
6AB1049S	20	30	N	7	N	<100	70	N	30	<200	200	N
6AA1054S	20	30	N	7	N	N	100	N	30	<200	300	N
6AA1055S	50	70	N	10	N	N	100	N	50	<200	500	N
6AA1056S	20	50	N	5	N	N	70	N	20	<200	100	N
6AA1057S	20	50	N	<5	N	<100	50	N	10	<200	150	N
6AA1058S	20	30	N	5	N	N	70	N	20	<200	200	N
6AA1059S	10	20	N	5	N	<100	50	N	15	<200	150	N
8AA5500S	20	30	N	<5	N	N	50	N	15	N	200	N
8AA5501S	30	20	N	5	N	N	50	N	20	N	200	N
8CA5511S	10	<10	N	7	N	N	50	N	20	N	500	N
8CA5512S	10	10	N	<5	N	150	50	N	10	N	150	N
8CA5513S	15	15	N	5	N	300	50	N	15	N	150	N
8CA5514S	20	15	N	7	N	<100	50	N	20	N	150	N
8CA5515S	50	15	N	7	N	N	70	N	20	N	100	N
8AA5519S	10	20	N	<5	N	N	50	N	10	N	100	N
8AA5520S	15	20	N	5	N	<100	50	N	10	N	100	N
8AA5521S	10	20	N	<5	N	N	50	N	15	N	150	N
8XX5522S	10	15	N	N	N	N	20	N	<10	N	100	N
8AB5540S	20	20	N	5	N	N	50	N	10	N	200	N
8AB5541S	15	150	N	<5	N	N	70	N	10	N	200	N
8AB5542S	20	20	N	7	N	150	50	N	20	N	200	N
8AB5543S	20	30	N	5	N	100	50	N	20	N	150	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	Au-ppm aa	As-ppm aa	Bi-ppm aa	Cd-ppm aa	Sb-ppm aa	Zn-ppm aa	Na-pct. s	P-pct. s	Ga-ppm s	Ge-ppm s	Hg-ppm aa	F%
6AA0043S	<.10	7	<2	.6	<2	44	--	--	--	--	--	--
6XX0044S	<.10	5	<2	.4	<2	25	--	--	--	--	--	--
6XX0045S	<.10	7	<2	.6	<2	30	--	--	--	--	--	--
6XX0046S	<.10	8	<2	.7	<2	49	--	--	--	--	--	--
6XX0047S	<.10	<5	<2	.5	2	21	--	--	--	--	--	--
6XX0048S	<.10	8	<2	.6	<2	48	--	--	--	--	--	--
6XX0049S	<.10	12	<2	.7	<2	42	--	--	--	--	--	--
6XX0050S	<.10	8	<2	.7	<2	34	--	--	--	--	--	--
6AB0051S	<.10	11	<2	.7	<2	72	--	--	--	--	--	--
6AB0052S	<.10	11	<2	.8	<2	37	--	--	--	--	--	--
6AB0053S	<.10	13	<2	.6	<2	39	--	--	--	--	--	--
6AB0054S	<.10	9	<2	.7	<2	41	--	--	--	--	--	--
6XX1038S	<.10	15	<2	.8	<2	55	--	--	--	--	--	--
6XX1039S	<.10	14	<2	.8	<2	50	--	--	--	--	--	--
6XX1040S	<.10	14	<2	.8	<2	54	--	--	--	--	--	--
6XX1041S	<.10	11	<2	1.0	<2	80	--	--	--	--	--	--
6XX1042S	<.10	11	<2	.7	2	39	--	--	--	--	--	--
6XX1043S	<.10	13	<2	.8	3	42	--	--	--	--	--	--
6XX1044S	<.10	7	<2	.6	<2	42	--	--	--	--	--	--
6XX1045S	<.10	8	<2	.7	<2	39	--	--	--	--	--	--
6AB1046S	<.10	12	<2	.5	<2	41	--	--	--	--	--	--
6AB1047S	<.10	16	<2	.8	<2	46	--	--	--	--	--	--
6AB1048S	<.10	17	<2	.9	<2	48	--	--	--	--	--	--
6AB1049S	<.10	15	<2	.7	<2	34	--	--	--	--	--	--
6AA1054S	<.10	10	<2	.5	<2	56	--	--	--	--	--	--
6AA1055S	<.10	28	<2	.9	<2	79	--	--	--	--	--	--
6AA1056S	<.10	17	<2	.8	<2	46	--	--	--	--	--	--
6AA1057S	<.10	11	<2	.7	2	39	--	--	--	--	--	--
6AA1058S	<.10	11	<2	.8	2	38	--	--	--	--	--	--
6AA1059S	--	9	<2	.5	<2	43	--	--	--	--	--	--
8AA5500S	<.05	7	<2	.5	<2	65	1.5	<.2	20	N	.06	.03
8AA5501S	<.05	6	<2	.4	<2	79	1.5	<.2	15	N	.04	.02
8CA5511S	<.05	<5	<2	.2	<2	41	1.0	<.2	10	N	N	.01
8CA5512S	.10	<5	<2	.5	<2	36	1.5	<.2	15	N	N	.04
8CA5513S	.10	5	<2	.6	<2	49	1.5	<.2	15	N	.02	.06
8CA5514S	<.05	<5	<2	.5	<2	64	1.5	<.2	15	N	N	.02
8CA5515S	<.05	<5	<2	.6	<2	49	1.0	<.2	20	N	N	.04
8AA5519S	.10	<5	<2	.5	<2	40	1.0	N	15	N	N	.03
8AA5520S	<.05	7	<2	.5	<2	38	1.0	N	15	N	N	.03
8AA5521S	.10	<5	<2	.6	<2	52	1.0	<.2	15	N	N	.04
8XX5522S	<.05	<5	<2	.5	<2	31	1.0	<.2	10	N	N	.03
8AB5540S	.15	<5	<2	.5	<2	50	1.5	<.2	20	N	N	.03
8AB5541S	.10	<5	<2	.6	<2	69	2.0	<.2	20	N	.04	.03
8AB5542S	.20	6	<2	.6	<2	47	2.0	<.2	20	N	N	.04
8AB5543S	.05	6	<2	.5	<2	52	2.0	<.2	20	N	N	.04

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--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
8AB5545S	39 53 36	113 48 30	3.0	2.0	1.00	.20	300	N	N	N
8BB5546S	39 51 52	113 47 44	5.0	3.0	1.00	.50	300	N	N	N
8BB5547S	39 51 33	113 47 22	7.0	2.0	1.50	.70	700	N	N	N
8BB5548S	39 50 25	113 48 25	5.0	.7	.20	.20	500	N	N	N
8BB5549S	39 50 5	113 48 22	10.0	1.0	.30	.30	500	N	N	N
8BB5550S	39 49 31	113 48 34	3.0	1.5	.50	.30	500	N	N	N
8BB5551S	39 48 56	113 49 1	3.0	1.0	.20	.50	500	N	N	N
8BB5552S	39 47 43	113 50 21	3.0	2.0	1.00	.50	500	N	N	N
8BB5553S	39 46 12	113 50 39	2.0	1.0	.20	.20	500	N	N	N
8BB5554S	39 46 41	113 51 47	2.0	.5	.15	.15	300	N	N	N
8BB5555S	39 45 58	113 51 40	3.0	2.0	.50	.30	500	N	N	N
8BB5556S	39 45 18	113 51 57	3.0	1.0	.20	.30	300	N	N	N
8BB5557S	39 45 16	113 52 0	2.0	2.0	.50	.15	500	N	N	N
8CB5558S	39 43 31	113 52 27	2.0	2.0	.30	.50	500	N	N	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	B-ppm s	Ba-ppm s	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
8AB5545S	30	300	2.0	N	N	10	50	20	200	N	20
8BB5546S	20	500	1.0	N	N	15	30	20	100	N	<20
8BB5547S	<10	500	5.0	N	N	<10	50	15	150	N	30
8BB5548S	15	300	3.0	N	N	<10	50	10	300	N	20
8BB5549S	20	300	3.0	N	N	15	100	15	300	N	30
8BB5550S	20	300	2.0	N	N	10	70	20	70	N	<20
8BB5551S	15	300	2.0	N	N	10	50	10	300	N	20
8BB5552S	50	300	2.0	N	N	15	70	20	100	N	20
8BB5553S	30	300	2.0	N	N	<10	50	15	100	N	<20
8BB5554S	10	200	2.0	N	N	<10	20	15	100	N	N
8BB5555S	50	500	2.0	N	N	20	50	30	100	N	30
8BB5556S	50	300	1.5	N	N	10	50	30	50	N	<20
8BB5557S	50	300	1.5	N	N	<10	20	30	N	N	N
8CB5558S	100	300	1.5	N	N	10	30	30	70	N	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	Ni-ppm s	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
8AB5545S	15	30	N	5	<10	N	100	N	50	N	500	N
8BB5546S	20	50	N	10	<10	200	100	N	50	N	200	N
8BB5547S	5	30	N	10	N	300	100	N	200	N	1,000	<100
8BB5548S	5	30	N	10	N	<100	100	N	500	N	500	150
8BB5549S	10	30	N	15	10	100	150	N	150	N	300	300
8BB5550S	20	30	N	10	N	200	100	N	30	N	300	N
8BB5551S	10	50	N	10	N	150	70	N	70	N	300	100
8BB5552S	20	30	N	15	N	300	100	<20	70	N	300	100
8BB5553S	15	50	N	7	N	200	50	N	50	N	500	<100
8BB5554S	10	50	N	<5	N	N	50	N	50	N	300	<100
8BB5555S	30	50	N	10	N	100	70	N	30	N	200	200
85B5556S	20	30	N	5	N	N	50	N	20	N	200	N
8BB5557S	10	30	N	<5	N	N	50	N	<10	N	100	N
8CB5558S	20	20	N	<5	N	N	50	N	20	N	200	N

TABLE 3--RESULTS OF ANALYSES, STREAM SEDIMENT SAMPLES--Continued

Sample	Au-ppm aa	As-ppm aa	Bi-ppm aa	Cd-ppm aa	Sb-ppm aa	Zn-ppm aa	Na-pct. s	P-pct. s	Ga-ppm s	Ge-ppm s	Hg-ppm aa	F%
8AB5545S	<.05	<5	<2	.8	<2	46	2.0	<.2	20	N	N	.03
8BB5546S	.10	<5	<2	.7	<2	78	3.0	<.2	30	N	N	.06
8BB5547S	.15	<5	4	.9	<2	64	3.0	<.2	30	N	N	.05
8BB5548S	<.05	<5	4	.7	<2	52	3.0	.2	30	N	N	.05
8BB5549S	<.05	<5	4	1.5	<2	77	3.0	<.2	30	N	N	.09
8BB5550S	<.05	<5	<2	.6	<2	77	3.0	<.2	30	N	N	.06
8BB5551S	<.05	<5	3	.6	<2	59	3.0	<.2	30	N	N	.03
8BB5552S	.10	<5	<2	1.0	<2	97	3.0	.2	30	N	N	.08
8BB5553S	<.05	<5	<2	.4	<2	77	3.0	.2	20	N	N	.04
8BB5554S	<.05	<5	3	.5	<2	66	2.0	.2	15	N	N	.04
8BB5555S	<.05	<5	<2	.7	<2	78	2.0	.2	30	N	N	.03
8BB5556S	<.05	<5	<2	.7	<2	78	1.5	<.2	20	N	N	.03
8BB5557S	.0	<5	6	.9	<2	110	1.0	<.2	15	N	N	.06
8CB5558S	.0	6	<2	.5	<2	67	1.5	.2	15	N	N	.03

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

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
6AA0043C	39 59 40	113 55 2	1.00	5.00	10.0	2.00	1,000	2	N	N	50
6XX0044C	40 0 31	113 55 6	1.50	10.00	15.0	.50	700	N	N	N	50
6XX0045C	40 1 35	113 54 55	.50	3.00	10.0	.30	300	N	N	N	50
6XX0046C	40 2 2	113 55 4	.20	1.00	2.0	.10	150	N	N	N	20
6XX0047C	40 2 50	113 55 5	.20	2.00	7.0	.20	200	N	N	N	20
6XX0048C	40 3 45	113 55 6	.30	1.00	10.0	.15	300	N	N	N	50
6XX0049C	40 5 24	113 53 42	.50	5.00	10.0	1.50	500	N	N	N	100
6XX0050C	40 5 9	113 54 58	.30	7.00	10.0	1.50	500	N	N	N	50
6AB0051C	39 58 11	113 49 16	.15	.20	5.0	>2.00	200	N	N	N	50
6AB0052C	39 58 27	113 50 34	.70	5.00	15.0	2.00	500	N	N	N	50
6AB0053C	39 59 30	113 51 10	.30	5.00	10.0	2.00	300	70	N	N	50
6AB0054C	39 59 53	113 49 31	.20	3.00	7.0	>2.00	300	N	N	N	50
6XX1038C	40 0 25	113 50 21	.50	3.00	10.0	>2.00	300	7	N	N	70
6XX1039C	40 1 19	113 50 34	.50	3.00	10.0	>2.00	300	15	N	N	30
6XX1040C	40 2 1	113 50 45	1.00	5.00	10.0	2.00	500	N	N	N	100
6XX1041C	40 2 31	113 51 1	1.00	5.00	10.0	2.00	500	N	N	N	150
6XX1042C	40 2 45	113 51 36	.50	5.00	10.0	.20	300	N	N	N	50
6XX1043C	40 2 39	113 49 39	.50	.50	5.0	.20	200	N	N	N	50
6XX1044C	40 3 55	113 49 54	.50	2.00	7.0	.50	200	N	N	N	50
6XX1045C	40 4 29	113 52 27	.70	2.00	15.0	.20	500	N	N	N	200
6AB1046C	39 53 45	113 52 11	.50	.20	1.0	2.00	300	N	N	N	150
6AB1047C	39 55 3	113 51 1	1.00	5.00	10.0	1.00	500	N	N	N	70
6AB1048C	39 56 33	113 48 57	.70	5.00	10.0	>2.00	500	N	N	N	100
6AB1049C	39 57 10	113 49 13	.50	7.00	10.0	>2.00	300	N	N	N	100
6AA1054C	39 55 12	113 56 18	.20	.50	2.0	>2.00	200	N	N	N	50
6AA1055C	39 56 4	113 56 10	.70	2.00	5.0	>2.00	300	N	N	N	200
6AA1056C	39 56 21	113 55 30	.70	10.00	10.0	>2.00	300	N	N	N	50
6AA1057C	39 56 42	113 56 1	.70	10.00	10.0	1.00	300	N	N	N	50
6AA1058C	39 57 44	113 55 22	.50	10.00	15.0	.30	300	N	N	N	50
6AA1059C	39 58 26	113 55 10	1.00	15.00	20.0	.70	500	N	N	N	50
8AA5500C	39 55 54	113 57 2	1.00	.20	1.0	>2.00	150	N	N	N	50
8AA5501C	39 54 48	113 57 7	1.00	.20	.2	1.00	100	N	N	N	50
8CA5511C	39 43 3	113 53 42	1.00	.15	1.0	>2.00	200	N	N	N	70
8CA5512C	39 42 22	113 53 13	1.00	.50	1.0	>2.00	200	N	N	N	30
8CA5513C	39 41 42	113 53 11	1.00	.50	1.5	>2.00	200	N	N	N	50
8CA5514C	39 41 45	113 55 19	1.50	.20	2.0	>2.00	500	N	N	N	100
8CA5515C	39 41 53	113 56 38	.70	.20	.5	>2.00	200	N	N	N	100
8AA5519C	39 57 35	113 56 36	1.50	2.00	5.0	>2.00	150	N	N	N	50
8AA5520C	39 58 24	113 55 40	.50	5.00	7.0	.50	150	N	N	N	20
8AA5521C	39 59 5	113 55 41	.70	3.00	5.0	2.00	150	N	N	N	20
8XX5522C	40 1 21	113 56 15	.50	5.00	3.0	.10	100	N	N	N	<20
8AB5540C	39 56 25	113 48 4	.50	.50	1.0	>2.00	150	10	N	N	30
8AB5541C	39 57 30	113 49 0	1.00	.20	1.0	>2.00	100	N	N	N	70
8AB5542C	39 55 17	113 47 21	1.00	3.00	3.0	>2.00	150	7	N	N	30
8AB5543C	39 55 20	113 47 21	1.50	.50	1.0	>2.00	200	N	N	N	100

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES--Continued

Sample	Ba-ppm s	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
6AA0043C	700	<2	100	N	<10	50	50	50	N	70	N	150
6XX0044C	5,000	<2	N	N	N	30	20	100	N	N	N	50
6XX0045C	>10,000	2	N	N	N	20	20	<50	N	N	N	20
6XX0046C	>10,000	<2	N	N	N	<20	<10	<50	N	N	N	N
6XX0047C	>10,000	<2	N	N	N	<20	<10	<50	N	N	N	N
6XX0048C	>10,000	<2	N	N	N	70	30	200	N	N	10	<20
6XX0049C	10,000	<2	N	N	N	50	10	150	N	<50	N	20
6XX0050C	5,000	<2	N	N	N	50	10	150	N	N	N	30
6AB0051C	7,000	50	N	N	<10	100	<10	<50	N	100	N	30
6AB0052C	>10,000	<2	N	N	N	50	20	100	N	50	N	100
6AB0053C	10,000	15	N	N	<10	50	30	100	N	50	N	50,000
6AB0054C	200	10	20	N	<10	50	<10	50	N	70	N	500
6XX1038C	1,000	2	N	N	<10	70	10	50	N	100	N	1,000
6XX1039C	500	50	N	N	<10	100	20	100	N	50	N	1,000
6XX1040C	500	2	N	N	N	70	20	100	N	<50	N	200
6XX1041C	2,000	2	N	N	N	50	20	150	N	70	N	100
6XX1042C	>10,000	<2	N	N	N	50	10	100	N	N	N	20
6XX1043C	>10,000	<2	N	N	N	<20	<10	50	N	N	N	<20
6XX1044C	>10,000	<2	N	N	N	20	<10	50	N	N	N	<20
6XX1045C	>10,000	2	N	N	N	100	20	100	20	N	N	<20
6AB1046C	700	<2	N	N	N	100	<10	100	<10	50	N	20
6AB1047C	1,000	<2	N	N	N	50	10	100	N	50	N	1,000
6AB1048C	7,000	5	N	N	<10	100	10	50	50	100	N	300
6AB1049C	7,000	5	N	N	<10	50	<10	70	N	70	N	100
6AA1054C	1,500	50	70	N	<10	70	<10	<50	N	<50	N	50
6AA1055C	1,500	10	N	N	<10	300	20	100	N	300	N	500
6AA1056C	2,000	10	N	N	<10	100	20	50	N	50	N	500
6AA1057C	200	N	N	N	N	30	<10	100	N	N	N	500
6AA1058C	200	N	N	N	N	20	10	100	N	N	N	20
6AA1059C	200	<2	N	N	N	30	<10	100	N	N	N	20
8AA5500C	500	3	N	N	N	100	<10	700	N	70	N	100
8AA5501C	100	<2	N	N	N	150	<10	100	N	50	N	<20
8CA5511C	100	5	N	N	<20	20	<10	100	N	<50	N	70
8CA5512C	500	2	N	N	<20	20	<10	<100	N	50	N	100
8CA5513C	1,500	2	N	N	<20	70	10	100	N	50	N	70
8CA5514C	200	<2	N	N	<20	50	20	300	N	70	N	50
8CA5515C	1,500	2	50	N	<20	70	<10	<100	N	50	N	N
8AA5519C	2,000	<2	N	N	<20	20	10	300	N	50	10	70
8AA5520C	>10,000	<2	N	N	N	N	<10	<100	N	70	N	50
8AA5521C	1,000	<2	N	<50	<20	<20	<10	100	N	50	N	70
8XX5522C	<50	<2	N	N	N	N	<10	N	N	N	N	50
8AB5540C	1,500	<2	N	N	N	100	<10	100	N	70	N	500
8AB5541C	500	3	N	N	<20	150	<10	100	N	100	N	200
8AB5542C	1,000	10	N	N	N	100	<10	150	N	70	N	200
8AB5543C	1,500	2	N	N	<20	150	10	200	N	70	N	200

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES--Continued

Sample	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	P-pct. s	Ga-ppm s	Ge-ppm s
6AA0043C	N	20	N	N	150	10,000	300	N	>2,000	500	--	--	--
6XX0044C	N	10	N	<200	50	100	200	500	>2,000	<200	--	--	--
6XX0045C	N	N	N	2,000	30	N	150	N	>2,000	N	--	--	--
6XX0046C	N	N	N	10,000	20	N	20	N	1,000	N	--	--	--
6XX0047C	N	N	N	10,000	20	N	50	N	2,000	N	--	--	--
6XX0048C	N	N	200	10,000	70	N	200	N	1,500	N	--	--	--
6XX0049C	N	20	N	200	100	N	500	N	>2,000	<200	--	--	--
6XX0050C	N	20	N	<200	70	N	500	N	>2,000	200	--	--	--
6AB0051C	N	70	N	N	100	N	1,000	N	>2,000	<200	--	--	--
6AB0052C	N	<10	N	2,000	50	N	200	1,000	>2,000	N	--	--	--
6AB0053C	N	20	50	1,000	70	N	300	N	>2,000	N	--	--	--
6AB0054C	N	30	N	300	70	N	500	N	>2,000	N	--	--	--
6XX1038C	N	50	N	1,500	70	N	700	N	>2,000	<200	--	--	--
6XX1039C	N	10	N	1,500	70	1,000	300	N	>2,000	N	--	--	--
6XX1040C	N	50	N	500	70	N	500	N	>2,000	200	--	--	--
6XX1041C	N	15	20	300	70	N	500	N	>2,000	<200	--	--	--
6XX1042C	N	N	N	2,000	20	N	200	N	>2,000	N	--	--	--
6XX1043C	N	<10	N	10,000	20	N	100	N	2,000	N	--	--	--
6XX1044C	N	<10	N	10,000	50	N	200	N	>2,000	<200	--	--	--
6XX1045C	N	<10	N	2,000	100	200	200	N	>2,000	<200	--	--	--
6AB1046C	N	30	N	N	150	<100	500	N	>2,000	5,000	--	--	--
6AB1047C	N	10	N	200	30	<100	300	N	>2,000	300	--	--	--
6AB1048C	N	50	N	500	70	<100	700	N	>2,000	200	--	--	--
6AB1049C	N	30	N	200	50	<100	500	N	>2,000	200	--	--	--
6AA1054C	N	70	30	N	100	<100	500	N	>2,000	500	--	--	--
6AA1055C	N	50	<20	<200	150	1,000	700	N	>2,000	500	--	--	--
6AA1056C	N	15	N	<200	100	1,000	300	N	>2,000	300	--	--	--
6AA1057C	N	10	N	N	50	200	200	N	>2,000	500	--	--	--
6AA1058C	N	<10	N	500	30	500	200	N	>2,000	<200	--	--	--
6AA1059C	N	<10	N	300	50	N	200	N	>2,000	N	--	--	--
8AA5500C	N	50	N	500	500	N	500	N	>2,000	700	2.0	<10	N
8AA5501C	N	N	N	N	100	100	100	N	>2,000	200	.5	50	N
8CA5511C	N	50	20	N	500	N	500	N	>2,000	N	.5	10	N
8CA5512C	N	70	<20	N	700	N	700	N	>2,000	<200	1.0	N	N
8CA5513C	N	70	<20	N	700	N	700	N	>2,000	<200	1.5	10	N
8CA5514C	N	100	<20	<200	500	N	500	N	>2,000	<200	.7	15	N
8CA5515C	N	<10	N	N	200	N	200	N	>2,000	N	.7	15	N
8AA5519C	N	70	N	N	700	N	700	N	>2,000	700	2.0	<10	N
8AA5520C	N	<10	N	300	200	N	200	N	>2,000	200	1.0	N	N
8AA5521C	N	50	N	N	500	N	500	N	>2,000	700	1.5	<10	N
8XX5522C	N	N	N	N	50	N	50	N	2,000	N	.7	N	N
8AB5540C	N	70	N	N	500	N	500	N	>2,000	300	1.5	<10	N
8AB5541C	N	70	N	N	100	N	300	N	>2,000	200	3.0	N	N
8AB5542C	N	70	50	N	70	N	300	N	>2,000	300	1.5	<10	N
8AB5543C	N	100	N	N	150	N	500	N	>2,000	200	1.5	N	N

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES--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
8AB5545C	39 53 36	113 48 30	.70	.70	3.0	>2.00	200	N	N	N	20
8BB5546C	39 51 52	113 47 44	1.00	.30	5.0	>2.00	200	N	N	N	<20
8BB5547C	39 51 33	113 47 22	.50	.10	3.0	>2.00	200	N	N	N	<20
8BB5548C	39 50 25	113 48 25	.30	.10	5.0	>2.00	500	N	N	N	<20
8BB5549C	39 50 5	113 48 22	.50	.20	10.0	2.00	700	N	N	N	<20
8BB5550C	39 49 31	113 48 34	.50	.20	7.0	>2.00	500	N	N	N	<20
8BB5551C	39 48 56	113 49 1	.50	.20	10.0	>2.00	1,000	N	N	N	<20
8BB5552C	39 47 43	113 50 21	.50	.20	7.0	>2.00	300	N	N	N	<20
8BB5553C	39 46 12	113 50 39	.70	.20	7.0	>2.00	700	N	N	N	<20
8BB5554C	39 46 41	113 51 47	.50	.10	5.0	>2.00	500	N	N	N	20
8BB5555C	39 45 58	113 51 40	.70	.20	2.0	>2.00	200	N	N	N	50
8BB5556C	39 45 18	113 51 57	1.00	.50	5.0	>2.00	200	N	N	N	200
8BB5557C	39 45 16	113 52 0	1.50	5.00	7.0	1.50	300	50	N	N	70
8CB5558C	39 43 31	113 52 27	2.00	.70	2.0	>2.00	300	N	N	N	300

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES--Continued

Sample	Ba-ppm s	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
8AB5545C	1,000	<2	N	50	<20	70	<10	500	N	100	N	200
8BB5546C	100	N	N	100	20	20	<10	500	N	150	N	300
8BB5547C	50	N	N	100	20	50	<10	2,000	N	100	N	100
8BB5548C	50	N	N	150	30	100	<10	2,000	N	100	N	200
8BB5549C	<50	N	N	N	N	100	<10	1,000	N	70	N	50
8BB5550C	<50	N	N	N	<20	50	<10	700	N	200	N	50
8BB5551C	<50	<2	N	N	<20	100	<10	1,500	N	100	N	70
8BB5552C	1,000	<2	N	<50	<20	70	<10	700	N	150	N	70
8BB5553C	200	10	N	N	<20	100	<10	700	N	100	N	200
8BB5554C	100	15	N	<50	<20	70	<10	700	10	100	N	150
8BB5555C	70	<2	N	N	<20	70	<10	200	N	100	N	500
8BB5556C	1,500	<2	N	N	<20	50	20	200	N	50	N	100
8BB5557C	<50	200	>2,000	N	<20	20	15	100	15	N	N	500
8CB5558C	200	2	N	N	20	70	10	300	N	70	N	200

TABLE 4--RESULTS OF ANALYSES, HEAVY-MINERAL CONCENTRATE SAMPLES--Continued

Sample	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	P-pct. s	Ga-ppm s	Ge-ppm s
8AB5545C	N	100	70	N	100	N	1,000	N	>2,000	3,000	3.0	<10	N
8BB5546C	N	50	100	N	100	N	700	N	>2,000	5,000	3.0	50	N
8BB5547C	N	70	70	N	100	100	1,500	N	>2,000	5,000	5.0	N	N
8BB5548C	N	70	100	N	70	N	2,000	N	>2,000	5,000	15.0	<10	N
8BB5549C	N	50	50	N	50	N	1,000	N	>2,000	700	15.0	<10	N
8BB5550C	N	30	100	N	150	N	1,000	N	>2,000	1,000	10.0	<10	N
8BB5551C	N	50	100	N	150	N	2,000	N	>2,000	1,000	15.0	<10	N
8BB5552C	N	50	100	N	100	500	1,000	N	>2,000	3,000	10.0	<10	N
8BB5553C	N	70	100	N	150	<50	1,500	N	>2,000	2,000	10.0	15	N
8BB5554C	N	50	100	N	100	<50	1,500	N	>2,000	5,000	7.0	10	N
8BB5555C	N	70	20	N	150	500	700	N	>2,000	1,000	5.0	10	N
8BB5556C	N	50	200	N	150	1,000	700	N	>2,000	<200	3.0	<10	N
8BB5557C	N	N	1,500	N	70	10,000	100	N	2,000	N	2.0	<10	N
8CB5558C	N	50	50	N	100	700	300	N	>2,000	N	1.0	50	N