UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Supplemental analytical results and sample locality map of stream-sediment and heavy-mineral-concentrate samples from the Craig Study Area; Craig, Dixon Entrance, Ketchikan, and Prince Rupert quadrangles, Alaska

By

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STUDIES RELATED TO AMRAP

The U.S. Geological Survey, is required by the Alaskan National Interests Lands Conservation Act (Public Law 96-487, 1980), to survey certain Federal lands to determine their mineral resource potential. Results from the Alaskan Mineral Resource Appraisal Program (AMRAP) must be made available to the public and be submitted to the President and Congress. This report presents analytical results of a geochemical survey of the Craig, Dixon Entrance, and a small part of the Ketchikan, and Prince Rupert quadrangles, Alaska.

INTRODUCTION

In the summer of 1991 the U.S. Geological Survey conducted supplemental reconnaissance geochemical survey of the Craig Study Area, Alaska. This report presents data from the analysis of samples collected during this survey and supplements U.S. Geological Survey Open-File Report 91-36A (McDanal and others 1991) where a preponderance of the data generated from the original reconnaissance geochemical survey is presented. The Craig Study Area comprises about 1400 mi^2 (3600 km^2) in southeastern Alaska, and includes all of Craig, Dixon Entrance, and a small part of the western fringes of the Ketchikan and Prince Rupert 1:250,000 scale quadrangles (see fig. 1). Acccess to the study area is limited to the use of boats and flost planes. The larger settlements are Craig, Klawak, Hollis, and Hydaburg with Ketchikan, to the east, the nearest distributiion center for the studay area.

A digital Lotus Base format of the data which is presented can be found on floppy disk in the pocket of this report, U.S. Geological Survey Open-File Report 92-XXX.

The Craig Study Area contains parts of three northwest-trending tectonostratigraphic terranes (Berg and others, 1972, 1978; Monger and Berg, 1987). From the southwest to the northeast, they are the Alexander terrane, the Gravina-Nutzotin overlap assemblage, and the controversial Taku terrane (Brew and Ford, 1984). The climate of the region is mild with an average annual rainfall of 100-160 inches, a mean daily temperature of 60-64°F in July and 28-32°F in January.

The Craig Study Area includes parts of the (from west to east) Prince of Wales Mountains, Kupreanof Lowlands, and Coastal Foothills (physiographic divisions of Wahrhaftig, 1965). The Prince of Wales Mountains physiographic division consists of moderately rugged glaciated mountains with a maximum elevation of 3,800 ft. They are disected by steep-walled U-shaped valleys and by fiords 600-1,000 ft deep. The Kupreanof Lowlands physiographic division consists of islands and channels with a local relief of 300-500 ft and a maximum elevation of 1,500 ft. The coastal Foothills physiographic division consists of high mountains 3-30 mi across separated by flat floot valleys and straits 1/2-10 mi wide; with a maximum elevation of 4,500 ft.

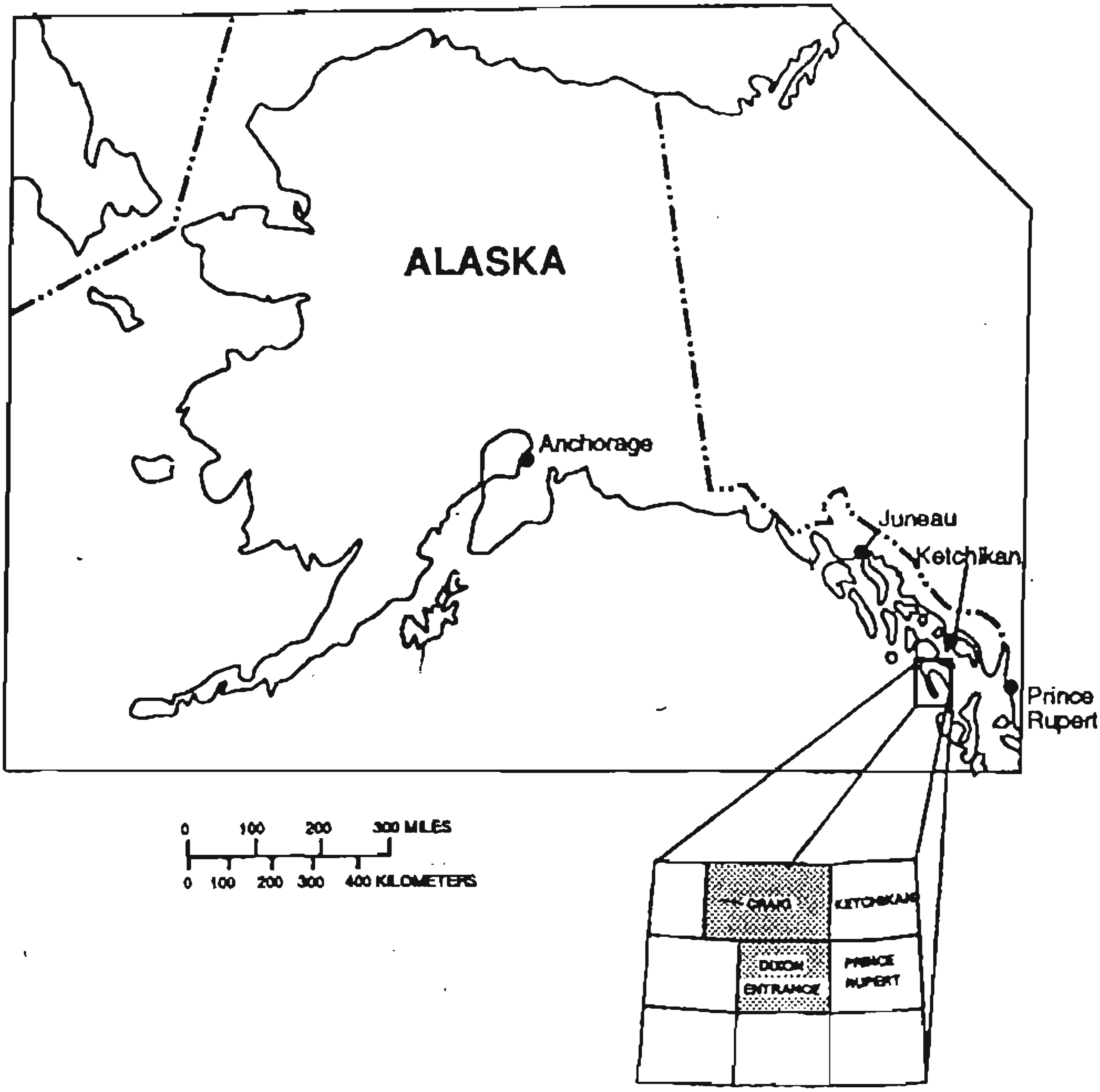

Figure 1. Location map of the Craig Study Area, Alaska

METHODS OF STUDY

Sample Media

Analyses of the stream-sediment and heavy-mineral-concentrate 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

Forty six heavy-mineral-concentrate and 51 stream-sediment samples were collected (plate 1). Plate 1 shows the localities where samples were collected for this supplemental study, in addition to the localities of samples collected for the original study as presented by McDanal and others, 1991.

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 = 1:250,000) (plate 1). Each sample was composited from several localities within an area that may extend as much as 20 ft from the site plotted on the map.

Heavy-mineral-concentrate samples

Heavy-mineral-concentrate samples were collected from the same active alluvium as some of 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 were 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.

Samples that had been panned in the field were air dried and sieved to -35 mesh; bromoform (specific gravity 2.85) was used to remove the remaining quartz and feldspar. 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 (removed at a setting of 0.25 ampere), primarily magnetite, was not analyzed. The second fraction (removed at a setting of 1.75 ampere), largely ferromagnesian silicates and iron oxides, was saved for archival storage. The third fraction (the nonmagnetic 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 samples were analyzed for 35 elements and the heavy-mineral-concentrate samples were analyzed for 37 elements using a semiquantitative, direct-current arc emission spectrographic method (modification of Grimes and Marranzino, 1968). The elements analyzed and their lower limits of determination are listed in table 1.

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). Analytical data for samples from the Craig Study Area are listed in tables 3, and 4.

Chemical methods

Other methods of analysis used on samples from the Craig Study Area are summarized in table 2.

Analytical results for stream-sediment and heavy-mineral-concentrate samples are listed in tables 3 and 4 respectively.

DATA STORAGE SYSTEM

Upon completion of all analytical work, the analytical results were entered into the Branch of Geochemistry computer data base called PLUTO. 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. For the two tables, the data 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" indicates atomic absorption analyses; "ICP/p" indicates inductively coupled plasma-atomic emission spectroscopy, partial analysis. 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. For emission spectrographic analyses, a "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that an element was observed but was below the lowest reporting value. For AA and ICP analyses, a "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that an element was below the lowest reporting value. 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.

REFERENCES CITED

Berg, H.C., Jones, D.L., and Coney,P.J., 1978, Map showing Pre-Cenozoic tectonostratigraphic terranes of southeastern Alaska and adjacent areas: U.S. Geological Survey Open-File Report 78-1085, scale 1:1,000,000, 2 sheets.

Berg, J.C., Jones, D.L., and Richter, D.H., 1972, Gravin-Nutzotin belt, Tectonic significance of an upper Mesozoic sedimentary and volcanic sequence in southern and southeastern Alaska in Geological Survey research 1972: U.S. Geological Survey Professional Paper 800-D, p. D1-D24.

Brew, C.A. and Ford, A.B.,1984, Tectonostratigraphic terraines in the Coast plutonic-metamorphic complex, southeastern Alaska, in Bartsch-Winkler, S., and Reed, K.M., eds., The United States Geological Survey in Alaska: Miscellaneous geologic research 1982: U.S. Geological Survey Circular 939, p. 90-93.

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

Koirtyohann, S. R., and Khalil, Moheb, 1976, Variables in the determination of mercury by cold vapor atomic absorption: Analytical Chemistry, 48, p. 136-139.

McDanal, S.K., Arbogast, B.F., and Cathrall, J.B., 1991, Analytical results and sample locality map of stream-sediment and heavy-mineral-concentrate samples from the Craig Study Area; Craig, Dixon Entrance, Ketchikan, and Prince Rupert quadrangles, Alaska: U.S. Geological Survey Open-File Report 91-36A, p. 122.

Monger, J.W.H. and Berg, W.C., 1987, Lithotectonic terrane map of western Canada and southeastern Alaska: U.S. Geological Survey Miscellaneous Field Studies Map MF 1874-Bm 21 p., scale 1:2,500,000.

Motooka, J.M., 1988, An exloration geochemical technique for the determination of preconcentrated organometallic halides by ICP-AES: Applied Spectroscopy, v. 42, no. 7, p. 1293-1296.

Motooka, J. M., and Grimes, D. J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.

Thompson, C. E., Nakagawa, H. M., and Van Sickle, G. H., 1968, Rapid analysis for gold in geologic materials, in Geological Survey research 1968: U.S. Geological Survey Professional Paper 600-B, p. B130-B132.

VanTrump, George, Jr., and Miesch, A. T., 1977, The U.S. Geological Survey RASS-STATPAC system for management and statistical reduction of geochemical data: Computers and Geosciences, v. 3, p. 475-488.

Wahrhatig, Clyde, 1965, Phhsiographic divisions of Alaska: U.S. Geological Survey Professional Paper 482, 52 p., 6 plates.

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

[The values shown are the lower limits of determination assigned by the Grimes and Marranzino method, except for those values in parentheses, which are the lower values assigned by the Myers and others method. 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 rocks.]

Elements	Lower determination limit	Upper determination limit
	Percent	
Iron (Fe)	0.05	20
Magnesium (Mg)	0.02	10
Phosphorus (P)	0.2	10
Calcium (Ca)	0.05	20
Sodium (Na)	0.2	5
Titanium (Ti)	0.002	1
	Parts per million	
Manganese (Mn)	10	5,000
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)	5	2,000
Chromium (Cr)	10	5,000
Copper (Cu)	5	20,000
Gallium (Ga)	5	500
Germanium (Ge)	10	100
Lanthanum (La)	20	1,000
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
Vanadium (V)	10	10,000
Tungsten (W)	50	10,000
Yttrium (Y)	10	2,000
Zinc (Zn)	200	10,000
Zirconium (Zr)	10	1,000
Thorium (Th)	100	2,000

TABLE 2.--Chemical methods used

[AA = atomic absorption; ICP = inductively coupled plasma spectroscopy]

Element or constituent determined	Sample type	Method	Determination limit (micrograms/ gram or ppm)	Reference
Gold (Au)	stream sediments	AA	.1	Modification of Thompson and others, 1968.
Mercury (Hg)	stream sediments	AA	0.02	Koirtyohann and Khalil, 1976.
Silver (Ag)	stream sediments	ICP	0.045	Motooka, 1988.
Arsenic (As)		ICP	0.6	
Gold (Au)		ICP	0.15	
Bismuth (Bi)		ICP	0.06	
Cadmium (Cd)		ICP	0.05	
Copper (Cu)		ICP	0.05	
Molybdenum (Mo)		ICP	0.09	
Lead (Pb)		ICP	0.6	
Antimony (Sb)		ICP	0.6	
Zinc (Zn)		ICP	0.05	

Table 3. RESULTS OF ANALYSIS OF STREAM-SEDIMENT SAMPLES

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

Field Number	Lab No	Lat	Long	Ag-ppm ICP/p	As-ppm ICP/p	Au-ppm ICP/p	Bi-ppm ICP/p	Cd-ppm ICP/p	Cu-ppm ICP/p	Mo-ppm ICP/p	Pb-ppm ICP/p	Sb-ppm ICP/p	Zn-ppm ICP/p	Ca-pct. S	Fe-pct. S
940	D-382802	553740	1323340	0.22	2.5	N 0.10	N 0.67	0.26	97	0.61	8.6	0.94	34	1	1
944	D-382803	553810	1323422	0.086	6.2	N 0.10	N 0.67	0.30	56	0.55	6.2	0.80	79	1	7
945	D-382804	553728	1323030	0.15	7.7	N 0.10	1.1	0.070	34	1.7	6.7	1.2	13	3	7
946	D-382805	555312	1323855	N 0.067	2.6	N 0.10	N 0.67	0.15	46	0.39	6.3	1.1	56	7	10
946A	D-382806	555312	1323855	N 0.067	1.2	N 0.10	N 0.67	0.11	23	0.36	3.5	N 0.67	23	5	7
947	D-382807	555330	1324320	N 0.067	2.1	N 0.10	N 0.67	0.099	39	0.78	3.1	0.80	55	2	7
948	D-382808	555448	1324512	N 0.067	5.5	N 0.10	N 0.67	0.33	49	0.38	8.8	2.5	92	7	10
949	D-382809	552930	1325730	0.22	19	N 0.10	N 0.67	2.7	44	5.9	17	3.8	310	1.5	7
950	D-382810	552955	1325850	0.21	13	N 0.10	N 0.67	1.7	20	6.1	23	5.7	270	1	7
951	D-382811	552837	1325940	0.94	21	N 0.10	N 0.67	2.6	86	7.9	36	14	530	1.5	7
952	D-382812	553108	1330150	0.22	23	N 0.10	N 0.67	1.1	12	3.4	51	4.8	320	0.7	10
953	D-382813	553005	1330435	N 0.067	3.4	N 0.10	N 0.67	0.66	22	3.2	4.8	1.6	140	1.5	10
954	D-382814	553238	1330540	0.14	52	N 0.10	N 0.67	1.0	21	3.6	18	2.2	210	3	10
954A	D-382815	553238	1332540	0.14	46	N 0.10	N 0.67	0.89	20	3.0	16	2.2	200	2	10
955	D-382816	551228	1330558	0.33	13	N 0.10	N 0.67	3.3	25	1.9	24	3.6	370	1.5	7
956	D-382817	553141	1330640	1.1	10	N 0.10	N 0.67	3.5	54	7.9	71	5.5	580	1	7
957	D-382818	552745	1330130	0.58	26	N 0.10	N 0.67	13	61	21	21	14	910	0.7	10
958	D-382819	553110	1330130	N 0.067	7.3	N 0.10	N 0.67	1.7	23	8.6	7.0	2.9	250	1.5	10
959	D-382820	552950	1330532	0.17	11	N 0.10	N 0.67	4.3	27	8.5	8.4	5.1	470	1	7
960	D-382821	552855	1330410	0.096	5.5	N 0.10	N 0.67	1.5	24	7.5	6.6	2.8	200	1.5	7
961	D-382822	552755	1325812	0.22	12	N 0.10	N 0.67	0.60	29	5.9	6.2	1.9	130	0.5	7
962	D-382823	553242	1330525	0.094	11	N 0.10	N 0.67	0.37	14	2.6	8.7	0.76	89	2	10
963	D-382824	553242	1330503	N 0.067	6.1	N 0.10	N 0.67	0.16	14	1.1	4.6	0.84	58	2	10
964	D-382825	553246	1330450	N 0.067	5.6	N 0.10	N 0.67	0.077	15	3.8	10	N 0.67	53	3	7
965	D-382826	552240	1325140	0.079	8.4	N 0.10	N 0.67	0.20	71	2.9	5.8	1.1	89	1.5	10
966	D-382827	552320	1325040	0.18	16	N 0.10	N 0.67	0.36	83	1.6	6.7	2.0	94	1	10
967	D-382828	552840	1325100	0.24	7.3	N 0.10	0.86	0.47	130	1.6	4.8	1.3	110	1	10
968	D-382829	554235	1323055	N 0.067	31	N 0.10	N 0.67	0.12	62	1.7	5.5	N 0.67	61	3	20
969	D-382830	554400	1322950	N 0.067	7.2	N 0.10	N 0.67	0.17	27	1.9	6.6	N 0.67	72	2	10
970	D-382831	554216	1323140	N 0.067	2.8	N 0.10	N 0.67	0.21	33	0.93	4.8	N 0.67	100	5	10
971	D-382832	554620	1324035	N 0.067	3.5	N 0.10	N 0.67	0.24	110	0.35	11	0.79	80	5	10
972	D-382833	554710	1323930	0.099	32	N 0.10	N 0.67	0.38	54	2.0	6.1	0.91	62	1.5	10
973	D-382834	554727	1323908	0.10	7.7	N 0.10	N 0.67	0.44	61	0.88	4.8	0.79	120	3	15
974	D-382835	554903	1323850	0.15	10	N 0.10	N 0.67	0.62	110	1.2	6.1	1.2	150	5	15
975	D-382836	554417	1323345	N 0.067	3.8	N 0.10	N 0.67	0.17	29	2.0	4.5	N 0.67	64	5	15
976	D-382837	552905	1324940	0.081	4.2	N 0.10	N 0.67	0.24	51	0.66	6.6	0.87	86	3	7
977	D-382838	553010	1324958	0.92	31	0.43	N 0.67	1.5	70	2.9	43	3.9	240	2	10
978	D-382839	553345	1325250	N 0.067	2.1	N 0.10	N 0.67	0.18	97	3.6	2.5	0.82	49	7	10
979	D-382840	553330	1325350	N 0.067	5.4	N 0.10	N 0.67	0.15	91	16	3.1	N 0.67	46	5	10
980	D-382841	553415	1325505	N 0.067	26	N 0.10	N 0.67	0.34	68	1.7	4.0	N 0.67	84	1.5	5
981	D-382842	553450	1325530	0.17	33	N 0.10	N 0.67	1.2	80	2.8	15	2.5	170	5	10
982	D-382843	553448	1325515	N 0.067	1.9	N 0.10	N 0.67	0.081	61	1.8	2.0	N 0.67	32	7	10
983	D-382844	553708	1325542	N 0.067	12	N 0.10	N 0.67	0.28	67	1.1	8.0	1.3	89	2	7
984	D-382845	554800	1330750	0.079	2.7	N 0.10	N 0.67	0.28	25	0.89	8.7	0.73	66	1	2
985	D-382846	554800	1330910	N 0.067	5.2	N 0.10	N 0.67	0.23	49	0.58	8.2	N 0.67	95	2	10
986	D-382847	554730	1331150	N 0.067	6.0	N 0.10	N 0.67	0.30	29	1.4	5.7	0.79	34	20	5
987	D-382848	554515	1331235	N 0.067	7.2	N 0.10	N 0.67	0.22	37	0.85	7.7	0.78	84	3	7
988	D-382849	554350	1331230	0.095	4.0	N 0.10	N 0.67	0.36	44	0.96	9.2	0.81	44	1	3
989	D-382850	554315	1331250	N 0.067	7.9	N 0.10	N 0.67	0.29	53	1.1	9.9	0.80	85	2	7
990	D-382851	554130	1331240	N 0.067	3.2	N 0.10	N 0.67	0.16	43	0.55	12	1.4	100	1.5	15
991	D-382852	552237	1325810	24	45	N 1.1	N 7.0	33	4100	39	140	9.6	3100	0.1	15

Table 3. continued - RESULTS OF ANALYSIS OF STREAM-SEDIMENT SAMPLES

Field Number	Mg-pct. S	Na-pct. S	P-pct. S	Ti-pct. S	Ag-ppm S	As-ppm S	Au-ppm S	B-ppm S	Ba-ppm S	Be-ppm S	Bi-ppm S	Cd-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S
940	0.2	0.2	< 0.2	0.1	N 0.5	N 200	N 10	< 10	150	< 1	N 10	N 20	< 10	10	50
944	0.7	0.7	< 0.2	0.5	N 0.5	N 200	N 10	15	150	N 1	N 10	N 20	10	100	50
945	3	2	< 0.2	0.5	N 0.5	N 200	N 10	20	500	N 1	N 10	N 20	30	100	70
946	3	1	< 0.2	0.5	N 0.5	N 200	N 10	10	200	N 1	N 10	N 20	30	150	100
946A	2	1	N 0.2	0.3	N 0.5	N 200	N 10	15	200	< 1	N 10	N 20	10	100	30
947	5	1.5	< 0.2	1	< 0.5	N 200	N 10	15	100	< 1	N 10	N 20	50	200	100
948	5	1.5	N 0.2	0.5	N 0.5	N 200	N 10	10	300	N 1	N 10	N 20	30	500	70
949	2	1.5	0.2	0.7	N 0.5	N 200	N 10	50	500	1	N 10	N 20	20	70	50
950	2	1.5	< 0.2	> 1	N 0.5	N 200	N 10	30	1500	< 1	N 10	N 20	30	100	20
951	2	1	< 0.2	1	0.5	N 200	N 10	70	1500	3	N 10	N 20	30	300	150
952	2	1	0.2	> 1	< 0.5	N 200	N 10	50	1000	N 1	N 10	N 20	30	100	20
953	3	1	0.2	> 1	N 0.5	N 200	N 10	30	1000	N 1	N 10	N 20	30	150	20
954	3	1.5	< 0.2	0.7	N 0.5	N 200	N 10	50	700	< 1	N 10	N 20	20	70	30
954A	2	2	0.2	0.7	N 0.5	N 200	N 10	50	700	< 1	N 10	N 20	20	70	30
955	2	1.5	0.2	0.5	N 0.5	N 200	N 10	50	700	1	N 10	N 20	15	50	30
956	0.7	0.7	0.3	0.5	1.5	N 200	N 10	70	500	1	N 10	N 20	15	70	50
957	1.5	0.7	0.3	1	1	N 200	N 10	70	1000	N 1	N 10	N 20	20	100	100
958	3	1	0.3	> 1	N 0.5	N 200	N 10	30	1000	N 1	N 10	N 20	30	200	30
959	2	1	0.2	> 1	N 0.5	N 200	N 10	50	1000	N 1	N 10	N 20	20	150	50
960	1	0.7	0.2	> 1	N 0.5	N 200	N 10	15	500	< 1	N 10	N 20	15	70	20
961	0.7	1	< 0.2	0.5	N 0.5	N 200	N 10	30	300	< 1	N 10	N 20	10	30	50
962	2	2	< 0.2	1	N 0.5	N 200	N 10	30	700	N 1	N 10	N 20	15	70	30
963	2	2	0.2	1	N 0.5	N 200	N 10	30	700	N 1	N 10	N 20	15	100	30
964	3	2	< 0.2	1	N 0.5	N 200	N 10	30	700	< 1	N 10	N 20	15	700	30
965	2	1.5	< 0.2	1	N 0.5	N 200	N 10	15	200	< 1	N 10	N 20	30	100	100
966	3	1.5	< 0.2	1	N 0.5	N 200	N 10	30	700	< 1	N 10	N 20	30	500	150
967	2	1.5	< 0.2	1	0.7	N 200	N 10	20	500	< 1	N 10	N 20	20	100	200
968	3	1.5	0.3	0.5	N 0.5	N 200	N 10	15	500	< 1	N 10	N 20	30	200	100
969	2	2	0.2	0.7	N 0.5	N 200	N 10	10	500	1	N 10	N 20	50	100	50
970	5	2	0.3	0.7	5	N 200	N 10	20	500	< 1	N 10	N 20	50	500	70
971	7	2	0.5	0.7	N 0.5	N 200	N 10	15	700	1	N 10	N 20	50	700	150
972	1	1	0.2	0.2	N 0.5	N 200	N 10	15	200	< 1	N 10	N 20	10	100	70
973	5	1.5	0.2	1	N 0.5	N 200	N 10	30	500	N 1	N 10	N 20	30	500	100
974	5	1.5	0.5	1	N 0.5	N 200	N 10	20	500	< 1	N 10	N 20	50	500	200
975	3	2	0.7	> 1	N 0.5	N 200	N 10	20	500	1	N 10	N 20	30	300	50
976	3	2	0.3	1	N 0.5	N 200	N 10	50	700	N 1	N 10	N 20	20	70	70
977	2	2	0.5	1	1	N 200	N 10	50	700	< 1	N 10	N 20	20	70	150
978	3	2	0.2	0.3	N 0.5	N 200	N 10	< 10	200	N 1	N 10	N 20	20	50	100
979	3	2	< 0.2	0.5	N 0.5	N 200	N 10	< 10	300	N 1	N 10	N 20	30	50	100
980	1	1	< 0.2	0.3	N 0.5	N 200	N 10	< 10	150	< 1	N 10	N 20	15	15	50
981	3	1.5	< 0.2	0.5	N 0.5	N 200	N 10	20	300	N 1	N 10	N 20	50	100	70
982	3	2	< 0.2	0.5	N 0.5	N 200	N 10	10	300	N 1	N 10	N 20	20	30	70
983	2	1.5	< 0.2	0.5	N 0.5	N 200	N 10	30	300	N 1	N 10	N 20	20	30	70
984	0.5	0.7	0.3	0.5	N 0.5	N 200	N 10	15	200	1	N 10	N 20	< 10	15	15
985	3	1.5	0.2	1	N 0.5	N 200	N 10	30	200	N 1	N 10	N 20	50	150	70
986	1.5	1	N 0.2	0.3	N 0.5	N 200	N 10	20	150	N 1	N 10	N 20	10	70	30
987	3	1.5	< 0.2	0.7	N 0.5	N 200	N 10	30	300	< 1	N 10	N 20	20	200	50
988	0.5	0.5	< 0.2	0.3	N 0.5	N 200	N 10	30	200	1	N 10	N 20	15	50	30
989	2	1	0.3	0.5	N 0.5	N 200	N 10	50	300	1	N 10	N 20	20	200	70
990	1	1	0.5	> 1	N 0.5	N 200	N 10	50	300	N 1	N 10	N 20	20	70	50
991	3	0.7	N 0.2	0.2	10	N 200	N 10	20	100	1	N 10	100	10	10	7000

Table 3. continued - RESULTS OF ANALYSIS OF STREAM-SEDIMENT SAMPLES

Field Number	Ga-ppm S	Ge-ppm S	La-ppm S	Mn-ppm S	Mo-ppm S	Nb-ppm S	Ni-ppm S	Pb-ppm S	Sb-ppm S	Sc-ppm S	Sn-ppm S	Sr-ppm S	Th-ppm S	V-ppm S	W-ppm S
940	7	N 10	N 50	150	N 5	N 20	< 5	< 10	N 100	< 5	N 10	< 100	N 100	50	N 20
944	50	N 10	N 50	150	N 5	N 20	10	15	N 100	10	N 10	100	N 100	300	N 20
945	30	N 10	N 50	2000	N 5	N 20	30	15	N 100	15	N 10	300	N 100	200	N 20
946	30	N 10	N 50	2000	N 5	N 20	50	15	N 100	20	N 10	300	N 100	300	N 20
946A	30	N 10	N 50	1500	N 5	N 20	20	10	N 100	15	N 10	300	N 100	200	N 20
947	30	N 10	< 50	1500	N 5	N 20	100	10	N 100	20	N 10	200	N 100	200	N 20
948	50	N 10	N 50	2000	N 5	N 20	70	20	N 100	30	N 10	300	N 100	300	N 20
949	30	N 10	< 50	2000	5	N 20	50	20	N 100	10	N 10	100	N 100	300	N 20
950	50	N 10	N 50	> 5000	< 5	< 20	50	30	N 100	10	N 10	< 100	N 100	200	N 20
951	50	N 10	< 50	3000	5	< 20	200	50	N 100	10	N 10	100	N 100	150	N 20
952	50	N 10	< 50	2000	N 5	20	30	70	N 100	7	N 10	100	N 100	200	N 20
953	30	N 10	N 50	1000	< 5	< 20	50	< 10	N 100	10	N 10	150	N 100	200	N 20
954	50	N 10	< 50	5000	N 5	N 20	20	30	N 100	10	N 10	200	N 100	150	N 20
954A	50	N 10	< 50	3000	< 5	N 20	20	20	N 100	10	N 10	300	N 100	200	N 20
955	20	N 10	< 50	5000	5	N 20	30	20	N 100	10	N 10	200	N 100	200	N 20
956	20	N 10	< 50	3000	7	N 20	100	50	N 100	10	N 10	100	N 100	150	N 20
957	30	N 10	< 50	1500	15	< 20	150	20	N 100	10	N 10	100	N 100	1500	N 20
958	30	N 10	N 50	2000	5	< 20	70	10	N 100	15	N 10	100	N 100	300	N 20
959	30	N 10	< 50	1500	7	N 20	100	10	N 100	10	N 10	100	N 100	700	N 20
960	20	N 10	N 50	2000	< 5	< 20	30	< 10	N 100	7	N 10	100	N 100	500	N 20
961	20	N 10	N 50	1500	< 5	N 20	15	10	N 100	10	N 10	< 100	N 100	500	N 20
962	30	N 10	N 50	1500	N 5	< 20	30	15	N 100	15	N 10	200	N 100	300	N 20
963	30	N 10	N 50	1500	N 5	N 20	20	10	N 100	20	N 10	200	N 100	500	N 20
964	50	N 10	N 50	700	5	N 20	20	20	N 100	20	N 10	300	N 100	300	N 20
965	50	N 10	N 50	3000	N 5	N 20	30	15	N 100	20	N 10	100	N 100	300	N 20
966	50	N 10	N 50	1500	N 5	N 20	150	15	N 100	30	N 10	N 100	N 100	500	N 20
967	30	N 10	N 50	> 5000	N 5	N 20	30	15	N 100	20	N 10	N 100	N 100	200	N 20
968	50	N 10	N 50	2000	N 5	N 20	50	20	N 100	20	N 10	300	N 100	300	N 20
969	30	N 10	N 50	> 5000	N 5	20	20	20	N 100	15	N 10	200	N 100	200	N 20
970	50	N 10	N 50	> 5000	N 5	< 20	70	20	N 100	30	N 10	300	N 100	300	N 20
971	50	N 10	N 50	2000	N 5	N 20	70	20	N 100	30	N 10	300	N 100	300	N 20
972	20	N 10	N 50	1500	N 5	N 20	15	15	N 100	10	N 10	100	N 100	200	N 20
973	30	N 10	N 50	2000	N 5	N 20	100	15	N 100	30	N 10	200	N 100	300	N 20
974	50	N 10	N 50	2000	N 5	N 20	100	15	N 100	30	N 10	200	N 100	300	N 20
975	50	N 10	50	3000	N 5	30	50	15	N 100	20	N 10	200	N 100	200	N 20
976	70	N 10	< 50	2000	N 5	N 20	30	15	N 100	15	N 10	200	N 100	300	N 20
977	50	N 10	< 50	1500	N 5	N 20	20	70	N 100	15	30	150	N 100	500	N 20
978	50	N 10	N 50	1000	< 5	N 20	10	10	N 100	30	N 10	150	N 100	300	N 20
979	30	N 10	N 50	2000	10	N 20	20	10	N 100	7	N 10	300	N 100	200	N 20
980	20	N 10	N 50	1000	N 5	N 20	7	10	N 100	20	N 10	150	N 100	200	N 20
981	30	N 10	N 50	5000	N 5	N 20	30	20	N 100	20	N 10	200	N 100	300	N 20
982	30	N 10	N 50	1500	N 5	N 20	15	10	N 100	20	N 10	300	N 100	300	N 20
983	20	N 10	N 50	1500	N 5	N 20	20	15	N 100	15	N 10	200	N 100	300	N 20
984	15	N 10	N 50	700	N 5	< 20	5	15	N 100	< 5	N 10	100	N 100	50	N 20
985	50	N 10	N 50	700	N 5	N 20	70	15	N 100	15	N 10	100	N 100	200	N 20
986	20	N 10	N 50	1500	N 5	N 20	15	15	N 100	10	N 10	200	N 100	100	N 20
987	30	N 10	N 50	1500	N 5	N 20	50	15	N 100	20	N 10	200	N 100	200	N 20
988	15	N 10	N 50	> 5000	N 5	N 20	10	10	N 100	5	N 10	100	N 100	150	N 20
989	30	N 10	< 50	1000	N 5	N 20	50	15	N 100	15	N 10	200	N 100	200	N 20
990	30	N 10	< 50	1000	N 5	N 20	20	20	N 100	10	N 10	200	N 100	300	N 20
991	70	N 10	N 50	> 5000	15	N 20	N 5	100	N 100	5	N 10	N 100	N 100	50	N 20

Table 3. continued - RESULTS OF ANALYSIS OF STREAM-SEDIMENT SAMPLES

Field Number	Y-ppm S	Zn-ppm S	Zr-ppm S	Au-ppm AA	Hg-ppm AA
940	< 10	N 200	10	N 0.33	1.1
944	< 10	N 200	30	N 0.05	0.03
945	20	N 200	70	N 0.05	0.15
946	15	N 200	20	N 0.20	0.04
946A	10	N 200	20	N 0.05	0.08
947	15	N 200	50	N 0.10	0.03
948	15	N 200	30	N 0.05	0.15
949	15	N 200	30	N 0.10	0.05
950	10	N 200	100	N 0.05	0.05
951	20	< 200	150	N 0.05	0.17
952	15	< 200	200	N 0.05	0.05
953	15	N 200	150	N 0.05	0.06
954	15	N 200	50	N 0.05	0.07
954A	15	N 200	100	N 0.05	0.06
955	15	N 200	200	N 0.05	0.10
956	20	300	150	N 0.05	0.37
957	20	700	200	N 0.05	0.20
958	15	N 200	150	N 0.05	0.09
959	20	200	150	N 0.05	0.19
960	15	N 200	150	N 0.05	0.14
961	15	N 200	100	N 0.05	0.13
962	15	N 200	150	N 0.05	0.05
963	15	N 200	100	N 0.05	0.02
964	15	N 200	150	N 0.05	0.03
965	20	N 200	100	N 0.05	0.06
966	20	N 200	100	N 0.05	0.03
967	20	N 200	100	0.05	0.13
968	15	N 200	50	N 0.05	N 0.02
969	15	N 200	300	N 0.05	0.06
970	20	N 200	100	N 0.10	0.02
971	20	N 200	50	N 0.05	N 0.02
972	15	N 200	30	N 0.05	0.08
973	20	N 200	50	N 0.05	0.02
974	20	N 200	50	N 0.05	0.03
975	30	N 200	> 1000	N 0.05	0.04
976	15	N 200	70	N 0.05	0.05
977	20	< 200	70	0.80	0.05
978	15	N 200	100	N 0.05	0.04
979	15	N 200	30	N 0.05	0.03
980	10	N 200	30	N 0.10	0.10
981	15	N 200	20	N 0.05	0.02
982	20	N 200	70	N 0.05	N 0.02
983	15	N 200	50	N 0.05	0.06
984	< 10	N 200	70	N 0.05	0.16
985	20	N 200	50	N 0.05	0.09
986	10	N 200	30	N 0.05	0.09
987	15	N 200	50	N 0.20	0.06
988	< 10	N 200	30	N 0.10	0.22
989	15	N 200	70	N 0.05	0.11
990	15	N 200	50	N 0.05	0.13
991	100	10000	500	0.25	3.3

Table 4. RESULTS OF ANALYSIS OF HEAVY-MINERAL-CONCENTRATE SAMPLES

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

Field Number	Lab No	Lat	Long	Ca-pct. S	Fe-pct. S	Mg-pct. S	Na-pct. S	P-pct. S	Ti-pct. S	Ag-ppm S	As-ppm S	Au-ppm S	B-ppm S	Ba-ppm S	Be-ppm S
940	D-382853	553740	1323340	15	20	10	0.5	N 0.5	2	N 1	N 500	N 20	20	100	N 2
941	D-382854	552810	1324217	1	) 50	0.2	(0.5	N 0.5	0.5	50	1000	N 20	20	10000	N 2
942	D-382855	552815	1324219	0.2	50	0.2	N 0.5	N 0.5	) 2	10	700	N 20	20	700	N 2
943	D-382856	552820	1324222	0.1	) 50	0.05	(0.5	N 0.5	0.1	30	1000	N 20	(20	150	N 2
944	D-382857	553810	1323422	10	20	5	0.7	N 0.5	2	N 1	N 500	N 20	30	200	N 2
945	D-382858	553728	1323030	10	30	5	0.5	N 0.5	) 2	N 1	N 500	N 20	50	200	N 2
946	D-382859	555312	1323855	10	15	3	0.5	N 0.5	1	N 1	N 500	N 20	(20	200	N 2
946A	D-382860	555312	1323855	15	15	3	0.5	N 0.5	0.7	(1	N 500	N 20	30	200	N 2
947	D-382861	555330	1324320	7	50	2	0.5	N 0.5	) 2	1	N 500	N 20	30	150	N 2
948	D-382862	555448	1324512	15	20	7	0.5	N 0.5	1	N 1	N 500	N 20	20	200	N 2
949	D-382863	552930	1325730	7	20	5	(0.5	N 0.5	) 2	(1	N 500	N 20	50	300	N 2
950	D-382864	552955	1325850	7	30	5	0.5	N 0.5	) 2	(1	N 500	N 20	20	) 10000	N 2
951	D-382865	552837	1325940	7	30	5	(0.5	N 0.5	) 2	3	N 500	N 20	20	) 10000	(2
952	D-382866	553108	1330150	15	15	10	0.5	N 0.5	) 2	N 1	N 500	N 20	(20	700	N 2
953	D-382867	553005	1330435	10	20	7	(0.5	N 0.5	) 2	(1	N 500	N 20	30	500	N 2
954	D-382868	553238	1330540	10	30	5	0.5	N 0.5	) 2	N 1	N 500	N 20	50	300	N 2
955	D-382869	551228	1330558	10	30	5	0.5	N 0.5	) 2	5	N 500	N 20	70	500	N 2
956	D-382870	553141	1330640	10	50	5	0.5	N 0.5	) 2	(1	N 500	N 20	(20	2000	N 2
958	D-382871	553110	1330130	15	15	10	0.5	N 0.5	) 2	N 1	N 500	N 20	20	500	N 2
959	D-382872	552950	1330532	10	30	7	0.5	N 0.5	) 2	(1	N 500	N 20	20	5000	N 2
960	D-382873	552855	1330410	10	20	7	(0.5	N 0.5	) 2	N 1	N 500	N 20	20	200	N 2
961	D-382874	552755	1325812	7	20	7	0.5	N 0.5	) 2	N 1	N 500	N 20	200	200	N 2
962	D-382875	553242	1330525	10	30	5	(0.5	N 0.5	) 2	N 1	N 500	N 20	70	150	N 2
963	D-382876	553242	1330503	10	30	7	0.5	N 0.5	) 2	N 1	N 500	N 20	50	300	N 2
964	D-382877	553246	1330450	10	20	7	0.5	N 0.5	) 2	N 1	N 500	N 20	50	500	N 2
965	D-382878	552240	1325140	10	30	3	0.5	N 0.5	) 2	N 1	N 500	N 20	70	150	N 2
966	D-382879	552320	1325040	5	50	2	0.5	N 0.5	2	300	N 500	100	70	1500	N 2
967	D-382880	552840	1325100	3	) 50	1	(0.5	N 0.5	) 2	2	N 500	N 20	20	150	N 2
968	D-382881	554235	1323055	10	20	5	0.5	N 0.5	1.5	N 1	N 500	N 20	50	200	N 2
969	D-382882	554400	1322950	10	20	7	0.7	N 0.5	) 2	N 1	N 500	N 20	20	200	N 2
970	D-382883	554216	1323140	10	15	7	0.5	N 0.5	2	N 1	N 500	N 20	50	200	N 2
973	D-382884	554727	1323908	7	20	7	0.5	N 0.5	) 2	N 1	N 500	N 20	70	150	N 2
974	D-382885	554903	1323850	15	15	7	1	N 0.5	1.5	N 1	N 500	N 20	70	200	N 2
975	D-382886	554417	1323345	7	20	5	(0.5	(0.5	) 2	N 1	N 500	N 20	50	150	N 2
976	D-382887	552905	1324940	10	20	5	0.5	N 0.5	) 2	N 1	N 500	N 20	150	2000	N 2
977	D-382888	553010	1324958	7	50	3	0.5	N 0.5	) 2	200	N 500	150	30	2000	N 2
978	D-382889	553345	1325250	10	50	5	0.5	N 0.5	) 2	N 1	N 500	N 20	(20	150	N 2
979	D-382890	553330	1325350	10	30	7	0.7	N 0.5	2	N 1	N 500	N 20	(20	200	N 2
980	D-382891	553415	1325505	7	50	3	0.5	N 0.5	2	N 1	N 500	N 20	20	200	N 2
981	D-382892	553450	1325530	7	20	5	0.5	N 0.5	2	N 1	(500	N 20	(20	200	N 2
982	D-382893	553448	1325515	7	30	2	0.7	N 0.5	0.7	N 1	N 500	N 20	(20	100	N 2
983	D-382894	553708	1325542	10	20	5	0.5	N 0.5	) 2	N 1	N 500	N 20	20	300	N 2
985	D-382895	554800	1330910	7	20	3	0.5	N 0.5	) 2	N 1	N 500	N 20	20	150	N 2
986	D-382896	554730	1331150	10	30	5	0.5	N 0.5	) 2	N 1	N 500	N 20	70	200	N 2
987	D-382897	554515	1331235	10	20	5	(0.5	N 0.5	2	(1	N 500	N 20	30	150	N 2
988	D-382898	554350	1331230	10	20	7	(0.5	N 0.5	2	N 1	N 500	N 20	50	300	(2

Table 4. continued - RESULTS OF ANALYSIS OF HEAVY-MINERAL-CONCENTRATE SAMPLES

Field Number	Bi-ppm S	Cd-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S	Ga-ppm S	Ge-ppm S	La-ppm S	Mn-ppm S	Mo-ppm S	Nb-ppm S	Ni-ppm S	Pb-ppm S	Sb-ppm S	Sc-ppm S
940	N 20	N 50	50	200	100	20	N 20	N 100	5000	N 10	N 50	30	(20	N 200	100
941	N 20	(50	150	70	2000	N 10	N 20	N 100	300	(10	N 50	1000	200	N 200	N 10
942	N 20	100	50	70	2000	10	N 20	N 100	500	20	(50	700	150	N 200	10
943	N 20	50	100	30	2000	N 10	N 20	N 100	100	N 10	N 50	1000	200	N 200	N 10
944	N 20	N 50	30	200	100	20	N 20	N 100	3000	N 10	N 50	50	(20	N 200	70
945	N 20	N 50	50	200	300	15	N 20	N 100	5000	N 10	N 50	50	20	N 200	70
946	N 20	N 50	50	200	100	30	N 20	N 100	3000	N 10	N 50	30	20	N 200	50
946A	N 20	N 50	20	300	30	50	N 20	N 100	3000	N 10	N 50	30	20	N 200	70
947	N 20	N 50	700	200	500	20	N 20	150	2000	N 10	N 50	100	30	N 200	50
948	N 20	N 50	50	1500	70	15	N 20	N 100	3000	N 10	N 50	70	20	N 200	70
949	N 20	N 50	30	1500	150	10	N 20	100	5000	N 10	50	100	30	N 200	50
950	N 20	N 50	50	2000	100	20	N 20	N 100	7000	N 10	N 50	100	50	N 200	50
951	N 20	N 50	70	1500	200	N 10	N 20	N 100	2000	N 10	(50	300	70	N 200	50
952	N 20	N 50	50	5000	30	N 10	N 20	N 100	1500	N 10	N 50	200	(20	N 200	100
953	N 20	N 50	50	5000	50	(10	N 20	N 100	3000	N 10	(50	200	50	N 200	50
954	N 20	N 50	50	1000	30	20	N 20	N 100	5000	N 10	(50	50	30	N 200	50
955	N 20	N 50	50	1500	100	20	N 20	100	5000	N 10	N 50	50	30	N 200	70
956	N 20	N 50	50	1000	100	50	N 20	N 100	5000	N 10	N 50	70	50	N 200	50
958	N 20	N 50	50	5000	10	20	N 20	N 100	1500	N 10	N 50	200	(20	N 200	200
959	N 20	N 50	50	5000	100	30	N 20	N 100	2000	20	(50	200	30	N 200	70
960	N 20	N 50	70	5000	70	20	N 20	N 100	1500	15	N 50	200	30	N 200	150
961	N 20	N 50	50	5000	50	30	N 20	N 100	3000	N 10	N 50	150	20	N 200	100
962	N 20	N 50	30	2000	70	50	N 20	N 100	5000	N 10	50	50	20	N 200	50
963	N 20	N 50	50	1500	70	50	N 20	N 100	5000	N 10	N 50	50	20	N 200	70
964	N 20	N 50	50	1000	100	30	N 20	N 100	3000	N 10	N 50	50	20	N 200	100
965	N 20	N 50	50	1000	150	50	N 20	N 100	) 10000	N 10	N 50	50	20	N 200	30
966	N 20	N 50	500	1500	2000	30	N 20	N 100	1500	N 10	N 50	500	100	N 200	20
967	N 20	N 50	200	700	5000	20	N 20	N 100	1500	(10	N 50	50	20	N 200	20
968	N 20	N 50	50	1000	50	30	N 20	N 100	3000	N 10	(50	50	20	N 200	70
969	N 20	N 50	50	1000	30	20	N 20	N 100	10000	N 10	100	50	20	N 200	50
970	N 20	N 50	50	1500	30	30	N 20	N 100	5000	N 10	50	50	20	N 200	70
973	N 20	N 50	50	1500	150	30	N 20	N 100	3000	N 10	N 50	150	20	N 200	70
974	N 20	N 50	50	1500	150	70	N 20	N 100	3000	N 10	N 50	100	20	N 200	70
975	N 20	N 50	30	500	70	30	N 20	N 100	5000	N 10	150	50	20	N 200	70
976	N 20	N 50	50	700	1000	30	N 20	N 100	3000	N 10	N 50	70	20	N 200	70
977	N 20	N 50	300	1500	2000	30	N 20	N 100	3000	N 10	N 50	100	300	N 200	50
978	N 20	N 50	100	100	500	100	N 20	N 100	) 10000	N 10	N 50	20	20	N 200	30
979	N 20	N 50	50	200	100	50	N 20	N 100	) 10000	N 10	N 50	20	20	N 200	100
980	N 20	N 50	50	150	150	50	N 20	N 100	10000	N 10	N 50	20	20	N 200	50
981	N 20	N 50	50	500	200	30	N 20	N 100	5000	N 10	N 50	50	30	N 200	150
982	N 20	N 50	50	150	70	100	N 20	N 100	5000	N 10	N 50	10	20	N 200	20
983	N 20	N 50	70	200	70	50	N 20	N 100	5000	N 10	N 50	50	30	N 200	100
985	N 20	N 50	50	2000	50	70	N 20	N 100	3000	N 10	N 50	70	50	N 200	100
986	N 20	N 50	50	1500	100	50	N 20	N 100	2000	15	N 50	70	20	N 200	100
987	N 20	N 50	50	1500	100	30	N 20	N 100	3000	N 10	N 50	70	20	N 200	150
988	N 20	N 50	50	3000	150	20	N 20	N 100	2000	N 10	N 50	100	30	N 200	150

Table 4. continued - RESULTS OF ANALYSIS OF HEAVY-MINERAL-CONCENTRATE SAMPLES

Field Number	Sn-ppm S	Sr-ppm S	Th-ppm S	V-ppm S	W-ppm S	Y-ppm S	Zn-ppm S	Zr-ppm S	Pd-ppm S	Pt-ppm S
940	N 20	700	N 200	3000	N 50	30	N 500	500	N 100	N 100
941	N 20	N 200	N 200	100	N 50	20	) 20000	50	N 100	N 100
942	N 20	N 200	N 200	200	N 50	700	5000	1500	N 100	N 100
943	N 20	N 200	N 200	50	N 50	N 20	) 20000	100	N 100	N 100
944	N 20	700	N 200	2000	N 50	50	N 500	2000	N 100	N 100
945	N 20	500	N 200	3000	N 50	20	N 500	(20	N 100	N 100
946	N 20	500	N 200	1000	N 50	30	N 500	70	N 100	N 100
946A	N 20	700	N 200	1000	N 50	30	N 500	70	N 100	N 100
947	N 20	500	N 200	1500	N 50	70	N 500	100	N 100	N 100
948	N 20	700	N 200	1000	N 50	30	N 500	200	N 100	N 100
949	N 20	200	N 200	1000	N 50	70	N 500	2000	N 100	N 100
950	N 20	(200	N 200	1000	N 50	50	N 500	2000	N 100	N 100
951	N 20	N 200	N 200	200	N 50	30	700	300	N 100	N 100
952	N 20	N 200	N 200	700	N 50	20	N 500	700	N 100	N 100
953	N 20	N 200	N 200	700	N 50	20	N 500	2000	N 100	N 100
954	N 20	200	N 200	1500	N 50	50	N 500	) 2000	N 100	N 100
955	N 20	200	N 200	2000	N 50	50	N 500	2000	N 100	N 100
956	N 20	200	N 200	3000	N 50	50	N 500	2000	N 100	N 100
958	N 20	N 200	N 200	1000	N 50	(20	N 500	150	N 100	N 100
959	N 20	200	N 200	700	N 50	30	N 500	1000	N 100	N 100
960	N 20	N 200	N 200	700	N 50	20	N 500	100	N 100	N 100
961	N 20	300	N 200	1000	N 50	50	N 500	2000	N 100	N 100
962	N 20	300	N 200	1500	N 50	70	N 500	) 2000	N 100	N 100
963	N 20	300	N 200	1500	N 50	50	N 500	) 2000	N 100	N 100
964	N 20	300	N 200	1500	N 50	100	N 500	2000	N 100	N 100
965	N 20	500	N 200	1500	N 50	100	N 500	2000	N 100	N 100
966	N 20	N 200	N 200	300	N 50	70	N 500	700	N 100	N 100
967	N 20	(200	N 200	300	N 50	50	N 500	200	N 100	N 100
968	N 20	700	N 200	1000	N 50	50	N 500	2000	N 100	N 100
969	N 20	500	N 200	500	N 50	70	N 500	) 2000	N 100	N 100
970	N 20	500	N 200	700	N 50	50	N 500	) 2000	N 100	N 100
973	N 20	300	N 200	1000	N 50	50	N 500	100	N 100	N 100
974	N 20	500	N 200	500	N 50	30	N 500	100	N 100	N 100
975	N 20	300	N 200	500	N 50	70	N 500	) 2000	N 100	N 100
976	N 20	500	N 200	700	N 50	30	N 500	) 2000	N 100	N 100
977	150	300	N 200	500	200	50	N 500	70	N 100	N 100
978	N 20	N 200	N 200	5000	N 50	100	N 500	) 2000	N 100	N 100
979	N 20	(200	N 200	2000	N 50	100	N 500	1500	N 100	N 100
980	N 20	N 200	N 200	3000	N 50	70	N 500	1000	N 100	N 100
981	N 20	(200	N 200	2000	N 50	70	N 500	1000	N 100	N 100
982	N 20	N 200	N 200	3000	N 50	50	N 500	1000	N 100	N 100
983	N 20	300	N 200	2000	N 50	70	N 500	700	N 100	N 100
985	N 20	200	N 200	2000	N 50	20	N 500	1500	N 100	N 100
986	N 20	500	N 200	1500	N 50	30	N 500	700	N 100	N 100
987	N 20	300	N 200	1000	N 50	30	N 500	50	N 100	N 100
988	N 20	500	N 200	1000	N 50	30	N 500	100	N 100	N 100