UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical results and sample locality map of heavy-mineral-concentrate samples from the Goshute Peak Wilderness Study Area (NV-010-033), Elko County, Nevada

By

Gordon W. Day and Harlan N. Barton

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STUDIES RELATED TO WILDERNESS

Bureau of Land Management Wilderness Study Areas

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 Goshute Peak Wilderness Study Area (NV-010-033), Elko County, Nevada.

INTRODUCTION

In May 1984, the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Goshute Peak Wilderness Study Area (NV-010-033), Elko County, Nevada.

The Goshute Peak Wilderness Study Area (NV-010-033), comprises 69,770 acres, about 109 mi^2 (282 km^2) in the southeastern portion of Elko County, Nevada, and lies about 20 mi (32 km) southwest of Wendover, Nevada (see fig. 1). We studied 61,004 acres, about 95 mi^2 (246 km^2) of the Goshute Peak Wilderness Study Area. Throughout this report "wilderness study area" and "study area" refer only to the area studied by the U.S. Geological Survey. Access to the study area is provided by roads and jeep trails branching from U.S. alternate 93.

The wilderness study area is in the southern part of the Goshute-Toano Range, a typical block-faulted range in the center of the Great Basin geomorphic province and the Basin and Range structural province. The range is bounded by steep basin range faults on the west which produce impressively high west-facing cliffs. Its eastern margin defined by erosional patterns, is more subdued and indefinite. Rocks exposed in and near the wilderness study area are shallow water marine formations of Middle Cambrian to Triassic age, igneous, mostly rhyolitic rocks of Tertiary age, and terrestrial sediments of Tertiary and Quaternary age.

The lower Paleozoic sequence is folded in the form of a subdued anticline whose axis trends north through the wilderness study area but veers westward under Goshute Valley just north of the area. Two styles of brittle extension are displayed in the study area. Extension within the Middle Cambrian to Devonian sequence was accommodated by younger-on-older low-angle planar faults that caused thinning or elimination of stratigraphic units. These faults are concentrated mainly in the Ordovician rocks. Extension within the overlying strata was accommodated by high angle listric faults that flattened downward nearly parallel to bedding in, or sporadically below, Mississippian shale. Blocks of upper Paleozoic rocks have rotated as much as 90 degrees and have spread apart leaving the lower Paleozoic sequence almost completely denuded.

METHODS OF STUDY

Sample Medium

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.

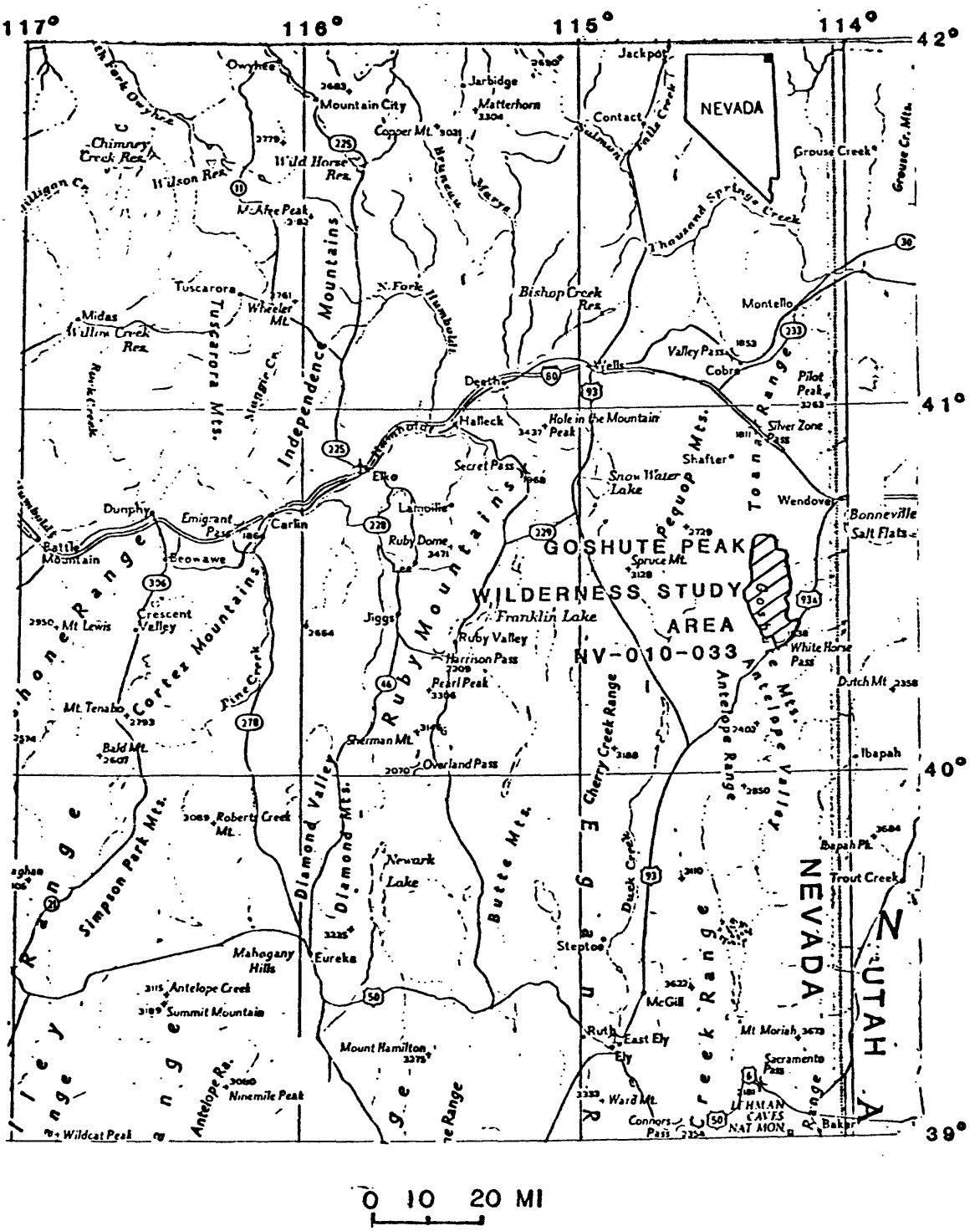

Figure 1. Locality map of the Goshute Peak Wilderness Study Area (NV-010-033), Elko County, Nevada.

Sample Collection

Samples were collected at 129 sites (plate 1). At 16 of those sites, a duplicate sample was also collected as part of a general study to determine analytical and sampling variation. The duplicate samples are shown by a slashed line (/) between the sample numbers on plate 1. The average sampling density was about one sample site per 0.7 mi^2. The area of the drainage basins sampled ranged from 0.3 mi^2 to 1.5 mi^2.

Heavy-mineral-concentrate samples

The heavy-mineral-concentrate samples were collected from active alluvium 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). Each sample was composited from several localities within an area that may extend as much as 100 ft from the site plotted on the map. Each bulk sample was sieved using 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

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 0.1 ampere to remove the magnetite and ilmenite, and a current of 1.0 ampere to split the remainder of the sample into paramagnetic and nonmagnetic fractions.

Sample Analysis

Spectrographic method

The heavy-mineral-concentrate samples were analyzed for 31 elements using a semiquantitative, direct-current arc emission spectrographic method (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. 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 Goshute Peak Wilderness Study Area (NV-010-033) are listed in table 2.

ROCK ANALYSIS STORAGE SYSTEM

Upon completion of all analytical work, the analytical results were entered into a computer-based file called Rock Analysis Storage System (RASS). 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 TABLE

Table 2 lists the results of the spectrographic analyses of the heavy-mineral-concentrate samples. 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. 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. Because of the formatting used in the computer program that produced the table, some of the elements listed in the table (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.

REFERENCES CITED

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.

Ketnea, Keith B., Day, Warren C., Elrick, Maya, Vaag, Myra K., Gerlitz, Carol N., Barton, Harlan N., Saltus, Richard W., Brown, S. Don, 1986, Mineral Resources of the Bluebell and Goshute Peak Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin (in press).

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.

TABLE 1.--Limits of determination for the spectrographic analysis of heavy-mineral concentrates, based on a 5-mg sample

Elements	Lower determination limit	Upper determination limit
	Percent	
Iron (Fe)	0.1	50
Magnesium (Mg)	.05	20
Calcium (Ca)	.1	50
Titanium (Ti)	.005	2
	Parts per million	
Manganese (Mn)	20	10,000
Silver (Ag)	1.0	10,000
Arsenic (As)	500	20,000
Gold (Au)	20	1,000
Boron (B)	20	5,000
Barium (Ba)	50	10,000
Beryllium (Be)	2	2,000
Bismuth (Bi)	20	2,000
Cadmium (Cd)	50	1,000
Cobalt (Co)	10	5,000
Chromium (Cr)	20	10,000
Copper (Cu)	10	50,000
Lanthanum (La)	50	2,000
Molybdenum (Mo)	10	5,000
Niobium (Nb)	50	5,000
Nickel (Ni)	10	10,000
Lead (Pb)	20	50,000
Antimony (Sb)	200	20,000
Scandium (Sc)	10	200
Tin (Sn)	20	2,000
Strontium (Sr)	200	10,000
Vanadium (V)	20	20,000
Tungsten (W)	100	20,000
Yttrium (Y)	20	5,000
Zinc (Zn)	500	20,000
Zirconium (Zr)	20	2,000
Thorium (Th)	200	5,000

TABLE 2.—Spectrographic analyses of heavy-mineral-concentrate samples from the Goshute Peak Wilderness Study Area, Elko County, Nevada

[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	Ba-ppm s	Be-ppm s
GA026H	40 25 57	114 15 13	.50	5.0	20	.05	150	N	N	N	20	N	N
GA027H	40 29 2	114 14 2	.50	2.0	10	1.00	100	N	N	N	50	>10,000	N
GA028H	40 25 27	114 12 22	1.00	1.0	20	.20	50	N	N	N	100	5,000	N
GA031H	40 27 55	114 13 41	.50	5.0	10	.20	100	N	N	N	50	5,000	N
GA032H	40 27 59	114 13 44	.50	7.0	10	.50	150	N	N	N	50	5,000	N
GA033H	40 27 47	114 13 13	.70	2.0	10	.50	70	N	N	N	70	2,000	N
GA034H	40 27 47	114 13 13	.50	2.0	20	.50	50	N	N	N	70	3,000	N
GA035H	40 27 50	114 13 10	.70	5.0	10	.70	100	N	N	N	50	5,000	N
GA036H	40 28 15	114 13 5	1.00	2.0	10	.50	100	N	N	N	50	3,000	N
GA037H	40 28 28	114 16 27	.50	10.0	20	.10	200	N	N	N	20	2,000	N
GA038H	40 28 18	114 15 45	.50	10.0	15	.20	150	N	N	N	20	2,000	N
GA039H	40 29 45	114 13 18	.50	5.0	10	.50	150	N	N	N	20	1,500	N
GA040H	40 29 45	114 13 18	.50	5.0	10	.20	150	N	N	N	20	1,500	N
GA041H	40 30 8	114 16 10	.50	5.0	10	.50	100	N	N	N	20	N	N
GA042H	40 30 12	114 16 8	1.00	10.0	20	.10	100	N	N	N	20	N	N
GA043H	40 31 0	114 13 45	.50	7.0	15	.70	150	N	N	N	20	1,500	N
GA044H	40 31 18	114 13 45	.30	5.0	10	1.00	100	N	N	N	20	N	N
GA045H	40 32 8	114 13 57	.50	5.0	20	.70	100	N	N	N	20	N	N
GA046H	40 32 20	114 14 35	.50	2.0	10	.70	100	N	N	N	20	N	N
GA047H	40 32 47	114 14 6	.20	10.0	10	.50	150	N	N	N	<20	N	N
GA048H	40 32 47	114 14 6	.30	7.0	10	1.00	150	N	N	N	20	N	N
GA049H	40 34 6	114 13 54	.50	7.0	10	1.00	150	N	N	N	20	1,000	N
GA050H	40 34 37	114 14 52	.30	10.0	20	.20	150	N	N	N	20	1,000	N
GA051H	40 35 18	114 15 13	.30	5.0	15	.50	150	N	N	N	20	1,000	N
GA052H	40 35 50	114 15 36	.50	2.0	5	1.00	100	N	N	N	20	1,500	N
GA053H	40 36 52	114 16 42	.70	2.0	10	2.00	150	N	N	N	30	1,000	N
GA054H	40 31 37	114 16 28	.30	5.0	10	.20	150	N	N	N	<20	N	N
GA055H	40 33 24	114 14 25	.50	2.0	5	1.00	100	N	N	N	20	N	N
GA056H	40 33 24	114 14 25	.30	5.0	10	.30	100	N	N	N	20	N	N
GA057H	40 33 11	114 15 45	1.00	2.0	10	1.00	150	N	N	N	50	700	N
GA058H	40 33 13	114 15 48	1.00	2.0	10	1.00	150	N	N	N	20	N	N
GA059H	40 33 26	114 15 39	.50	10.0	15	.10	200	N	N	N	50	N	N
GA060H	40 36 12	114 17 31	1.00	1.0	10	1.00	200	N	N	N	50	N	N
GA061H	40 36 5	114 16 32	.50	1.0	10	.50	200	N	N	N	20	500	N
GH001H	40 37 31	114 16 28	.15	10.0	10	.05	150	N	N	N	<20	2,000	N
GH002H	40 37 55	114 18 13	.50	2.0	10	1.50	150	N	N	N	30	300	N
GH003H	40 37 59	114 18 42	1.00	2.0	10	1.00	150	N	N	N	50	1,000	N
GH004H	40 37 23	114 19 18	.50	5.0	20	1.00	200	N	N	N	20	200	N
GH005H	40 37 18	114 19 21	1.00	2.0	10	1.00	150	N	N	N	50	N	N
GH006H	40 37 25	114 19 43	.30	2.0	20	.70	150	N	N	N	20	N	N
GH007H	40 34 8	114 20 9	1.00	1.0	50	.50	150	N	N	N	100	500	N
GH008H	40 34 39	114 19 52	.50	1.0	20	1.00	200	N	N	N	50	500	N
GH009H	40 34 39	114 19 52	.50	1.0	20	.50	200	N	N	N	50	1,000	2
GH010H	40 35 12	114 19 53	.50	.5	20	1.00	150	N	N	N	20	300	N
GH011H	40 35 22	114 19 58	.50	2.0	10	1.00	150	N	N	N	50	N	5

TABLE 2.--Continued

Sample	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	Sn-ppm s	Sr-ppm s
GA026H	N	N	N	100	<10	200	N	N	30	N	N	15	N	1,000
GA027H	N	N	N	70	<10	100	N	N	N	N	N	30	N	700
GA028H	N	N	N	300	<10	100	N	N	N	N	N	20	N	1,000
GA031H	N	N	N	20	<10	50	N	N	N	N	N	20	N	200
GA032H	N	N	N	20	<10	50	N	N	N	N	N	20	N	200
GA033H	N	N	N	300	10	150	N	N	N	50	N	10	N	700
GA034H	N	N	N	200	<10	100	N	N	N	<20	N	10	N	700
GA035H	N	N	N	70	<10	50	N	N	N	N	N	10	N	500
GA036H	N	N	N	50	<10	50	N	N	N	N	N	20	N	500
GA037H	<20	N	N	N	<10	50	N	N	N	<20	N	20	20	N
GA038H	N	N	N	20	<10	50	N	N	N	150	N	20	N	N
GA039H	N	N	N	100	10	100	N	N	N	50	N	10	N	200
GA040H	<20	N	N	50	<10	50	N	N	N	N	N	20	700	200
GA041H	N	N	N	50	<10	<50	N	N	N	N	N	20	N	N
GA042H	N	N	N	N	<10	<50	N	N	N	<20	N	10	N	N
GA043H	N	N	N	70	<10	50	N	N	N	N	N	10	N	200
GA044H	N	N	N	50	N	50	N	N	N	N	N	10	70	N
GA045H	N	N	N	N	<10	70	N	N	N	100	N	10	N	200
GA046H	N	N	N	50	<10	100	N	N	N	N	N	20	N	200
GA047H	N	N	N	N	<10	50	N	N	N	N	N	20	N	N
GA048H	N	N	N	50	N	100	N	N	N	20	N	10	N	N
GA049H	N	N	N	70	<10	50	N	N	N	N	N	20	N	N
GA050H	70	N	N	20	<10	50	N	N	N	N	N	15	N	N
GA051H	N	N	N	N	<10	70	N	N	N	N	N	10	N	500
GA052H	N	N	N	20	<10	50	N	N	N	N	<200	10	N	200
GA053H	N	N	N	70	10	70	N	N	N	100	10,000	30	N	200
GA054H	N	N	N	N	<10	50	N	N	N	N	N	N	N	500
GA055H	N	N	N	70	<10	50	N	N	N	N	N	20	N	N
GA056H	N	N	N	N	<10	<50	N	N	N	N	N	20	N	N
GA057H	N	N	N	70	10	100	N	N	N	N	N	20	N	200
GA058H	N	N	N	20	<10	150	N	N	N	N	N	10	N	500
GA059H	N	N	N	20	<10	100	N	N	N	N	N	20	N	700
GA060H	N	N	N	50	15	100	N	N	N	<20	N	20	N	700
GA061H	N	N	N	70	<10	70	N	N	N	N	N	15	N	500
GH001H	N	N	N	N	10	<50	N	N	N	N	N	N	N	N
GH002H	N	N	N	70	<10	50	N	N	N	N	<200	10	N	500
GH003H	N	N	N	100	<10	100	N	<50	N	N	1,000	20	N	700
GH004H	N	N	N	50	<10	50	N	N	N	20	3,000	10	N	500
GH005H	N	N	N	70	<10	50	N	N	N	N	700	20	N	500
GH006H	N	N	N	70	<10	100	N	N	N	N	5,000	10	N	1,500
GH007H	N	N	N	50	<10	70	N	N	N	N	N	10	N	700
GH008H	N	N	N	50	15	70	N	N	N	70	N	10	N	500
GH009H	N	N	N	20	<10	50	N	N	N	N	N	10	N	700
GH010H	N	N	N	100	<10	100	N	N	N	N	N	10	N	2,000
GH011H	N	N	N	70	<10	50	N	N	N	N	N	20	N	300

TABLE 2.--Continued

Sample	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
GA026H	20	N	200	N	2,000	N
GA027H	20	N	300	N	>2,000	N
GA028H	20	N	300	N	>2,000	N
GA031H	20	N	100	N	>2,000	N
GA032H	20	150	70	N	>2,000	N
GA033H	50	N	200	N	>2,000	N
GA034H	20	N	200	N	>2,000	N
GA035H	20	N	100	N	>2,000	N
GA036H	20	N	70	N	>2,000	N
GA037H	20	N	50	N	>2,000	N
GA038H	20	N	70	N	>2,000	N
GA039H	50	N	150	N	>2,000	N
GA040H	20	N	100	N	>2,000	N
GA041H	<20	N	100	N	>2,000	N
GA042H	<20	N	30	N	2,000	N
GA043H	20	N	150	N	>2,000	N
GA044H	20	N	150	N	>2,000	N
GA045H	20	N	150	N	>2,000	N
GA046H	20	N	200	N	>2,000	N
GA047H	<20	N	50	N	>2,000	N
GA048H	20	N	150	N	>2,000	N
GA049H	20	N	200	N	>2,000	N
GA050H	<20	N	50	N	>2,000	N
GA051H	<20	N	200	N	>2,000	N
GA052H	20	N	200	N	>2,000	N
GA053H	70	N	200	N	>2,000	N
GA054H	<20	N	100	N	700	N
GA055H	50	N	200	N	>2,000	N
GA056H	<20	N	70	N	>2,000	N
GA057H	50	N	200	N	>2,000	N
GA058H	20	N	200	N	>2,000	N
GA059H	<20	N	150	N	>2,000	N
GA060H	20	N	200	N	>2,000	N
GA061H	<20	N	100	N	>2,000	N
GH001H	<20	N	20	N	500	N
GH002H	50	<100	200	N	>2,000	N
GH003H	50	200	200	N	>2,000	N
GH004H	20	500	150	N	>2,000	N
GH005H	50	100	150	N	>2,000	N
GH006H	20	200	150	N	>2,000	N
GH007H	20	N	150	N	>2,000	N
GH008H	50	N	150	N	>2,000	N
GH009H	20	N	100	N	>2,000	N
GH010H	<20	N	150	N	>2,000	N
GH011H	50	N	200	N	>2,000	N

TABLE 2.--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	Be-ppm s
GH012H	40 33 10	114 19 5	.50	2.0	10	1.00	150	N	N	N	20	2,000	N
GH013H	40 33 4	114 19 1	.50	7.0	20	.50	200	N	N	N	20	N	N
GH014H	40 32 52	114 19 42	.30	10.0	10	.50	150	N	N	N	20	N	N
GH015H	40 33 3	114 19 51	.50	5.0	20	1.00	150	N	N	N	20	N	N
GH016H	40 36 10	114 19 41	.50	1.0	20	1.00	200	N	N	N	20	N	N
GH017H	40 36 5	114 19 45	1.00	2.0	20	.70	200	N	N	N	50	500	N
GH018H	40 36 42	114 20 10	.30	2.0	20	1.00	100	N	N	N	20	2,000	N
GH019H	40 27 31	114 18 21	.20	10.0	10	.50	150	N	N	N	20	3,000	N
GH020H	40 27 33	114 18 24	.50	10.0	20	.10	200	N	N	N	20	700	N
GH021H	40 27 25	114 19 10	.70	5.0	10	1.00	150	N	N	N	20	N	N
GH022H	40 27 22	114 19 36	.20	10.0	10	.70	150	N	N	N	20	700	N
GH023H	40 27 27	114 17 48	.50	5.0	20	.50	150	N	N	N	20	N	N
GH024H	40 28 34	114 20 57	.50	7.0	10	.20	100	N	N	N	<20	200	N
GH025H	40 28 37	114 20 58	1.00	10.0	20	.50	150	N	N	N	20	2,000	N
GH026H	40 28 51	114 21 50	.50	2.0	10	.20	100	N	N	N	20	>10,000	N
GJ001H	40 25 35	114 14 15	.30	10.0	20	.10	150	N	N	N	<20	700	N
GJ002H	40 24 11	114 13 39	.50	2.0	20	.70	100	N	N	N	50	500	N
GJ003H	40 23 50	114 13 43	.30	2.0	20	.20	70	N	N	N	20	2,000	N
GJ004H	40 23 19	114 14 25	.50	2.0	20	.50	100	N	N	N	20	500	N
GJ005H	40 22 51	114 13 42	.70	1.0	20	.20	100	N	N	N	70	500	N
GJ006H	40 21 43	114 14 48	.50	.5	20	.20	100	N	N	N	50	1,000	N
GJ007H	40 21 40	114 16 22	.50	5.0	20	.70	200	N	N	N	50	10,000	N
GJ008H	40 22 45	114 17 12	.30	5.0	7	1.00	100	N	N	N	<20	2,000	N
GJ009H	40 22 45	114 17 12	.30	10.0	20	.50	150	N	N	N	20	1,500	N
GJ010H	40 23 15	114 17 26	.30	10.0	10	.50	100	N	N	N	20	5,000	N
GJ011H	40 24 0	114 17 52	.20	5.0	10	1.00	100	N	N	N	20	>10,000	N
GJ012H	40 24 20	114 17 49	.20	10.0	20	.05	150	N	N	N	<20	200	N
GJ013H	40 25 9	114 17 49	.20	10.0	20	.20	150	N	N	N	<20	3,000	N
GJ014H	40 25 8	114 17 44	.30	2.0	10	.70	100	N	N	N	20	5,000	N
GJ015H	40 26 24	114 18 44	.30	10.0	10	1.00	150	N	N	N	50	500	N
GJ017H	40 26 57	114 19 1	1.00	10.0	20	.50	150	N	N	N	20	N	N
GJ018H	40 28 8	114 20 13	.30	7.0	10	.70	150	N	N	N	20	N	N
GJ019H	40 32 18	114 20 21	.20	2.0	10	1.00	150	N	N	N	20	200	N
GJ020H	40 32 18	114 20 21	.30	5.0	20	.20	150	N	N	N	20	700	N
GJ021H	40 31 51	114 17 54	1.00	5.0	20	.50	200	N	N	N	50	200	N
GJ022H	40 31 42	114 18 22	.50	5.0	20	.50	300	N	N	N	20	N	N
GJ023H	40 31 9	114 18 52	.50	10.0	15	.05	150	N	N	N	20	2,000	N
GJ024H	40 30 55	114 21 20	.50	7.0	20	.30	150	N	N	N	20	500	N
GJ025H	40 30 55	114 21 20	.50	7.0	20	.50	200	N	N	N	20	1,000	N
GJ026H	40 31 28	114 21 22	.50	2.0	20	.50	150	N	N	N	20	1,500	N
GJ027H	40 29 56	114 20 32	1.00	10.0	20	.20	100	N	N	N	<20	N	N
GK024H	40 25 27	114 12 18	.50	2.0	10	.70	150	N	N	N	50	>10,000	N
GK025H	40 25 27	114 12 18	1.00	2.0	10	.70	200	N	N	N	70	>10,000	N
GK026H	40 26 28	114 12 46	.50	.5	20	.50	100	N	N	N	70	>10,000	N
GK027H	40 27 6	114 14 12	.30	10.0	20	.50	150	N	N	N	20	300	N

TABLE 2.--Continued

Sample	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	Sn-ppm s	Sr-ppm s
GH012H	N	N	30	70	<10	70	N	N	N	N	N	10	N	200
GH013H	N	N	N	20	<10	<50	N	N	N	N	N	20	N	200
GH014H	N	N	N	20	<10	50	N	N	N	<20	N	20	N	200
GH015H	N	N	N	70	N	50	N	N	N	N	N	10	N	200
GH016H	N	N	N	50	<10	100	N	N	N	N	N	20	N	700
GH017H	N	N	N	50	<10	100	N	N	N	N	N	20	N	2,000
GH018H	N	N	N	50	<10	100	N	N	N	N	2,000	10	N	2,000
GH019H	N	N	N	20	10	50	N	N	N	20	N	10	N	200
GH020H	N	N	N	N	<10	<50	N	N	N	50	2,000	20	N	N
GH021H	N	N	N	50	<10	100	N	N	N	30	N	30	N	200
GH022H	N	N	N	50	<10	50	N	N	N	N	N	10	N	N
GH023H	N	N	N	20	<10	70	N	N	N	100	N	20	N	N
GH024H	N	N	N	N	<10	<50	N	N	N	20	N	10	N	N
GH025H	N	N	N	50	10	50	N	N	N	20	N	10	N	N
GH026H	N	N	N	150	15	200	N	N	20	20	N	10	N	1,500
GJ001H	N	N	N	N	<10	50	N	N	N	N	N	10	N	N
GJ002H	N	N	N	150	10	200	N	N	N	N	N	15	N	1,000
GJ003H	N	N	N	150	<10	150	N	N	30	N	N	10	N	1,000
GJ004H	N	N	N	150	10	100	N	N	30	N	N	10	N	1,000
GJ005H	N	N	N	200	15	500	N	N	70	<20	N	10	N	2,000
GJ006H	N	N	N	150	<10	200	N	N	30	N	N	10	N	1,000
GJ007H	N	N	N	100	10	100	N	<50	N	N	N	20	N	700
GJ008H	N	N	N	20	<10	50	N	N	N	N	N	10	N	N
GJ009H	N	N	N	50	<10	50	N	N	N	N	N	20	N	N
GJ010H	N	N	N	20	<10	50	N	N	N	N	N	15	N	N
GJ011H	N	N	N	20	<10	70	N	N	N	50	N	30	N	200
GJ012H	N	N	N	N	<10	<50	N	N	N	50	N	N	N	N
GJ013H	N	N	N	N	<10	<50	N	N	N	N	N	20	N	N
GJ014H	N	N	N	20	15	50	N	N	N	N	N	20	N	200
GJ015H	N	N	N	50	N	50	N	N	N	50	N	10	N	N
GJ017H	N	N	N	20	<10	50	N	N	N	20	N	20	N	N
GJ018H	N	N	N	20	<10	50	N	N	N	30	N	10	N	N
GJ019H	N	N	N	50	<10	100	N	N	N	N	N	10	N	200
GJ020H	N	N	N	20	<10	50	N	N	N	<20	N	15	N	500
GJ021H	N	N	N	N	<10	200	N	N	N	N	N	10	N	1,000
GJ022H	N	N	N	N	10	150	N	N	N	20	N	20	N	700
CJ023H	N	N	N	N	<10	<50	N	N	N	N	N	10	N	N
GJ024H	N	N	N	20	<10	50	N	N	N	N	<200	10	N	200
GJ025H	N	N	N	50	<10	100	N	N	N	N	N	10	N	300
GJ026H	N	N	N	50	<10	<50	N	N	N	N	N	20	N	300
GJ027H	N	N	N	N	<10	<50	N	N	N	N	N	<10	N	N
GK024H	N	N	N	150	10	100	N	N	N	70	N	10	N	1,000
GK025H	N	N	N	100	15	70	N	N	N	200	N	20	N	1,500
GK026H	N	N	N	150	<10	100	N	N	N	150	N	15	N	1,000
GK027H	N	N	N	50	20	50	N	N	N	N	<200	20	N	200

TABLE 2.--Continued

Sample	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
GH012H	20	N	200	<500	>2,000	N
GH013H	20	N	70	N	2,000	N
GH014H	50	N	150	N	>2,000	N
GH015H	20	N	150	N	>2,000	N
GH016H	20	N	200	N	2,000	N
GH017H	20	100	100	N	>2,000	N
GH018H	20	N	100	N	>2,000	N
GH019H	20	N	100	N	>2,000	N
GH020H	<20	N	70	N	>2,000	N
GH021H	50	N	200	N	>2,000	N
GH022H	20	N	100	N	>2,000	N
GH023H	20	N	150	N	>2,000	N
GH024H	<20	N	50	N	>2,000	N
GH025H	20	N	70	N	>2,000	N
GH026H	50	N	200	N	>2,000	N
GJ001H	<20	N	50	N	>2,000	N
GJ002H	50	N	500	N	>2,000	N
GJ003H	20	N	500	N	>2,000	N
GJ004H	20	N	700	N	>2,000	N
GJ005H	50	N	700	N	2,000	N
GJ006H	70	N	500	N	2,000	N
GJ007H	30	N	200	N	>2,000	N
GJ008H	20	N	100	N	>2,000	N
GJ009H	20	N	70	N	>2,000	N
GJ010H	<20	N	70	N	>2,000	N
GJ011H	50	N	200	N	>2,000	N
GJ012H	<20	N	<20	N	1,000	N
GJ013H	20	N	50	N	>2,000	N
GJ014H	20	N	200	N	>2,000	N
GJ015H	20	N	200	N	>2,000	N
GJ017H	<20	N	50	N	>2,000	N
GJ018H	20	N	100	N	>2,000	N
GJ019H	20	N	200	N	>2,000	N
GJ020H	20	N	70	N	>2,000	N
GJ021H	20	N	200	N	>2,000	N
GJ022H	<20	N	200	N	>2,000	N
GJ023H	20	N	20	N	1,000	N
GJ024H	20	150	70	N	>2,000	N
GJ025H	20	500	150	N	>2,000	N
GJ026H	<20	N	100	N	>2,000	N
GJ027H	<20	N	30	N	1,500	N
GK024H	20	N	150	N	>2,000	N
GK025H	50	N	100	N	>2,000	N
GK026H	20	N	150	N	>2,000	N
GK027H	20	N	100	N	>2,000	N

TABLE 2.--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	Be-ppm s
GK028H	40 27 8	114 14 52	.50	5.0	20	1.00	100	N	N	N	20	2,000	N
GK029H	40 27 5	114 14 50	.20	10.0	15	.20	100	N	N	N	20	1,500	N
GK030H	40 28 33	114 16 24	.50	10.0	10	.50	100	N	N	N	20	N	N
GK031H	40 28 24	114 16 16	.20	10.0	20	.05	150	N	N	N	<20	N	N
GK032H	40 28 33	114 15 4	.30	15.0	15	.05	150	N	N	N	20	700	N
GK033H	40 28 33	114 15 4	.50	7.0	20	.30	150	N	N	N	20	5,000	N
GK034H	40 29 7	114 13 28	.50	2.0	10	.20	70	N	N	N	20	>10,000	N
GK035H	40 29 16	114 13 26	.30	5.0	10	.50	70	N	N	N	20	>10,000	N
GK036H	40 30 25	114 13 57	.50	2.0	10	1.50	100	N	N	N	50	500	N
GK037H	40 31 7	114 15 43	.50	5.0	20	.15	200	N	N	N	20	N	N
GK038H	40 30 58	114 15 52	.50	10.0	20	.10	200	N	N	N	20	N	N
GK039H	40 31 17	114 15 31	.30	10.0	15	.05	200	N	N	N	20	N	N
GK040H	40 31 29	114 13 51	.30	10.0	20	.50	150	N	N	N	20	N	N
GK041H	40 31 29	114 13 51	.70	10.0	10	.50	150	N	N	N	20	N	N
GK042H	40 32 5	114 13 55	.20	5.0	15	.50	100	N	N	N	20	N	N
GK043H	40 32 34	114 14 8	.20	5.0	10	.07	150	N	N	N	<20	N	N
GK044H	40 33 9	114 13 59	.30	5.0	10	.70	100	N	N	N	20	N	N
GK045H	40 34 16	114 14 7	.20	10.0	20	.10	100	N	N	N	<20	N	N
GK046H	40 34 14	114 14 9	.20	7.0	15	.70	150	N	N	N	20	5,000	N
GK047H	40 34 59	114 15 1	.50	5.0	10	.50	100	N	N	N	20	500	N
GK048H	40 35 34	114 15 18	.30	2.0	5	1.00	150	N	N	N	30	10,000	N
GK049H	40 35 34	114 15 18	.50	5.0	10	.30	150	N	N	N	50	10,000	N
GK050H	40 36 43	114 16 36	.50	2.0	10	1.00	200	N	N	N	50	1,000	N
GK051H	40 31 41	114 16 33	.50	2.0	15	.50	300	N	N	N	50	N	N
GK052H	40 33 27	114 14 25	.50	5.0	10	1.00	100	N	N	N	20	200	N
GK053H	40 33 35	114 16 54	.50	7.0	15	.20	150	N	N	N	20	1,500	N
GK054H	40 33 38	114 16 53	.50	1.0	20	1.00	150	N	N	N	70	300	N
GK055H	40 33 38	114 16 53	.70	5.0	20	.20	200	N	N	N	20	N	N
GK056H	40 36 8	114 17 30	.50	2.0	5	1.50	200	N	N	N	20	N	N
GK057H	40 36 17	114 16 53	1.00	5.0	15	.50	300	N	N	N	50	N	N
GT001H	40 25 29	114 14 16	.20	5.0	20	.20	100	N	N	N	20	1,000	N
GT002H	40 25 40	114 14 2	.50	5.0	10	.70	100	N	N	N	20	5,000	N
GT003H	40 24 27	114 13 23	.30	5.0	10	1.00	150	N	N	N	20	5,000	N
GT004H	40 23 38	114 13 53	.50	1.0	20	.10	200	N	N	N	50	700	N
GT005H	40 23 15	114 14 28	1.00	10.0	50	.50	200	N	N	N	50	700	N
GT006H	40 22 55	114 13 57	.50	1.0	20	.70	100	N	N	N	70	300	N
GT007H	40 21 45	114 14 45	.20	2.0	7	1.00	100	N	N	N	20	1,500	N
GT008H	40 21 13	114 15 45	.30	5.0	5	1.00	100	N	N	N	20	500	N
GT009H	40 21 13	114 15 45	.70	5.0	20	1.00	150	N	N	N	50	1,500	N
GT010H	40 22 8	114 16 46	.30	5.0	20	.50	100	N	N	N	20	5,000	N
GT011H	40 22 30	114 16 59	.20	10.0	20	.20	150	N	N	N	20	1,500	N
GT012H	40 23 43	114 16 59	.20	10.0	15	.10	150	N	N	N	20	700	N
GT013H	40 24 42	114 17 23	.30	5.0	5	1.00	100	N	N	N	20	2,000	N
GT014H	40 24 50	114 17 30	.20	10.0	20	.70	100	N	N	N	<20	2,000	N
GT015H	40 25 37	114 18 47	.30	5.0	10	1.00	150	N	N	N	50	10,000	N

TABLE 2.--Continued

Sample	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	Sn-ppm s	Sr-ppm s
GK028H	N	N	N	50	10	70	N	N	N	N	N	10	N	200
GK029H	N	N	N	20	<10	100	N	N	N	N	N	20	N	200
GK030H	N	N	N	20	<10	<50	N	N	N	30	N	10	N	N
GK031H	N	N	N	N	<10	<50	N	N	N	N	N	N	N	N
GK032H	N	N	N	N	<10	<50	N	N	N	N	N	<10	N	N
GK033H	N	N	N	150	<10	150	N	N	N	20	N	10	N	500
GK034H	N	N	N	150	10	150	N	N	N	N	N	20	N	1,500
GK035H	N	N	N	50	10	50	N	N	N	N	N	20	N	1,500
GK036H	N	N	N	70	<10	100	N	N	N	50	N	30	N	500
GK037H	N	N	N	N	<10	100	N	N	N	N	N	10	N	500
GK038H	N	N	N	N	<10	50	N	N	N	N	N	20	N	N
GK039H	N	N	N	20	<10	50	N	N	N	<20	N	15	N	N
GK040H	N	N	N	20	<10	50	N	N	N	N	N	20	N	N
GK041H	N	N	N	50	<10	50	N	N	N	N	N	20	N	200
GK042H	N	N	N	N	<10	50	N	N	N	70	N	20	N	N
GK043H	N	N	N	N	<10	50	N	N	N	N	N	N	N	N
GK044H	N	N	N	20	<10	50	N	N	N	N	N	20	N	200
GK045H	N	N	N	N	<10	<50	N	N	N	N	N	N	N	N
GK046H	20	N	N	20	<10	50	N	N	N	N	N	10	N	N
GK047H	N	N	N	70	<10	50	N	N	N	N	N	10	N	200
GK048H	N	N	N	20	<10	50	N	N	N	50	N	10	200	200
GK049H	<20	N	N	N	<10	50	N	N	N	70	N	20	100	200
GK050H	N	N	N	70	10	100	N	N	N	150	N	20	N	500
GK051H	<20	N	N	N	10	150	N	N	N	<20	N	20	N	1,000
GK052H	N	N	N	50	<10	50	N	N	N	N	N	10	70	N
GK053H	N	N	N	20	<10	100	N	N	N	N	N	20	N	200
GK054H	N	N	N	200	15	200	N	N	50	<20	N	10	N	1,000
GK055H	N	N	N	N	<10	50	N	N	N	N	N	15	N	300
GK056H	N	N	N	100	10	100	N	N	N	N	N	50	N	200
GK057H	N	N	N	20	<10	100	N	N	N	N	N	20	N	500
GT001H	N	N	N	70	<10	70	N	N	N	N	N	10	N	500
GT002H	N	N	N	70	N	150	N	N	N	N	N	10	N	700
GT003H	N	N	N	50	<10	100	N	N	N	N	N	10	N	200
GT004H	N	N	N	200	15	200	N	N	30	<20	N	N	N	1,000
GT005H	N	N	N	200	10	1,000	N	N	30	20	N	10	N	2,000
GT006H	N	N	N	150	15	200	N	N	30	N	N	10	N	1,000
GT007H	N	N	N	50	<10	100	N	N	N	N	N	30	N	200
GT008H	N	N	N	50	<10	70	N	N	N	N	N	20	20	N
GT009H	N	N	N	150	<10	200	N	<50	30	<20	N	20	N	1,000
GT010H	N	N	N	100	10	100	N	N	N	50	N	30	N	700
GT011H	N	N	N	N	<10	50	N	N	N	N	N	20	N	200
GT012H	N	N	N	20	<10	50	N	N	N	N	N	15	N	200
GT013H	N	N	N	50	<10	50	N	N	N	N	N	30	N	N
GT014H	N	N	N	20	<10	50	N	N	N	N	N	10	N	N
GT015H	N	N	N	70	<10	100	N	N	N	50	N	30	N	N

TABLE 2.--Continued

Sample	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
GK028H	20	N	150	N	>2,000	N
GK029H	<20	N	70	N	>2,000	N
GK030H	20	N	100	N	>2,000	N
GK031H	<20	N	<20	N	1,000	N
GK032H	20	N	20	N	1,000	N
GK033H	50	N	150	N	>2,000	N
GK034H	50	N	200	N	>2,000	N
GK035H	20	N	100	N	>2,000	N
GK036H	50	N	300	N	>2,000	N
GK037H	<20	N	150	N	2,000	N
GK038H	20	N	70	N	700	N
GK039H	20	N	50	N	2,000	N
GK040H	20	N	70	N	>2,000	N
GK041H	20	N	50	N	>2,000	N
GK042H	<20	N	100	N	>2,000	N
GK043H	20	N	20	N	700	N
GK044H	20	N	150	N	>2,000	N
GK045H	<20	N	50	N	1,500	N
GK046H	20	N	200	N	>2,000	500
GK047H	20	N	200	N	>2,000	N
GK048H	20	N	200	N	>2,000	N
GK049H	50	N	150	N	>2,000	N
GK050H	20	N	150	N	>2,000	N
GK051H	20	N	300	N	>2,000	N
GK052H	20	N	200	N	>2,000	N
GK053H	<20	N	150	N	>2,000	N
GK054H	50	N	500	N	>2,000	N
GK055H	<20	N	70	N	>2,000	N
GK056H	70	N	300	N	>2,000	N
GK057H	20	N	100	N	>2,000	N
GT001H	<20	N	150	N	>2,000	N
GT002H	20	N	200	N	>2,000	N
GT003H	20	N	200	N	>2,000	N
GT004H	50	N	700	N	1,000	N
GT005H	70	N	500	N	>2,000	N
GT006H	50	N	500	N	>2,000	N
GT007H	20	N	200	N	>2,000	N
GT008H	30	N	150	N	>2,000	N
GT009H	50	N	500	N	>2,000	N
GT010H	20	N	300	N	>2,000	N
GT011H	20	N	100	N	700	N
GT012H	20	N	100	N	>2,000	N
GT013H	20	N	150	N	>2,000	N
GT014H	20	N	100	N	>2,000	N
GT015H	50	N	150	N	>2,000	N

TABLE 2.--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	Be-ppm s
GT016H	40 26 18	114 18 27	.20	10.0	20	.10	150	N	N	N	50	2,000	N
GT017H	40 26 18	114 18 27	.20	10.0	30	.10	150	N	N	N	<20	2,000	N
GT018H	40 26 37	114 18 42	.20	10.0	15	.20	100	N	N	N	<20	700	N
GT020H	40 31 54	114 17 55	.30	5.0	15	.70	200	N	N	N	50	N	N
GT021H	40 31 54	114 18 22	.50	.5	10	1.00	150	N	N	N	20	N	N
GT022H	40 31 7	114 18 57	.50	10.0	20	.50	150	N	N	N	50	N	N
GT023H	40 33 37	114 19 46	.50	5.0	20	1.00	200	N	N	N	20	500	N
GT024H	40 30 8	114 21 24	.70	2.0	15	1.00	100	N	N	N	50	700	N
GT025H	40 30 8	114 21 24	.30	10.0	20	.20	100	N	N	N	20	N	N
GT026H	40 29 54	114 20 33	.20	10.0	20	.20	100	N	N	N	<20	700	N

TABLE 2.--Continued

Sample	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	Sn-ppm s	Sr-ppm s
GT016H	N	N	N	N	<10	<50	N	N	N	N	N	10	N	200
GT017H	N	N	N	N	<10	50	N	N	N	N	N	15	N	N
GT018H	N	N	N	N	<10	<50	N	N	N	N	N	20	N	N
GT020H	N	N	N	50	<10	70	N	N	N	N	N	20	N	200
GT021H	N	N	N	70	<10	70	N	N	N	N	N	20	N	300
GT022H	N	N	N	50	<10	70	N	N	N	20	N	10	N	200
GT023H	N	N	N	70	<10	100	N	N	N	<20	N	10	N	500
GT024H	N	N	N	70	<10	100	N	N	N	N	N	20	N	500
GT025H	N	N	N	N	<10	<50	N	N	N	N	N	<10	N	N
GT026H	N	N	N	N	N	50	N	N	N	N	N	20	N	N

TABLE 2.--Continued

Sample	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s
GT016H	<20	N	50	N	2,000	N
GT017H	<20	N	50	N	>2,000	N
GT018H	<20	N	50	N	>2,000	N
GT020H	20	N	300	N	>2,000	N
GT021H	20	N	200	N	>2,000	N
GT022H	20	N	100	N	>2,000	N
GT023H	20	N	150	N	>2,000	N
GT024H	20	N	200	N	>2,000	N
GT025H	<20	N	50	N	1,000	N
GT026H	<20	N	70	N	>2,000	N