UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analytical results and sample locality map of stream-sediment, heavy-mineral-concentrate, and rock samples from the Dirty Devil, French Springs-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas (UT-050-236A,B,237), Wayne and Garfield Counties, Utah

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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. 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 and mineralogical survey of the Dirty Devil, French Spring-Happy Canyon and Horseshoe Canyon (UT-050-236A,B,237) Wilderness Study Areas, Wayne and Garfield Counties, Utah.

INTRODUCTION

In April 1982 the U.S. Geological Survey conducted a reconnaissance geochemical survey of the Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Wayne and Garfield Counties, Utah.

The Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas comprise about 470 mi^2 (1,222 km^2) in Wayne and Garfield Counties, Utah. Access to the study areas is provided by unimproved dirt roads and jeep trails.

The study areas are located along the Dirty Devil River fifteen miles southeast of Hanksville, Utah. The areas are comprised of flat lying sediments of the Henry Basin section that are Triassic to Holocene in age. The individual formations have been described in detail by Dubiel and others, 1984.

The topographic relief in the study areas is about 2400 ft (730 m), with a maximum elevation of 6400 ft (1950 m). The ground surface is a flat lying plateau which has been eroded to steep walled canyons by intermittent streams and one third-order river. The climate is arid.

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 a limited number of minerals in rock material eroded from the drainage basin upstream from each sample site. The selective concentration of minerals, many of which are ore-related, permits determination of some elements that are not easily detected in stream-sediment samples.

Analyses of unaltered or unmineralized rock samples provide background geochemical data for individual rock units. On the other hand, analyses of altered or mineralized rocks, where present, may provide useful geochemical information about the major- and trace-element assemblages associated with a mineralizing system.

Sample Collection

Samples were collected at 178 sites (plate 1). At nearly all of those sites, both a stream-sediment sample and a heavy-mineral-concentrate sample were collected. Where suitable outcrop was available, rock samples were collected. Sampling density was about 1 sample site per 2.6 mi^2 for the stream sediments and heavy-mineral concentrates, and about 1 sample site per 67 mi^2 for the rocks. The area of the drainage basins sampled ranged from 5 mi^2 to 25 mi^2.

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 = 1:50,000). 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.

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 were removed.

Rock samples

Rock samples were collected from outcrops or exposures in the vicinity of the plotted site location. Samples were collected from unaltered, altered, or mineralized rock outcrops.

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 including 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.

Rock samples were crushed and then pulverized to minus 0.15 mm with ceramic plates.

Sample Analysis

Spectrographic method

The stream-sediment, heavy-mineral-concentrate, and rock 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. 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 Dirty Devil, French Spring-Happy Canyon and Horseshoe Canyon Wilderness Study Areas are listed in Tables 2-4.

In addition to the spectrographic analysis, all heavy-mineral-concentrate samples were mineralogically analyzed. Minerals reported include zircon (round and euhedral), sphene, rutile, anatase, barite, apatite, scheelite, epidote, pyrite, pyroxene, arsenopyrite, amphibole and rock fragments. The relative abundance of these minerals was visually determined using a binocular microscope.

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, 1976).

DESCRIPTION OF DATA TABLES

Tables 2-4 list the analyses for the samples of rock, stream sediment, and heavy-mineral concentrate, respectively. For the three 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 maps (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. If an element was not looked for in a sample, two dashes (--) are entered in tables 2-4 in place of an analytical value. Because of the formatting used in the computer program that produced tables 2-4, 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.

Table 5 contains the mineralogical data for Dirty Devil, French Springs-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas. In the table, the data are arranged so that column 1 contains the USGS assigned sample numbers. These numbers again correspond to the numbers shown on the site location map (plate 1). Columns headed with mineral names show the relative amount of that specific mineral in a sample. Relative abundance is indicated by either two dashes (--) (meaning that mineral was not observed), or a number from 1-6, where: 1 = trace present, <1%; 2 = present, >2%; 3 = common, >5%; 4 = major, >20%; 5 = dominant, >50%; 6 = ubiquitous, >85%.

REFERENCES CITED

Dubiel, R. F., Bromfield, C. S., Larson, M. J., Patterson, C. G., and Peterson, Fred, 1984, Geologic map of the Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Wayne and Garfield Counties, Utah: U.S. Geological Survey Miscellaneous Field Study Map unpublished.

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.

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.

VanTrump, George, Jr., and Miesch, A. T., 1976, 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 rocks and stream sediments, 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 rocks and stream sediments]

Elements	Lower determination limit	Upper determination limit
	Percent	
Iron (Fe)	0.05	20
Magnesium (Mg)	.02	10
Calcium (Ca)	.05	20
Titanium (Ti)	.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
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.--Spectrographic analysis of rock samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah

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

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM904A	38 21 15	110 14 7	.3	.1	10	.15	700	N	N	N	20	300	N	N	N	N	100
HM904B	38 21 15	110 14 7	.3	.7	10	.15	700	N	N	N	50	200	N	N	N	N	30
HM904C	38 21 15	110 14 7	.2	7.0	15	.02	2,000	N	N	N	20	<20	N	N	N	7	<10
HM904D	38 21 15	110 14 7	.3	10.0	20	.02	3,000	N	N	N	<10	30	N	N	N	10	<10
HM904E	38 21 15	110 14 7	.3	1.5	3	.10	70	N	N	N	70	300	<1	N	N	<5	15
HM904F	38 21 15	110 14 7	.7	5.0	10	.10	1,500	N	N	N	30	100	N	N	N	10	20
HM905A	38 21 15	110 14 7	.3	10.0	15	.02	2,000	N	N	N	<10	30	N	N	N	7	10

TABLE 2.--Spectrographic analysis of rock samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-1H
HM904A	10	20	N	N	<5	30	N	<5	N	100	15	N	20	N	300	N
HM904B	5	<20	N	N	<5	30	N	<5	N	150	20	N	15	N	150	N
HM904C	10	20	N	N	5	15	N	N	N	200	15	N	10	N	10	N
HM904D	<5	20	N	N	<5	20	N	N	N	500	20	N	15	N	10	N
HM904E	10	<20	N	N	7	20	N	<5	N	300	30	N	10	N	100	N
HM904F	15	20	N	N	30	30	N	5	N	150	50	N	20	N	100	N
HM905A	10	<20	N	N	<5	15	N	N	N	150	10	N	10	N	15	N

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah

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

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-P	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM224	38 11 35	110 15 50	.50	.3	.50	.15	100	N	N	N	100	700	1.0	N	N	N	1(
HM225	38 12 5	110 15 25	.30	.2	.50	.15	70	N	N	N	30	500	1.0	N	N	N	100
HM226	38 10 10	110 17 30	1.00	1.0	3.00	.30	300	N	N	N	50	700	1.0	N	N	5	70
HM227	38 9 55	110 18 45	.70	1.0	2.00	.20	200	N	N	N	70	300	1.0	N	N	5	15
HM228	38 10 0	110 19 25	.30	.3	.50	.07	70	N	N	N	20	300	1.0	N	N	N	N
HM229	38 10 15	110 19 45	.50	.5	1.00	.10	100	N	N	N	15	300	1.0	N	N	N	10
HM230	38 10 7	110 20 5	.70	.5	1.00	.15	150	N	N	N	20	500	1.0	N	N	5	10
HM231	38 12 10	110 18 59	.30	.2	.30	.10	70	N	N	N	30	200	1.0	N	N	N	N
HM232	38 12 15	110 14 5	.20	.2	.50	.10	70	N	N	N	30	200	N	N	N	N	N
HM233	38 12 7	110 20 0	.70	.3	.30	.20	100	N	N	N	70	500	1.0	N	N	N	20
HM234	38 12 45	110 20 20	.50	.2	1.00	.20	100	N	N	N	30	700	1.0	N	N	N	10
HM235	38 12 34	110 20 45	.30	.2	.30	.15	70	N	N	N	20	300	N	N	N	N	15
HM236	38 12 53	110 20 45	.50	.3	1.00	.15	150	N	N	N	50	500	1.0	N	N	N	10
HM237	38 12 50	110 21 10	.50	.2	.50	.15	70	.5	N	N	30	500	N	N	N	N	20
HM238	38 13 1	110 21 17	.50	.2	.50	.20	70	N	N	N	20	300	1.0	N	N	N	15
HM239	38 12 55	110 21 50	.30	.2	.30	.07	70	N	N	N	20	200	N	N	N	N	N
HM240	38 13 05	110 22 10	.20	.2	.50	.10	70	N	N	N	30	200	1.0	N	N	N	N
HM241	38 13 33	110 22 25	.50	.3	.50	.20	70	N	N	N	50	700	1.0	N	N	N	150
HM242	38 13 10	110 23 51	.30	.5	.70	.10	100	N	N	N	20	200	1.0	N	N	N	N
HM243	38 12 30	110 24 14	.50	.7	1.00	.15	100	<.5	N	N	50	300	1.0	N	N	N	.0
HM244	38 11 50	110 25 59	1.00	1.0	1.50	.20	200	N	N	N	50	500	1.0	N	N	5	20
HM245	38 13 29	110 25 34	.50	.3	.50	.15	50	N	N	N	20	200	N	N	N	N	10
HM246	38 14 37	110 25 17	.20	.3	.50	.15	70	N	N	N	70	300	1.0	N	N	N	15
HM247	38 14 39	110 24 56	.30	.2	.50	.10	70	N	N	N	20	200	1.0	N	N	N	N
HM248	38 14 20	110 26 55	.20	.3	.50	.10	70	N	N	N	20	1,000	1.0	N	N	N	10
HM249	38 14 12	110 26 52	.70	.3	.50	.10	70	<.5	N	N	100	500	1.0	N	N	N	20
HM274	38 20 56	110 33 06	1.00	1.0	3.00	.15	500	N	N	N	50	500	1.0	N	N	5	10
HM275	38 20 37	110 32 27	3.00	2.0	5.00	.50	500	N	N	N	150	700	1.5	N	N	10	50
HM276	38 22 25	110 31 15	.30	.2	.20	.07	50	N	N	N	30	200	1.0	N	N	N	N
HM277	38 20 37	110 31 44	.20	.2	.50	.05	70	N	N	N	20	300	N	N	N	N	N
HM278	38 20 46	110 31 45	.30	.3	.30	.10	200	N	N	N	20	300	1.0	N	N	N	N
HM279	38 20 11	110 32 5	.50	.2	.20	.10	100	N	N	N	30	300	1.0	N	N	N	10
HM280	38 19 15	110 31 0	.30	.3	.50	.10	100	N	N	N	50	500	1.0	N	N	N	10
HM281	38 19 32	110 30 55	.20	.2	.30	.03	50	<.5	N	N	15	1,000	N	N	N	N	N
HM282	38 21 23	110 28 13	.30	.3	.70	.10	70	N	N	N	30	300	1.0	N	N	N	15
HM283	38 20 56	110 29 6	.20	.2	.20	.10	50	N	N	N	20	200	1.0	N	N	N	N
HM284	38 21 45	110 27 30	.50	.5	.70	.20	100	N	N	N	50	500	1.0	N	N	N	20
HM285	38 21 40	110 27 19	.20	.2	.20	.10	100	N	N	N	30	300	1.0	N	N	N	N
HM286	38 21 19	110 27 51	.20	.2	.50	.10	100	1.0	N	N	20	300	1.0	N	N	N	30
HM287	38 22 28	110 21 30	.30	.5	.70	.07	150	N	N	N	30	500	1.0	N	N	5	30
HM288	38 22 36	110 25 40	.20	.2	1.00	.10	100	N	N	N	20	200	1.0	N	N	N	N
HM289	38 22 29	110 25 46	.50	.3	1.00	.20	100	N	N	N	100	300	N	N	N	N	10
HM290	38 16 47	110 26 31	.50	.3	1.00	.10	100	N	N	N	30	300	1.0	N	N	N	10
HM291	38 17 57	110 27 24	.20	.2	.30	.07	70	N	N	N	20	200	1.0	N	N	N	10
HM292	38 17 22	110 29 4	.50	.2	.50	.15	100	N	N	N	30	200	1.0	N	N	N	70

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM224	5	N	N	N	5	15	N	--	N	N	15	N	N	N	--	N
HM225	5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM226	10	20	N	N	7	10	N	--	N	150	20	N	15	N	--	N
HM227	7	20	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM228	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM229	5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM230	7	N	N	N	5	10	N	--	N	100	20	N	10	N	--	N
HM231	<5	N	N	N	N	10	N	--	N	N	15	N	15	N	--	N
HM232	<5	N	N	N	N	10	N	--	N	N	15	N	N	N	--	N
HM233	5	20	N	N	10	15	N	--	N	100	30	N	10	N	--	N
HM234	7	N	N	N	N	10	N	--	N	N	20	N	N	N	--	N
HM235	7	20	N	N	5	10	N	--	N	N	15	N	N	N	--	N
HM236	5	20	N	N	5	15	N	--	N	100	20	N	N	N	--	N
HM237	<5	N	N	N	N	10	N	--	N	N	15	N	10	N	--	N
HM238	7	N	N	N	N	10	N	--	N	N	20	N	N	N	--	N
HM239	<5	N	N	N	N	10	N	--	N	N	15	N	N	N	--	N
HM240	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM241	5	N	N	N	5	20	N	--	N	100	20	N	10	N	--	N
HM242	5	N	N	N	5	10	N	--	N	100	15	N	N	N	--	N
HM243	5	20	N	N	5	10	N	--	N	100	20	N	10	N	--	N
HM244	10	30	N	<20	7	15	N	--	N	100	30	N	15	N	--	N
HM245	5	N	N	N	N	10	N	--	N	N	15	N	10	N	--	N
HM246	7	20	N	N	5	10	N	--	N	N	15	N	10	N	--	N
HM247	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM248	5	N	N	N	5	10	N	--	N	100	10	N	N	N	--	N
HM249	5	N	N	N	5	10	N	--	N	N	10	N	10	N	--	N
HM274	7	20	N	N	7	10	N	--	N	500	20	N	10	N	--	N
HM275	20	50	<5	N	15	15	N	--	N	500	70	N	30	N	--	N
HM276	7	N	N	N	N	10	N	--	N	N	15	N	N	N	--	N
HM277	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM278	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM279	5	20	N	N	5	10	N	--	N	100	15	N	15	N	--	N
HM280	<5	20	N	N	N	10	N	--	N	100	10	N	10	N	--	N
HM281	<5	N	N	N	N	10	N	--	N	N	<10	N	N	N	--	N
HM282	5	N	N	N	5	10	N	--	N	100	10	N	N	N	--	N
HM283	<5	N	N	N	N	10	N	--	N	N	<10	N	10	N	--	N
HM284	7	N	N	N	5	15	N	--	N	150	15	N	15	N	--	N
HM285	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM286	5	N	N	N	7	15	N	--	N	N	10	N	N	N	--	N
HM287	5	N	N	N	5	15	N	--	N	100	10	N	N	N	--	N
HM288	5	N	5	N	5	10	N	--	N	100	<10	N	N	N	--	N
HM289	5	N	N	N	5	10	N	--	N	100	20	N	10	N	--	N
HM290	5	20	N	N	5	15	N	--	N	100	20	N	10	N	--	N
HM292	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM293	5	N	N	<20	5	10	N	--	N	N	10	N	15	N	--	N

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM294	38 17 25	110 28 45	.30	.2	.50	.10	100	<.5	N	N	50	200	1.0	N	N	N	10
HM295	38 17 16	110 28 41	.30	.2	.50	.20	70	N	N	N	100	150	1.0	N	N	N	N
HM296	38 17 52	110 26 [illegible]	.20	.2	.30	.05	50	N	N	N	15	[illegible]50	1.0	N	N	N	N
HM297	38 17 46	110 26 2	.15	.2	.20	.10	50	N	N	N	20	200	1.0	N	N	N	<10
HM298	38 15 25	110 26 55	.30	.3	.30	.10	50	N	N	N	20	300	1.0	N	N	N	<10
HM299	38 15 17	110 27 0	.30	.2	.50	.10	70	N	N	N	50	200	1.0	N	N	N	N
HM300	38 15 5	110 26 26	.30	.2	.20	.10	50	N	N	N	50	200	1.0	N	N	5	50
HM301	38 22 5	110 33 45	.50	.3	1.00	.10	100	N	N	N	30	150	1.0	N	N	N	<10
HM302	38 22 9	110 33 40	.70	.7	3.00	.20	200	N	N	N	70	500	1.0	N	N	5	10
HM303	38 21 42	110 33 15	.20	.2	.70	.07	100	N	N	N	30	200	1.0	N	N	N	10
HM304	38 21 25	110 33 2	.30	.2	.50	.10	70	N	N	N	100	200	1.0	N	N	N	<10
HM305	38 23 51	110 24 35	.70	1.0	2.00	.15	200	N	N	N	100	500	1.0	N	N	5	15
HM306	38 23 44	110 24 31	.50	.7	1.00	.10	100	N	N	N	50	300	1.0	N	N	N	10
HM307	38 22 53	110 27 17	.70	1.0	1.50	.15	150	N	N	N	70	700	1.0	N	N	5	100
HM308	38 23 0	110 27 19	.50	1.0	2.00	.10	200	N	N	N	100	700	1.0	N	N	5	20
HM309	38 21 25	110 25 27	1.00	1.5	3.00	.30	200	N	N	N	150	500	1.0	N	N	5	20
HM310	38 21 30	110 25 20	.70	1.0	2.00	.50	200	N	N	N	100	500	1.0	N	N	5	50
HM311	38 20 5	110 25 47	.50	.7	.70	.20	100	N	N	N	150	500	1.0	N	N	N	20
HM312	38 20 1	110 25 48	.30	.5	1.00	.10	150	N	N	N	30	500	<1.0	N	N	N	N
HM313	38 20 7	110 27 23	.50	.5	.50	.20	150	N	N	N	50	500	<1.0	N	N	N	10
HM314	38 18 52	110 31 34	.20	.3	.30	.10	100	N	N	N	50	500	1.0	N	N	N	<10
HM315	38 18 3	110 31 40	.30	.3	.50	.10	100	N	N	N	20	300	<1.0	N	N	N	N
HM316	38 17 42	110 32 12	1.00	.5	2.00	.30	200	N	N	N	70	1,000	<1.0	N	N	N	70
HM317	38 17 29	110 32 38	.50	.2	.70	.15	100	N	N	N	30	500	1.0	N	N	N	10
HM318	38 22 15	110 31 16	.50	.3	1.50	.10	300	<.5	N	N	70	300	1.0	N	N	5	10
HM319	38 22 17	110 31 33	.30	.3	1.00	.10	150	N	N	N	50	500	1.0	N	N	5	20
HM320	38 21 13	110 31 33	.20	.3	.70	.10	100	N	N	N	20	300	<1.0	N	N	N	N
HM321	38 20 47	110 30 49	.30	.2	.30	.10	70	N	N	N	20	200	<1.0	N	N	N	10
HM322	38 20 50	110 30 58	.50	.3	.30	.30	150	N	N	N	200	300	1.0	N	N	N	10
HM323	38 19 1	110 32 3	.70	.7	1.00	.10	200	N	N	N	30	300	1.0	N	N	N	10
HM324	38 17 4	110 32 41	1.00	1.0	2.00	.20	200	N	N	N	50	1,000	1.0	N	N	5	15
HM325	38 17 9	110 32 50	.70	1.0	2.00	.15	200	N	N	N	50	700	1.0	N	N	5	10
HM326	38 16 34	110 33 3	1.50	2.0	3.00	.30	700	N	N	N	50	700	1.0	N	N	10	30
HM327	38 15 31	110 33 24	3.00	2.0	5.00	.50	1,000	N	N	N	30	200	1.0	N	N	20	50
HM328	38 15 15	110 33 43	2.00	3.0	5.00	.50	1,500	N	N	N	70	500	1.5	N	N	10	30
HM329	38 20 45	110 32 33	1.50	1.5	7.00	.30	700	N	N	N	20	200	1.5	N	N	10	50
HM330	38 17 0	110 30 35	.30	.2	.30	.10	100	N	N	N	70	200	1.0	N	N	N	70
HM331	38 15 7	110 29 57	.30	.2	.50	.15	100	N	N	N	50	500	1.0	N	N	N	N
HM334	38 19 4	110 15 32	.20	.2	.50	.05	100	N	N	N	20	200	<1.0	N	N	N	<10
HM335	38 18 4	110 15 28	.30	.2	.50	.07	70	N	N	N	20	200	<1.0	N	N	N	10
HM336	38 18 31	110 15 35	.70	.3	1.00	.15	200	N	N	N	50	300	1.0	N	N	N	150
HM337	38 18 47	110 15 25	.20	.2	.20	.10	70	N	N	N	20	200	N	N	N	N	N
HM338	38 19 6	110 15 18	.30	.3	.30	.20	100	N	N	N	30	300	<1.0	N	N	N	<10
HM339	38 19 12	110 15 12	.50	.2	.20	.10	100	N	N	N	30	300	1.0	N	N	N	N
HM340	38 21 13	110 15 37	.70	.5	.70	.20	150	N	N	N	50	500	<1.0	N	N	N	30

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NE	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM294	5	N	N	N	5	15	N	--	N	N	10	N	10	N	--	N
HM295	5	N	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM296	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM297	<5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM298	5	N	N	N	5	10	N	--	N	N	10	N	10	N	--	N
HM299	<5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM300	<5	N	N	N	5	10	N	--	N	N	10	N	10	N	--	N
HM301	5	N	N	N	5	15	N	--	N	100	15	N	N	N	--	N
HM302	7	N	N	N	7	10	N	--	N	700	20	N	15	N	--	N
HM303	5	20	N	N	5	10	N	--	N	100	10	N	10	N	--	N
HM304	5	N	N	N	7	10	N	--	N	100	10	N	N	N	--	N
HM305	7	20	N	N	10	10	N	--	N	100	20	N	10	N	--	N
HM306	5	20	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM307	7	20	N	N	7	10	N	--	N	100	20	N	10	N	--	N
HM308	7	20	N	N	7	15	N	--	N	100	20	N	15	N	--	N
HM309	10	30	N	N	10	15	N	--	N	150	30	N	20	N	--	N
HM310	7	N	N	N	10	15	N	--	N	100	20	N	10	N	--	N
HM311	7	N	N	N	7	15	N	--	N	100	15	N	10	N	--	N
HM312	5	20	N	N	5	10	N	--	N	100	10	N	10	N	--	N
HM313	5	N	N	N	7	10	N	--	N	N	15	N	15	N	--	N
HM314	<5	20	N	N	7	10	N	--	N	N	10	N	10	N	--	N
HM315	5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM316	7	N	N	N	10	10	N	--	N	N	30	N	15	N	--	N
HM317	5	20	N	N	5	10	N	--	N	N	15	N	10	N	--	N
HM318	5	N	N	N	5	10	N	--	N	N	20	N	N	N	--	N
HM319	5	20	N	N	7	15	N	--	N	N	15	N	10	N	--	N
HM320	7	20	N	N	5	10	N	--	N	N	15	N	N	N	--	N
HM321	<5	N	N	N	5	10	N	--	N	N	15	N	10	N	--	N
HM322	<5	20	N	N	N	10	N	--	N	N	20	N	10	N	--	N
HM323	5	N	N	N	7	15	N	--	N	N	20	N	10	N	--	N
HM324	5	20	N	N	10	15	N	--	N	200	30	N	20	N	--	N
HM325	7	20	N	N	5	10	N	--	N	100	30	N	10	N	--	N
HM326	20	20	N	N	15	15	N	--	N	150	50	N	30	N	--	N
HM327	20	20	N	N	20	10	N	--	N	100	150	N	20	N	--	N
HM328	30	30	N	<20	20	15	N	--	N	100	100	N	30	N	--	N
HM329	20	20	N	N	15	10	N	--	N	100	50	N	30	N	--	N
HM330	5	N	N	N	5	10	N	--	N	N	10	N	20	N	--	N
HM331	5	20	N	N	5	10	N	--	N	N	20	N	N	N	--	N
HM332	<5	20	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM333	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM336	5	N	N	N	5	15	N	--	N	N	15	N	15	N	--	N
HM337	<5	20	N	N	N	15	N	--	N	N	10	N	N	N	--	N
HM338	5	N	N	N	5	15	N	--	N	100	10	N	10	N	--	N
HM339	<5	20	N	N	5	10	N	--	N	N	<10	N	N	N	--	N
HM340	7	20	N	N	5	15	N	--	N	100	15	N	10	N	--	N

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM341	38 21 12	110 15 46	.50	.3	.20	.20	70	N	N	N	100	500	N	N	N	N	15
HM342	38 21 22	110 16 18	.30	.2	.20	.10	50	N	N	N	20	200	<1.0	N	N	N	N
HM343	38 24 12	110 15 6	.50	.2	.30	.10	70	N	N	N	30	300	<1.0	N	N	N	N
HM344	38 23 46	110 15 10	.30	.2	.20	.10	70	N	N	N	70	300	1.0	N	N	N	100
HM345	38 23 38	110 15 46	.50	.3	.30	.20	70	N	N	N	30	200	N	N	N	N	N
HM346	38 23 42	110 15 45	.70	.2	1.00	.20	200	N	N	N	70	300	1.0	N	N	N	20
HM347	38 23 37	110 15 38	.70	.3	1.00	.20	200	N	N	N	20	500	1.0	N	N	N	50
HM348	38 14 0	110 12 15	.50	.2	.20	.10	70	N	N	N	50	300	<1.0	N	N	N	N
HM349	38 14 0	110 12 7	.50	.3	.50	.50	150	N	N	N	50	500	<1.0	N	N	5	70
HM350	38 12 43	110 14 13	.30	.2	.70	.15	100	N	N	N	30	200	N	N	N	N	20
HM351	38 12 40	110 14 3	.20	.2	.50	.10	50	N	N	N	20	200	N	N	N	N	N
HM352	38 12 18	110 14 21	.50	.3	.50	.30	100	N	N	N	50	300	N	N	N	N	10
HM353	38 11 44	110 14 16	.50	.3	.50	.20	100	N	N	N	100	300	1.0	N	N	N	N
HM354	38 11 41	110 14 13	.50	.2	.30	.20	50	N	N	N	30	700	1.0	N	N	N	10
HM355	38 10 45	110 13 23	.50	.5	1.00	.10	200	N	N	N	50	500	1.0	N	N	N	N
HM356	38 11 4	110 11 5	.30	.2	.70	.15	100	N	N	N	30	200	1.0	N	N	N	N
HM357	38 11 1	110 11 1	.70	.3	1.50	.20	150	N	N	N	150	300	1.0	N	N	N	10
HM358	38 10 39	110 11 16	.30	.2	.70	.07	100	N	N	N	30	200	1.0	N	N	N	N
HM359	38 10 17	110 11 30	.50	.1	.20	.10	70	N	N	N	50	100	<1.0	N	N	N	200
HM360	38 12 17	110 11 43	.50	.7	1.00	.20	100	N	N	N	100	200	<1.0	N	N	5	50
HM361	38 12 15	110 11 38	.70	.3	1.00	.20	150	N	N	N	150	150	<1.0	N	N	N	N
HM362	38 25 22	110 13 40	.50	.5	1.00	.10	150	N	N	N	50	300	1.0	N	N	N	N
HM363	38 25 22	110 13 30	.50	.3	.50	.15	70	N	N	N	20	150	<1.0	N	N	N	<10
HM364	38 24 2	110 13 10	.10	.1	.20	.03	70	N	N	N	20	100	<1.0	N	N	N	N
HM365	38 24 6	110 13 7	.70	.3	.50	.30	100	N	N	N	100	200	N	N	N	5	70
HM366	38 24 18	110 11 30	.50	.5	1.00	.20	100	N	N	N	30	300	1.0	N	N	N	10
HM367	38 24 12	110 11 30	.30	.5	1.50	.20	100	N	N	N	50	200	1.0	N	N	N	70
HM368	38 23 46	110 12 4	.50	.3	.70	.15	100	N	N	N	50	150	1.0	N	N	N	10
HM369	38 23 41	110 12 13	.20	.2	.50	.10	100	N	N	N	30	200	1.0	N	N	N	N
HM380	38 22 52	110 13 19	.30	.2	.30	.15	70	N	N	N	100	200	N	N	N	N	N
HM381	38 22 39	110 13 40	.50	.3	.70	.20	100	N	N	N	100	300	<1.0	N	N	N	10
HM382	38 21 38	110 14 0	2.00	.5	.50	.20	500	N	N	N	30	200	1.0	N	N	10	20
HM383	38 21 21	110 14 0	2.00	.7	5.00	.20	100	N	N	N	70	200	1.0	N	N	7	50
HM384	38 21 25	110 13 51	.70	.3	.50	.15	70	N	N	N	50	300	<1.0	N	N	N	N
HM385	38 20 48	110 13 39	.50	.2	.30	.10	50	<.5	N	N	30	150	1.0	N	N	N	10
HM386	38 19 14	110 14 43	.30	.2	.30	.05	70	<.5	N	N	20	150	1.0	N	N	N	N
HM387	38 18 27	110 14 22	.50	.3	.50	.15	100	N	N	N	20	150	1.0	N	N	N	30
HM388	38 18 4	110 13 58	.50	.5	.70	.10	100	N	N	N	30	200	1.0	N	N	N	10
HM389	38 18 9	110 13 48	.50	.5	1.00	.15	100	N	N	N	30	300	1.0	N	N	N	N
HM390	38 17 31	110 13 14	.50	.3	.70	.20	200	N	N	N	70	150	<1.0	N	N	N	N
HM391	38 17 21	110 13 10	.50	.5	2.00	.20	300	N	N	N	50	500	1.5	N	N	N	N
HM392	38 17 10	110 12 18	.50	.3	2.00	.07	200	N	N	N	20	200	1.0	N	N	N	N
HM393	38 16 39	110 12 11	1.50	1.0	2.00	.30	200	N	N	N	70	1,000	1.0	N	N	5	50
HM394	38 16 16	110 12 10	.70	.3	1.00	.20	150	N	N	N	50	300	1.0	N	N	N	20
HM395	38 16 21	110 12 20	.50	.5	1.00	.20	150	N	N	N	70	500	1.0	N	N	N	20

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM341	<5	N	N	N	N	15	N	--	N	N	10	N	10	N	--	N
HM342	<5	20	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM343	5	N	N	N	N	15	N	--	N	N	10	N	N	N	--	N
HM344	5	20	N	N	5	15	N	--	N	N	10	N	N	N	--	N
HM345	<5	N	N	N	5	15	N	--	N	N	10	N	10	N	--	N
HM346	5	N	N	N	N	15	N	--	N	N	20	N	10	N	--	N
HM347	7	20	N	N	5	15	N	--	N	N	20	N	10	N	--	N
HM348	<5	N	N	N	N	10	N	--	N	N	15	N	10	N	--	N
HM349	5	N	N	N	5	15	N	--	N	N	20	N	20	N	--	N
HM350	5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM351	5	N	N	N	5	15	N	--	N	N	10	N	N	N	--	N
HM352	5	N	N	N	5	15	N	--	N	N	15	N	10	N	--	N
HM353	5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM354	5	N	N	N	5	10	N	--	N	N	15	N	10	N	--	N
HM355	7	N	N	N	5	15	N	--	N	100	20	N	10	N	--	N
HM356	5	N	N	N	N	10	N	--	N	100	15	N	N	N	--	N
HM357	5	N	N	N	5	15	N	--	N	150	30	N	15	N	--	N
HM358	5	N	N	N	5	10	N	--	N	N	20	N	N	N	--	N
HM359	<5	N	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM360	5	30	N	N	7	10	N	--	N	100	20	N	15	N	--	N
HM361	5	N	N	N	5	10	N	--	N	100	30	N	10	N	--	N
HM362	5	20	N	N	5	20	N	--	N	100	15	N	10	N	--	N
HM363	5	N	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM364	<5	20	N	N	N	10	N	--	N	N	<10	N	N	N	--	N
HM365	5	20	N	<20	5	15	N	--	N	N	20	N	20	N	--	N
HM366	5	N	N	N	5	15	N	--	N	100	20	N	15	N	--	N
HM367	5	N	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM368	5	20	N	N	5	10	N	--	N	100	20	N	10	N	--	N
HM369	5	N	N	N	5	15	N	--	N	N	10	N	N	N	--	N
HM380	<5	20	N	N	5	10	N	--	N	N	10	N	20	N	--	N
HM381	<5	20	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM382	10	50	N	N	10	20	N	--	N	300	70	N	20	N	--	N
HM383	15	30	20	N	20	20	N	--	N	200	150	N	20	N	--	N
HM384	5	20	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM385	5	20	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM386	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM387	<5	N	N	N	5	15	N	--	N	N	20	N	10	N	--	<100
HM388	5	N	N	N	5	15	N	--	N	100	15	N	10	N	--	N
HM389	5	20	N	N	5	15	N	--	N	N	20	N	10	N	--	N
HM390	<5	N	N	N	5	20	N	--	N	N	30	N	20	N	--	N
HM391	5	20	N	N	5	20	N	--	N	100	20	N	10	N	--	N
HM392	5	N	N	N	5	10	N	--	N	N	15	N	N	N	--	N
HM393	5	N	N	N	7	20	N	--	N	700	50	N	20	N	--	N
HM394	5	N	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM395	5	20	N	N	5	10	N	--	N	100	20	N	10	N	--	N

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM396	38 22 56	110 11 30	.30	.5	1.00	.10	100	N	N	N	30	200	1.0	N	N	N	N
HM397	38 22 49	110 11 33	1.00	.2	1.00	.30	100	N	N	N	50	500	<1.0	N	N	N	100
HM398	38 22 41	110 12 1	.30	.5	.70	.10	70	N	N	N	20	100	1.0	N	N	N	N
HM399	38 22 45	110 11 50	.30	.5	.50	.10	100	N	N	N	30	150	1.0	N	N	N	N
HM558	38 15 30	110 29 4	.20	.2	.30	.15	100	<.5	N	N	30	300	1.0	N	N	N	N
HM559	38 16 8	110 28 4	.20	.3	.50	.07	70	N	N	N	10	200	1.0	N	N	N	50
HM560	38 16 1	110 28 4	.50	.5	1.00	.15	150	N	N	N	15	200	1.0	N	N	N	10
HM561	38 16 57	110 26 56	.30	.3	.50	.10	70	N	N	N	20	200	1.0	N	N	N	10
HM562	38 17 4	110 26 56	.50	.3	.50	.07	100	N	N	N	30	300	1.0	N	N	N	10
HM563	38 16 9	110 26 45	.50	.2	.30	.10	100	N	N	N	30	200	1.0	N	N	N	N
HM564	38 16 6	110 26 29	.30	.2	.15	.05	50	N	N	N	20	150	N	N	N	N	N
HM565	38 16 50	110 25 15	.50	.3	1.00	.15	100	N	N	N	50	200	N	N	N	N	70
HM566	38 15 34	110 24 31	.50	.2	.30	.20	70	N	N	N	50	200	1.0	N	N	N	N
HM567	38 15 41	110 24 38	.30	.2	1.00	.15	70	N	N	N	30	300	1.0	N	N	N	10
HM568	38 14 59	110 22 58	.50	.3	.50	.15	70	<.5	N	N	50	200	1.0	N	N	N	30
HM569	38 15 7	110 23 2	.30	.2	.50	.15	70	N	N	N	50	200	1.0	N	N	N	N
HM570	38 14 25	110 23 22	.20	.2	.70	.07	100	N	N	N	15	200	1.0	N	N	N	N
HM571	38 14 4	110 23 50	.30	.3	.50	.05	100	N	N	N	15	150	N	N	N	N	N
HM572	38 13 59	110 25 26	.50	.3	.70	.10	70	N	N	N	20	300	1.0	N	N	N	10
HM573	38 25 23	110 13 51	.50	.5	1.50	.20	100	N	N	N	50	200	1.0	N	N	N	30
HM574	38 13 4	110 26 46	.50	.5	1.00	.20	150	<.5	N	N	30	500	1.5	N	N	5	15
HM575	38 13 13	110 27 4	.50	.5	1.00	.15	100	N	N	N	50	300	1.0	N	N	5	20
HM576	38 13 4	110 27 49	.30	.3	.70	.10	50	.7	N	N	20	200	1.0	N	N	N	20
HM577	38 14 32	110 29 4	.20	.2	.50	.07	50	N	N	N	20	150	N	N	N	N	N
HM578	38 14 20	110 28 53	.30	.3	.70	.10	100	N	N	N	50	500	1.0	N	N	5	10
HM600	38 21 47	110 11 35	.50	.7	1.00	.20	150	N	N	N	70	200	1.0	N	N	N	N
HM601	38 21 26	110 11 41	.70	.7	1.50	.15	200	N	N	N	30	200	1.5	N	N	N	10
HM602	38 21 25	110 11 45	.30	.3	.50	.10	100	<.5	N	N	100	200	1.0	N	N	N	20
HM603	38 20 55	110 10 38	.70	.5	1.00	.30	150	<.5	N	N	50	200	1.0	N	N	N	15
HM604	38 20 40	110 10 22	.50	.7	1.00	.15	100	N	N	N	30	200	1.0	N	N	N	N
HM605	38 20 46	110 10 15	.70	.3	1.00	.15	100	N	N	N	70	200	<1.0	N	N	N	30
HM606	38 20 10	110 11 50	.50	.2	.50	.10	70	N	N	N	15	300	<1.0	N	N	N	20
HM607	38 19 37	110 11 40	.50	.5	1.00	.15	200	N	N	N	100	500	<1.0	N	N	N	N
HM608	38 18 57	110 11 25	.50	.3	.50	.10	100	N	N	N	70	300	1.0	N	N	N	20
HM609	38 18 33	110 11 3	.70	.2	1.00	.15	100	N	N	N	50	200	<1.0	N	N	5	50
HM610	38 18 36	110 10 54	.30	.2	.30	.10	50	N	N	N	50	300	<1.0	N	N	N	N
HM611	38 17 8	110 10 25	.50	.3	.50	.10	70	N	N	N	20	300	<1.0	N	N	N	N
HM612	38 17 4	110 10 17	.50	.2	.30	.10	50	N	N	N	15	150	<1.0	N	N	N	50
HM613	38 19 6	110 15 18	.30	.2	.50	.10	100	N	N	N	10	300	1.0	N	N	N	N
HM614	38 18 45	110 15 25	.70	.2	.70	.20	150	N	N	N	150	300	<1.0	N	N	N	70
HM615	38 18 31	110 15 35	.30	.3	1.00	.15	200	N	N	N	100	200	1.0	N	N	N	N
HM616	38 18 4	110 15 32	.30	.2	.70	.15	100	N	N	N	70	200	<1.0	N	N	N	15
HM617	38 18 4	110 15 28	.30	.2	.50	.15	100	N	N	N	100	500	1.0	N	N	5	10

TABLE 3.--Spectrographic analysis of stream-sediment samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM396	7	N	N	N	N	10	N	--	N	500	15	N	N	N	--	N
HM397	<5	20	N	<20	5	15	N	--	N	N	50	N	20	N	--	N
HM398	5	N	N	N	5	15	N	--	N	N	15	N	N	N	--	N
HM399	5	N	N	N	5	15	N	--	N	N	15	N	N	N	--	N
HM558	5	N	N	N	5	15	N	--	N	N	10	N	10	N	--	N
HM559	<5	N	N	N	5	10	N	--	N	N	10	N	30	N	--	N
HM560	5	N	N	N	7	10	N	--	N	200	20	N	10	N	--	N
HM561	5	N	N	N	7	10	N	--	N	N	15	N	10	N	--	N
HM562	<5	20	N	N	N	10	N	--	N	100	20	N	N	N	--	N
HM563	5	N	N	<20	5	15	N	--	N	100	20	N	10	N	--	N
HM564	<5	N	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM565	7	N	N	N	5	15	N	--	N	100	20	N	10	N	--	N
HM566	5	20	N	N	5	15	N	--	N	N	15	N	10	N	--	N
HM567	5	N	N	N	N	15	N	--	N	N	15	N	N	N	--	N
HM568	5	N	N	N	5	15	N	--	N	N	20	N	10	N	--	N
HM569	5	N	N	N	5	15	N	--	N	N	15	N	10	N	--	N
HM570	5	20	N	N	N	15	N	--	N	N	10	N	10	N	--	N
HM571	5	N	N	N	N	15	N	--	N	N	10	N	N	N	--	N
HM572	5	N	N	N	5	15	N	--	N	N	15	N	10	N	--	N
HM573	7	N	N	N	5	20	N	--	N	N	10	N	10	N	--	N
HM574	10	20	N	<20	7	15	N	--	N	150	20	N	10	N	--	N
HM575	7	N	N	N	7	20	N	--	N	N	10	N	10	N	--	N
HM576	5	N	N	N	5	15	N	--	N	N	10	N	N	N	--	N
HM577	5	20	N	N	5	10	N	--	N	N	<10	N	N	N	--	N
HM578	7	20	N	N	7	15	N	--	N	100	10	N	10	N	--	N
HM600	5	20	N	N	5	20	N	--	N	100	20	N	10	N	--	N
HM601	5	20	N	N	7	20	N	--	N	150	30	N	10	N	--	N
HM602	5	N	N	N	5	15	N	--	N	100	15	N	N	N	--	N
HM603	5	20	N	<20	N	15	N	--	N	100	30	N	30	N	--	N
HM604	5	20	N	N	5	10	N	--	N	100	15	N	10	N	--	N
HM605	5	N	N	N	5	10	N	--	N	100	20	N	N	N	--	N
HM606	<5	20	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM607	<5	N	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM608	5	N	N	N	5	15	N	--	N	N	20	N	10	N	--	N
HM609	<5	N	N	N	5	10	N	--	N	N	20	N	10	N	--	N
HM610	<5	N	N	N	5	10	N	--	N	N	15	N	N	N	--	N
HM611	<5	N	N	N	5	10	N	--	N	N	15	N	N	N	--	N
HM612	<5	20	N	N	5	10	N	--	N	N	10	N	10	N	--	N
HM613	5	N	N	N	5	15	N	--	N	N	10	N	N	N	--	N
HM614	5	N	N	<20	5	15	N	--	N	N	30	N	10	N	--	N
HM615	<5	20	N	N	N	10	N	--	N	N	10	N	N	N	--	N
HM616	<5	N	N	N	5	10	N	--	N	N	10	N	N	N	--	N
HM617	<5	20	N	N	5	10	N	--	N	N	10	N	N	N	--	N

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah

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

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM2250	38 12 5	110 15 25	.50	<.05	.15	>2.0	70	N	N	N	100	>10,000	2	N	N	N	100
HM2260	38 10 1[illegible]	110 17 30	.50	.10	.50	>2.0	100	N	N	N	100	>10,000	3	N	N	N	50
HM2270	38 9 55	110 18 45	.20	.15	1.00	>2.0	100	N	N	N	70	>10,000	2	N	N	N	20
HM2280	38 10 0	110 19 27	.20	.10	.50	>2.0	70	N	N	N	100	>10,000	3	N	N	N	70
HM2290	38 10 15	110 19 45	.20	.15	.70	.3	100	N	N	N	50	>10,000	<2	N	N	N	20
HM2300	38 10 7	110 20 5	.20	.05	.30	>2.0	70	N	N	N	100	>10,000	2	N	N	N	100
HM2310	38 12 10	110 18 59	.30	<.05	.20	>2.0	70	N	N	N	200	>10,000	2	N	N	N	200
HM2320	38 12 15	110 14 5	1.00	.05	.20	>2.0	100	N	N	N	200	>10,000	3	N	N	N	300
HM2330	38 12 7	110 20 0	.20	<.05	.20	>2.0	70	N	N	N	150	>10,000	<2	N	N	N	50
HM2340	38 12 47	110 20 20	.50	<.05	.20	>2.0	70	N	N	N	100	>10,000	2	N	N	N	150
HM2350	38 12 34	110 20 45	.20	<.05	.10	2.0	50	N	N	N	50	>10,000	2	N	N	N	30
HM2360	38 12 53	110 20 45	.30	<.05	.20	>2.0	50	N	N	N	70	>10,000	2	N	N	N	50
HM2370	38 12 54	110 21 10	.30	<.05	.20	>2.0	70	N	N	N	30	>10,000	2	N	N	N	70
HM2380	38 12 55	110 21 50	.50	.05	.20	>2.0	70	N	N	N	50	>10,000	2	N	N	N	50
HM2400	38 13 25	110 22 10	.30	<.05	.10	>2.0	50	N	N	N	100	>10,000	2	N	N	N	30
HM2410	38 13 33	110 22 15	1.00	.05	.20	.7	50	N	N	N	100	>10,000	<2	N	N	N	50
HM2430	38 12 30	110 24 14	1.50	.20	.30	2.0	200	N	N	N	100	>10,000	N	N	N	N	300
HM2440	38 11 50	110 25 59	1.50	.10	.20	2.0	200	N	N	N	100	>10,000	<2	N	N	N	150
HM2450	38 13 29	110 25 34	2.00	.15	.30	>2.0	300	N	N	N	300	>10,000	N	N	N	N	500
HM2460	38 14 37	110 25 17	3.00	.10	.15	2.0	700	N	N	N	100	>10,000	N	N	N	N	700
HM2470	38 14 39	110 24 58	1.50	.05	.10	2.0	150	N	N	N	100	>10,000	<2	N	N	N	300
HM2480	38 14 20	110 26 55	1.50	.07	.10	1.5	150	N	N	N	70	>10,000	N	N	N	N	200
HM2490	38 14 12	110 26 52	1.50	.10	.10	1.5	200	N	N	N	50	>10,000	N	N	N	N	500
HM2740	38 20 56	110 33 56	3.00	.15	.30	>2.0	500	N	N	N	150	>10,000	N	N	N	N	700
HM2760	38 22 25	110 31 15	1.50	.05	.10	2.0	150	N	N	N	150	>10,000	N	N	N	N	200
HM2770	38 20 37	110 31 44	1.00	.05	.15	2.0	100	N	N	N	150	10,000	N	N	N	N	300
HM2780	38 20 46	110 31 45	1.50	.10	.10	2.0	150	N	N	N	200	10,000	N	N	N	N	500
HM2790	38 20 11	110 32 5	1.00	<.05	.10	>2.0	100	N	N	N	50	10,000	N	N	N	N	200
HM2800	38 19 15	110 31 0	1.50	.05	.10	>2.0	150	N	N	N	100	10,000	N	N	N	N	200
HM2810	38 19 32	110 30 55	2.00	.05	.10	2.0	150	N	N	N	20	>10,000	N	N	N	N	200
HM2820	38 21 23	110 28 13	1.00	<.05	.10	>2.0	50	N	N	N	30	>10,000	N	N	N	N	200
HM2830	38 20 56	110 29 6	1.50	.07	.15	>2.0	100	N	N	N	150	>10,000	N	N	N	N	300
HM2840	38 21 45	110 27 30	1.00	.07	.15	2.0	150	N	N	N	70	>10,000	N	N	N	N	150
HM2850	38 21 40	110 27 19	5.00	.07	.10	>2.0	200	N	N	N	300	>10,000	N	N	N	N	700
HM2860	38 21 19	110 27 51	3.00	.07	.10	>2.0	200	N	N	N	100	10,000	N	N	N	N	500
HM2870	38 22 28	110 21 30	3.00	.07	.15	2.0	300	N	N	N	70	>10,000	N	N	N	N	500
HM2880	38 22 36	110 25 40	1.50	.10	.15	>2.0	150	N	N	N	200	>10,000	N	N	N	N	200
HM2890	38 22 29	110 25 46	2.00	.10	.15	>2.0	200	N	N	N	150	>10,000	<2	N	N	N	300
HM2900	38 18 47	110 26 31	1.50	.07	.10	>2.0	200	N	N	N	200	>10,000	N	N	N	N	200
HM2920	38 17 57	110 27 24	5.00	.07	.10	>2.0	300	N	N	N	300	10,000	N	N	N	N	700
HM2930	38 17 26	110 29 4	1.00	.05	.10	1.5	100	N	N	N	150	>10,000	N	N	N	N	150
HM2940	38 17 25	110 28 45	2.00	.07	.15	>2.0	200	N	N	N	300	>10,000	N	N	N	N	300
HM2950	38 17 16	110 28 41	2.00	.05	.10	2.0	150	N	N	N	200	10,000	N	N	N	N	200
HM2960	38 17 54	110 28 7	1.50	.05	.10	>2.0	150	N	N	N	150	3,000	N	N	N	N	200
HM2970	38 17 45	110 28 2	1.50	.05	<.10	2.0	150	N	N	N	300	2,000	N	N	N	N	150

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM225C	10	N	N	N	<10	20	N	>200	N	1,000	100	N	2,000	N	>2,000	<200
HM226C	<10	N	N	N	<10	20	N	>200	N	5,000	100	N	1,000	N	>2,000	N
HM227C	10	N	N	N	<10	30	N	100	N	3,000	50	<100	300	N	>2,000	N
HM228C	10	N	N	N	<10	30	N	200	N	5,000	70	<100	1,000	N	>2,000	N
HM229C	N	N	N	N	<10	N	N	15	N	5,000	<20	N	100	N	>2,000	N
HM230C	<10	50	N	N	<10	20	N	200	N	3,000	70	<100	1,000	N	>2,000	N
HM231C	10	50	N	50	<10	30	N	>200	N	500	70	<100	1,500	N	>2,000	N
HM232C	10	50	N	N	<10	30	N	>200	N	300	100	<100	1,500	N	>2,000	N
HM233C	10	N	N	<50	<10	30	N	>200	N	300	70	<100	2,000	N	>2,000	N
HM234C	10	N	N	N	<10	20	N	>200	N	300	100	<100	2,000	N	>2,000	<200
HM235C	<10	N	N	N	<10	20	N	>200	N	500	50	N	1,000	N	>2,000	N
HM236C	<10	N	N	N	<10	20	N	>200	N	500	50	N	1,000	N	>2,000	N
HM237C	<10	N	N	N	<10	30	N	>200	N	500	50	N	1,000	N	>2,000	N
HM239C	<10	N	N	N	<10	20	N	>200	N	700	70	N	1,000	N	>2,000	<200
HM240C	<10	N	N	N	<10	<20	N	>200	N	1,000	70	N	700	N	>2,000	N
HM241C	N	N	N	N	<10	<20	N	200	N	1,000	30	N	500	N	>2,000	N
HM243C	10	<50	N	N	<10	70	N	30	N	5,000	100	N	500	N	>2,000	N
HM244C	<10	150	N	N	N	70	N	30	<20	5,000	100	N	500	N	>2,000	N
HM245C	<10	70	N	N	N	70	N	50	N	5,000	150	N	700	N	>2,000	N
HM246C	20	50	N	N	15	70	N	30	N	700	200	N	500	N	>2,000	N
HM247C	<10	<50	N	N	N	50	N	70	N	700	100	N	1,000	N	>2,000	N
HM248C	10	<50	N	N	<10	150	N	50	N	700	100	N	700	N	>2,000	N
HM249C	<10	<50	N	N	<10	100	N	50	N	700	100	N	700	N	>2,000	N
HM274C	10	<50	N	<50	10	70	N	20	N	>10,000	150	N	700	N	>2,000	N
HM276C	<10	70	N	N	N	70	N	70	N	3,000	150	N	1,000	N	>2,000	N
HM277C	<10	50	N	N	15	50	N	70	N	N	100	N	1,000	N	>2,000	N
HM278C	<10	N	N	N	<10	70	N	30	N	N	150	N	700	N	>2,000	N
HM279C	<10	<50	N	N	10	70	N	70	N	N	150	N	1,000	N	>2,000	N
HM280C	<10	50	N	N	N	70	N	50	N	3,000	150	N	700	N	>2,000	N
HM281C	<10	<50	N	N	15	70	N	50	N	5,000	150	N	1,000	N	>2,000	N
HM282C	N	<50	N	N	N	150	N	50	N	5,000	100	N	1,000	N	>2,000	N
HM283C	10	50	N	N	<10	70	N	50	N	3,000	150	N	1,000	N	>2,000	N
HM284C	<10	50	N	N	N	70	N	30	N	10,000	100	N	700	N	>2,000	N
HM285C	<10	N	N	N	15	200	N	70	N	700	200	N	1,000	N	>2,000	N
HM286C	N	<50	N	N	15	150	N	70	N	N	200	N	1,000	N	>2,000	N
HM287C	<10	<50	N	N	15	70	N	70	N	7,000	150	N	700	N	>2,000	N
HM288C	10	<50	N	N	<10	70	N	50	N	10,000	100	N	700	N	>2,000	N
HM289C	10	<50	N	N	<10	70	N	70	N	>10,000	150	N	1,000	N	>2,000	N
HM290C	10	<50	N	N	<10	70	N	50	30	700	150	N	1,000	N	>2,000	N
HM292C	10	<50	N	N	10	70	N	70	N	N	200	N	1,000	N	>2,000	N
HM293C	N	50	N	N	10	70	N	50	N	N	70	N	1,000	N	>2,000	N
HM294C	<10	50	N	N	N	100	N	70	N	N	200	N	1,000	N	>2,000	N
HM295C	N	N	N	N	15	70	N	50	700	N	150	N	1,000	N	>2,000	N
HM296C	<10	<50	N	N	<10	70	N	70	N	N	150	N	1,000	N	>2,000	N
HM297C	<10	<50	N	N	15	70	N	70	N	N	100	N	700	N	>2,000	N

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM298C	38 15 25	110 26 55	2.00	.05	<.10	>2.0	150	N	N	N	70	>10,000	N	N	N	N	200
HM299C	38 15 17	110 27 0	5.00	.07	.10	>2.0	300	N	N	N	150	>10,000	N	N	N	N	300
HM300C	38 15 5	110 28 26	3.00	.05	.10	2.0	200	N	N	N	200	>10,000	N	N	N	N	200
HM301C	38 22 5	110 33 45	2.00	.20	1.00	1.0	300	N	N	N	300	>10,000	N	N	N	N	300
HM304C	38 21 25	110 33 2	2.00	.07	.15	2.0	200	N	N	N	100	10,000	N	N	N	N	500
HM305C	38 23 51	110 24 35	5.00	.07	.15	2.0	500	N	N	N	150	>10,000	N	N	N	N	1,000
HM306C	38 23 44	110 24 31	3.00	.07	.15	2.0	300	N	N	N	200	>10,000	<2	N	N	N	300
HM307C	38 22 53	110 27 17	2.00	.07	.15	1.5	300	70	N	N	50	>10,000	<2	N	N	N	500
HM308C	38 23 0	110 27 18	1.50	.07	.15	2.0	150	N	N	N	70	>10,000	N	N	N	N	300
HM309C	38 21 25	110 25 26	5.00	.07	.10	>2.0	200	N	N	N	200	5,000	N	N	N	N	500
HM310C	38 21 30	110 25 20	3.00	.10	.15	>2.0	300	N	N	N	300	7,000	N	N	N	N	300
HM311C	38 20 5	110 25 47	7.00	.10	.15	2.0	500	N	N	N	200	>10,000	N	N	N	N	500
HM312C	38 20 0	110 25 49	7.00	.05	.10	2.0	500	N	N	N	50	>10,000	N	N	N	N	700
HM313C	38 20 7	110 27 23	7.00	.07	.10	>2.0	300	N	N	N	150	7,000	N	N	N	N	700
HM314C	38 18 52	110 31 34	7.00	.07	.10	2.0	300	N	N	N	100	>10,000	N	N	N	N	700
HM315C	38 18 3	110 31 40	7.00	.05	.10	2.0	300	N	N	N	150	5,000	N	N	N	N	500
HM316C	38 17 42	110 32 12	1.50	.05	.15	2.0	200	N	N	N	50	>10,000	N	N	N	N	200
HM317C	38 17 29	110 32 38	3.00	.10	.30	2.0	700	N	N	N	50	>10,000	N	N	N	N	1,000
HM318C	38 22 15	110 31 16	2.00	.07	.15	2.0	300	N	N	N	150	>10,000	N	N	N	N	500
HM319C	38 22 17	110 31 33	7.00	.07	.10	2.0	300	N	N	N	100	10,000	N	N	N	N	500
HM320C	38 21 13	110 31 33	.30	.07	.20	2.0	30	N	N	N	20	10,000	N	N	N	N	70
HM321C	38 20 47	110 30 49	.15	.05	.15	1.5	50	N	N	N	<20	>10,000	N	N	N	N	30
HM322C	38 20 50	110 30 58	.20	<.05	.10	2.0	30	N	N	N	<20	>10,000	N	N	N	N	50
HM323C	38 19 1	110 32 3	.50	.07	.20	1.5	70	N	N	N	70	>10,000	<2	N	N	N	50
HM324C	38 17 4	110 32 41	.70	.07	.15	2.0	50	N	N	N	30	>10,000	N	N	N	N	100
HM325C	38 17 9	110 32 50	.30	.05	.15	2.0	50	N	N	N	20	>10,000	N	N	N	N	70
HM326C	38 16 34	110 33 3	.50	.07	.30	1.5	50	N	N	N	20	>10,000	N	N	N	N	70
HM327C	38 15 31	110 33 24	.70	.07	.30	2.0	70	N	N	N	70	>10,000	N	N	N	N	70
HM328C	38 15 15	110 33 43	.70	.10	.30	2.0	200	N	N	N	50	>10,000	<2	N	N	N	100
HM330C	38 17 0	110 30 35	.50	.05	.10	>2.0	30	N	N	N	70	10,000	<2	N	N	N	70
HM331C	38 15 7	110 29 57	.50	.07	.20	>2.0	50	N	N	N	150	>10,000	N	N	N	N	100
HM334C	38 18 4	110 15 32	.50	.05	.10	>2.0	50	N	N	N	50	>10,000	N	N	N	<10	100
HM335C	38 18 4	110 15 28	.50	.07	.10	>2.0	50	N	N	N	50	10,000	N	N	N	N	100
HM336C	38 18 31	110 15 35	.20	<.05	.10	>2.0	30	N	N	N	50	>10,000	<2	N	N	N	100
HM337C	38 18 45	110 15 25	.30	.07	.15	2.0	100	N	N	N	50	>10,000	<2	N	N	N	100
HM338C	38 19 6	110 15 18	.50	.05	.15	>2.0	70	N	N	N	70	10,000	N	N	N	N	100
HM339C	38 19 12	110 15 12	.20	.05	.10	2.0	50	N	N	N	20	>10,000	N	N	N	N	100
HM340C	38 21 13	110 15 37	.50	.05	.10	2.0	70	N	N	N	50	7,000	N	N	N	N	100
HM341C	38 21 12	110 15 46	.50	.07	.20	2.0	70	N	N	N	100	>10,000	N	N	N	N	100
HM342C	38 21 22	110 16 18	.30	.05	.15	>2.0	70	N	N	N	70	>10,000	<2	N	N	N	100
HM343C	38 24 12	110 15 6	.30	.07	.20	1.0	30	N	N	N	100	>10,000	N	N	N	N	100
HM344C	38 23 41	110 15 18	.50	.05	.15	2.0	20	N	N	N	20	10,000	N	N	N	N	150
HM345C	38 23 38	110 15 46	.20	.07	.15	>2.0	30	N	N	N	30	>10,000	N	N	N	N	50
HM346C	38 23 42	110 15 45	.10	.10	.20	.7	20	N	N	N	20	>10,000	N	N	N	N	<20
HM347C	38 23 27	110 15 38	.30	<.05	.15	2.0	30	N	N	N	70	>10,000	N	N	N	N	50

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM298C	<10	50	N	N	10	70	N	50	N	N	100	N	700	N	>2,000	N
HM299C	10	<50	N	N	N	70	N	50	N	N	200	N	1,000	N	>2,000	N
HM300C	<10	<50	N	N	<10	500	N	70	100	N	150	N	1,000	N	>2,000	N
HM301C	10	70	N	N	<10	70	N	20	N	>10,000	100	N	300	N	>2,000	N
HM304C	<10	<50	N	N	N	70	N	50	N	N	150	N	700	N	N	N
HM305C	10	50	N	N	N	100	N	50	N	10,000	200	N	700	N	N	N
HM306C	<10	50	N	N	<10	70	N	50	N	>10,000	150	N	700	N	N	N
HM307C	N	N	N	N	N	70	N	50	N	>10,000	150	N	700	N	N	N
HM308C	N	N	N	N	N	70	N	50	N	7,000	100	N	700	N	N	N
HM309C	N	50	N	N	<10	100	N	100	N	N	200	N	1,000	N	N	N
HM310C	N	50	N	N	N	150	N	70	N	N	200	N	1,000	N	N	N
HM311C	15	<50	N	N	10	70	N	15	N	>10,000	200	N	500	N	N	N
HM312C	15	N	N	N	<10	100	N	30	N	5,000	300	N	700	N	N	N
HM313C	<10	N	N	N	N	100	N	70	70	N	300	N	1,000	N	N	N
HM314C	<10	N	N	N	N	70	N	30	N	N	300	N	700	N	N	N
HM315C	<10	<50	N	N	<10	70	N	50	<20	N	200	N	1,000	N	N	N
HM316C	<10	N	N	N	N	70	N	50	N	10,000	100	N	700	N	N	N
HM317C	10	50	N	N	N	70	N	50	N	>10,000	150	N	700	N	N	N
HM318C	<10	<50	N	N	N	70	N	30	N	3,000	150	N	500	N	N	N
HM319C	10	<50	N	N	10	100	N	50	N	N	200	N	700	N	N	N
HM320C	<10	<50	N	N	N	70	N	50	20	200	70	N	700	N	>2,000	N
HM321C	N	<50	N	N	N	50	N	50	<20	2,000	70	N	700	N	>2,000	N
HM322C	N	<50	N	N	N	70	N	50	<20	700	70	N	700	N	>2,000	N
HM323C	<10	50	N	N	<10	50	N	30	N	7,000	50	N	500	N	>2,000	N
HM324C	N	<50	N	N	N	70	N	30	<20	500	70	N	700	N	>2,000	N
HM325C	<10	<50	N	N	N	50	N	50	N	7,000	70	N	700	N	>2,000	N
HM326C	N	<50	N	N	N	50	N	30	N	>10,000	70	N	500	N	>2,000	N
HM327C	N	50	N	N	N	70	N	50	N	10,000	70	N	700	N	>2,000	N
HM328C	N	50	N	N	N	50	N	30	N	>10,000	70	N	500	N	>2,000	N
HM330C	N	50	N	N	N	70	N	30	N	700	70	N	500	N	>2,000	N
HM331C	N	50	N	N	N	70	N	50	N	10,000	70	N	700	N	>2,000	N
HM334C	N	<50	N	N	N	70	N	70	N	N	70	N	700	N	>2,000	N
HM335C	N	<50	N	N	N	70	N	50	N	N	100	N	700	N	>2,000	N
HM336C	N	<50	N	N	<10	70	N	50	N	<200	70	N	700	N	>2,000	N
HM337C	N	N	N	N	N	50	N	30	N	1,500	70	N	700	N	>2,000	N
HM338C	N	50	N	N	N	70	N	70	N	500	100	N	1,000	N	>2,000	N
HM339C	N	<50	N	N	N	70	N	30	N	N	70	N	700	N	>2,000	N
HM340C	N	<50	N	N	N	70	N	70	N	N	70	N	1,000	N	>2,000	N
HM341C	20	<50	N	N	N	50	N	50	N	1,000	70	N	700	N	>2,000	N
HM342C	N	70	N	N	<10	70	N	70	N	2,000	100	N	700	N	>2,000	N
HM343C	<10	50	N	N	N	20	N	15	N	>10,000	50	N	150	N	>2,000	N
HM344C	N	<50	N	N	<10	70	N	70	N	1,500	70	N	700	N	>2,000	N
HM345C	N	<50	N	N	N	70	N	50	N	7,000	100	N	700	N	>2,000	N
HM346C	50	N	N	N	N	20	N	10	N	>10,000	20	N	200	N	>2,000	N
HM347C	N	50	N	N	N	70	N	70	N	2,000	100	N	1,000	N	>2,000	N

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM348C	38 14 0	110 12 15	.20	.07	.15	2.0	30	N	N	N	20	>10,000	<2	N	N	N	50
HM349C	38 14 0	110 12 7	.20	.07	.15	1.5	30	N	N	N	30	>10,000	N	N	N	N	70
HM350C	38 12 43	110 14 13	.30	.10	.30	>2.0	30	N	N	N	20	>10,000	N	N	N	N	70
HM351C	38 12 40	110 14 3	.20	.15	.70	1.0	50	N	N	N	20	>10,000	N	N	N	N	30
HM352C	38 12 18	110 14 21	.20	.10	.30	>2.0	50	N	N	N	20	>10,000	N	N	N	N	50
HM353C	38 11 44	110 14 16	.20	.15	.50	2.0	70	N	N	N	20	>10,000	N	N	N	N	50
HM354C	38 11 41	110 14 13	.30	.20	1.50	2.0	200	N	N	N	30	>10,000	N	N	N	N	70
HM355C	38 10 45	110 13 23	.50	.20	2.00	2.0	300	N	N	N	50	>10,000	<2	N	N	N	100
HM356C	38 11 4	110 11 5	.50	.20	1.00	2.0	200	N	N	N	30	>10,000	N	N	N	N	100
HM357C	38 11 1	110 11 1	.50	.15	1.00	1.5	200	N	N	N	30	>10,000	N	N	N	N	20
HM358C	38 10 39	110 11 13	.15	.10	.70	2.0	100	N	N	N	20	>10,000	N	N	N	N	50
HM359C	38 10 17	110 11 30	.70	.10	.70	>2.0	150	10	N	N	50	>10,000	N	N	N	N	70
HM360C	38 12 17	110 11 43	.70	.10	.50	1.5	70	N	N	N	30	>10,000	N	N	N	N	70
HM361C	38 12 17	110 11 36	.70	.07	.15	>2.0	50	N	N	N	70	>10,000	<2	N	N	N	100
HM362C	38 25 22	110 13 40	.70	.07	.15	>2.0	50	N	N	N	150	>10,000	N	N	N	N	100
HM363C	38 25 22	110 13 30	.50	<.05	.15	2.0	50	N	N	N	20	>10,000	N	N	N	N	150
HM364C	38 24 2	110 13 10	1.00	.05	.10	>2.0	70	N	N	N	100	10,000	N	N	N	N	200
HM365C	38 24 6	110 13 7	.70	.07	.15	2.0	50	N	N	N	50	>10,000	N	N	N	N	100
HM366C	38 24 18	110 11 30	.70	.05	.20	1.5	100	N	N	N	20	>10,000	N	N	N	N	70
HM367C	38 24 12	110 11 30	.70	.07	.15	2.0	50	N	N	N	30	>10,000	N	N	N	N	150
HM368C	38 23 46	110 12 4	.50	.05	.15	2.0	50	N	N	N	<20	>10,000	N	N	N	N	100
HM369C	38 23 41	110 12 13	.70	.07	.20	2.0	70	N	N	N	70	>10,000	N	N	N	N	200
HM377C	38 10 8	110 21 0	.50	.20	.50	.3	70	N	N	N	20	>10,000	<2	N	N	<10	20
HM380C	38 22 52	110 13 19	.70	.05	.10	>2.0	20	N	N	N	150	10,000	2	N	N	<10	150
HM381C	38 22 39	110 13 40	.50	.05	.10	>2.0	30	N	N	N	50	7,000	N	N	N	N	70
HM382C	38 21 38	110 14 0	.50	.05	.10	>2.0	30	N	N	N	100	10,000	N	N	N	N	150
HM383C	38 21 21	110 14 0	.70	.05	<.10	2.0	30	N	N	N	100	>10,000	2	N	N	<10	50
HM384C	38 21 25	110 13 51	.70	<.05	<.10	>2.0	50	N	N	N	70	>10,000	2	N	N	N	100
HM385C	38 20 48	110 13 59	1.00	.07	.10	>2.0	50	N	N	N	300	>10,000	<2	N	N	N	300
HM387C	38 18 27	110 14 22	.70	.07	.10	>2.0	50	N	N	N	100	>10,000	N	N	N	N	200
HM388C	38 18 4	110 13 58	.30	.07	.15	>2.0	30	N	N	N	200	>10,000	N	N	N	N	100
HM389C	38 18 9	110 13 48	1.00	.05	<.10	>2.0	50	N	N	N	150	10,000	N	N	N	N	200
HM390C	38 17 31	110 13 14	.50	.07	.10	>2.0	50	N	N	N	150	>10,000	N	N	N	<10	200
HM391C	38 17 21	110 13 10	.70	.05	.10	>2.0	50	N	N	N	200	10,000	N	N	N	N	200
HM392C	38 17 10	110 12 18	1.00	.07	.10	>2.0	100	N	N	N	300	10,000	N	N	N	N	500
HM393C	38 16 39	110 12 11	1.00	.07	.10	>2.0	100	N	N	N	300	7,000	<2	N	N	N	300
HM394C	38 16 16	110 12 10	.70	.05	.10	>2.0	70	N	N	N	300	10,000	<2	N	N	N	200
HM395C	38 16 22	110 12 20	.70	.07	.10	>2.0	70	N	N	N	300	5,000	N	N	N	<10	200
HM396C	38 22 56	110 11 30	.70	.05	.15	>2.0	70	N	N	N	100	>10,000	N	N	N	N	150
HM397C	38 22 49	110 11 33	.70	<.05	<.10	2.0	70	N	N	N	150	>10,000	N	N	N	N	150
HM398C	38 22 41	110 12 1	1.00	.05	<.10	>2.0	70	N	N	N	150	5,000	N	N	N	N	200
HM399C	38 22 45	110 11 50	1.00	.05	.10	>2.0	70	N	N	N	200	>10,000	N	N	N	N	200
HM556C	38 15 30	110 29 9	1.00	.10	.30	>2.0	100	N	N	N	100	>10,000	<2	N	N	N	300
HM559C	38 16 8	110 28 4	1.00	.05	<.10	2.0	50	N	N	N	150	>10,000	<2	N	N	N	200

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM348C	N	50	N	N	N	50	N	50	N	3,000	70	N	700	N	>2,000	N
HM349C	N	<50	N	N	N	50	N	50	N	1,500	70	N	500	N	>2,000	N
HM350C	10	<50	N	N	N	50	N	50	N	3,000	70	N	700	N	>2,000	N
HM351C	N	<50	N	N	N	30	N	20	N	5,000	50	N	200	N	>2,000	N
HM352C	N	50	N	N	N	50	N	50	N	3,000	70	N	700	N	>2,000	N
HM353C	<10	50	N	N	N	30	N	30	N	7,000	70	N	500	N	>2,000	N
HM354C	10	50	N	N	<10	30	N	20	N	5,000	70	N	200	N	>2,000	N
HM355C	20	70	N	N	10	50	N	30	N	10,000	70	N	700	N	>2,000	N
HM356C	<10	50	N	N	N	50	N	20	N	7,000	70	N	500	N	>2,000	N
HM357C	<10	50	N	N	N	30	N	15	N	7,000	50	N	300	N	>2,000	N
HM358C	N	50	N	N	N	30	N	15	N	7,000	70	N	500	N	>2,000	N
HM359C	200	100	N	N	N	50	N	30	<20	10,000	100	N	700	N	>2,000	N
HM360C	N	50	N	N	N	50	N	20	N	3,000	70	N	500	N	>2,000	N
HM361C	N	50	N	N	N	70	N	50	N	1,000	100	N	700	N	>2,000	N
HM362C	N	70	N	N	N	70	N	30	<20	>10,000	100	N	700	N	>2,000	N
HM363C	N	50	N	N	N	70	N	50	N	1,500	70	N	700	N	>2,000	N
HM364C	N	50	N	N	N	70	N	70	<20	N	150	N	1,000	N	>2,000	N
HM365C	N	50	N	N	N	50	N	30	N	2,000	70	N	700	N	>2,000	N
HM366C	N	<50	N	N	N	50	N	20	N	7,000	70	N	700	N	>2,000	N
HM367C	N	<50	N	N	N	70	N	30	N	700	50	N	500	N	>2,000	N
HM368C	N	50	N	N	N	70	N	50	N	700	70	N	700	N	>2,000	N
HM369C	N	50	N	N	N	50	N	50	N	1,000	70	N	700	N	>2,000	N
HM377C	50	70	N	N	20	20	N	10	N	3,000	30	N	30	N	2,000	N
HM380C	N	<50	N	<50	N	70	N	50	70	N	70	N	500	N	>2,000	N
HM381C	N	N	N	N	N	70	N	50	30	N	100	N	700	N	>2,000	N
HM382C	N	<50	N	N	N	70	N	70	30	N	100	N	700	N	>2,000	N
HM383C	N	<50	N	N	<10	500	N	50	30	N	150	N	500	N	>2,000	N
HM384C	N	<50	N	N	<10	70	N	70	<20	N	70	N	700	N	>2,000	N
HM385C	N	<50	N	N	10	70	N	50	N	N	70	N	500	N	>2,000	N
HM386C	N	<50	N	N	10	70	N	50	50	N	100	N	700	N	>2,000	N
HM387C	N	N	N	N	N	50	N	50	30	N	100	N	500	N	>2,000	N
HM388C	N	<50	N	N	N	70	N	50	N	N	100	N	700	N	>2,000	N
HM389C	N	<50	N	N	<10	70	N	70	N	N	100	N	700	N	>2,000	N
HM390C	<10	<50	N	N	<10	70	N	70	N	N	70	N	700	N	>2,000	N
HM391C	N	<50	N	N	N	70	N	70	20	N	150	N	700	N	>2,000	N
HM392C	N	<50	N	N	N	70	N	70	70	N	150	N	700	N	>2,000	N
HM393C	N	<50	N	N	N	70	N	50	<20	N	150	N	700	N	>2,000	N
HM394C	N	<50	N	N	<10	70	N	70	N	N	100	N	700	N	>2,000	N
HM395C	N	<50	N	N	N	70	N	70	<20	N	100	N	1,000	N	>2,000	N
HM396C	<10	<50	N	N	N	70	N	70	50	1,000	100	N	700	N	>2,000	N
HM397C	N	N	N	N	N	70	N	70	N	N	70	N	700	N	>2,000	N
HM398C	N	N	N	N	N	50	N	70	N	N	150	N	1,000	N	>2,000	N
HM399C	N	N	N	N	N	70	N	70	<20	N	100	N	700	N	>2,000	N
HM558C	<10	N	N	N	<10	20	N	>200	N	1,000	70	N	1,000	N	>2,000	N
HM559C	<10	N	N	N	N	70	N	30	N	1,000	70	N	500	N	>2,000	N

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUDE	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-AS	S-AU	S-B	S-BA	S-BE	S-BI	S-CD	S-CO	S-CR
HM560C	38 16 1	110 28 4	.70	<.05	.15	>2.0	70	N	N	N	20	>10,000	N	N	N	N	100
HM561C	38 16 57	110 26 56	.70	<.05	.15	2.0	70	N	N	N	20	>10,000	2	N	N	N	70
HM562C	38 17 4	110 26 56	.20	<.05	.10	>2.0	70	N	N	N	100	>10,000	2	N	N	N	200
HM563C	38 16 9	110 26 45	.20	<.05	.10	>2.0	50	N	N	N	70	>10,000	2	N	N	N	50
HM564C	38 16 6	110 26 29	.70	.07	<.10	2.0	30	N	N	N	70	7,000	N	N	N	N	150
HM565C	38 16 50	110 25 15	.15	<.05	.10	2.0	50	N	N	N	70	>10,000	2	N	N	N	20
HM566C	38 15 34	110 24 31	.50	.05	.20	2.0	70	N	N	N	50	>10,000	2	N	N	N	100
HM567C	38 15 41	110 24 38	.50	<.05	.10	2.0	70	N	N	N	30	>10,000	2	N	N	N	150
HM568C	38 14 59	110 22 58	.70	.05	<.10	2.0	30	N	N	N	50	10,000	N	N	N	<10	150
HM569C	38 15 7	110 23 2	.50	<.05	.10	>2.0	50	N	N	N	50	>10,000	3	N	N	N	50
HM570C	38 14 28	110 23 22	.70	.05	.20	>2.0	100	N	N	N	100	>10,000	<2	N	N	N	100
HM571C	38 14 4	110 23 50	1.50	.07	.10	2.0	70	N	N	N	150	>10,000	N	N	N	N	700
HM572C	38 13 58	110 25 26	.50	<.05	<.10	2.0	50	N	N	N	70	>10,000	N	N	N	N	200
HM573C	38 25 23	110 13 52	.70	.07	.15	>2.0	70	N	N	N	70	10,000	N	N	N	<10	200
HM574C	38 13 4	110 26 46	1.00	.20	.30	2.0	100	N	N	N	100	>10,000	2	N	N	N	200
HM575C	38 13 13	110 27 4	.20	.10	.30	1.0	50	N	N	N	20	>10,000	<2	N	N	N	50
HM576C	38 13 4	110 27 49	2.00	.10	.30	>2.0	100	2	N	100	100	>10,000	2	N	N	N	500
HM578C	38 14 20	110 28 53	.50	.10	.30	2.0	70	N	N	N	100	>10,000	2	N	N	N	50
HM600C	38 21 47	110 11 35	1.00	.07	.10	>2.0	70	N	N	N	150	>10,000	N	N	N	N	300
HM601C	38 21 26	110 11 41	1.00	.05	.10	2.0	100	N	N	N	100	>10,000	N	N	N	N	200
HM602C	38 21 25	110 11 45	.70	<.05	<.10	2.0	50	N	N	N	30	>10,000	N	N	N	N	150
HM603C	38 20 55	110 10 38	1.50	.07	.10	>2.0	100	N	N	N	150	>10,000	N	N	N	N	300
HM604C	38 20 40	110 10 22	.50	<.05	<.10	2.0	50	N	N	N	20	10,000	<2	N	N	N	200
HM605C	38 20 46	110 10 15	.70	.05	.10	2.0	200	N	N	N	70	>10,000	N	N	N	<10	150
HM606C	38 20 10	110 11 50	.70	<.05	<.10	>2.0	70	N	N	N	150	>10,000	N	N	N	N	200
HM607C	38 19 37	110 11 40	.50	.07	.10	2.0	30	N	N	N	100	>10,000	N	N	N	N	150
HM608C	38 18 57	110 11 25	.30	<.05	<.10	>2.0	20	N	N	N	70	7,000	N	N	N	N	100
HM609C	38 18 33	110 11 3	1.00	.05	<.10	>2.0	70	N	N	N	150	10,000	N	N	N	N	500
HM610C	38 18 36	110 10 54	.50	.07	<.10	>2.0	50	N	N	N	150	>10,000	N	N	N	N	300
HM611C	38 17 8	110 10 25	.50	.05	<.10	2.0	50	N	N	N	100	10,000	N	N	N	N	200
HM612C	38 17 4	110 10 17	.70	.07	.15	>2.0	100	N	N	N	100	>10,000	N	N	N	N	500
HM613C	38 19 6	110 15 18	.70	.05	.10	>2.0	70	N	N	N	150	7,000	N	N	N	<10	150
HM614C	38 18 45	110 15 25	1.00	.10	.20	>2.0	150	N	N	N	200	>10,000	2	N	N	N	200
HM615C	38 18 31	110 15 35	1.00	<.05	.15	>2.0	100	N	N	N	100	>10,000	2	N	N	<10	200
HM616C	38 18 4	110 15 32	1.50	<.05	.15	>2.0	150	N	N	N	150	>10,000	2	N	N	N	300
HM617C	38 18 4	110 15 28	2.00	.05	.15	>2.0	150	N	N	N	200	>10,000	2	N	N	N	150

TABLE 4.--Spectrographic analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	S-CU	S-LA	S-MO	S-NB	S-NI	S-PB	S-SB	S-SC	S-SN	S-SR	S-V	S-W	S-Y	S-ZN	S-ZR	S-TH
HM560C	<10	N	N	N	<10	20	N	>200	N	>10,000	70	N	1,000	N	>2,000	<200
HM561C	<10	N	N	N	<10	20	N	>200	N	1,500	70	<100	1,500	N	>2,000	N
HM562C	<10	N	N	N	<10	20	N	>200	N	1,500	70	<100	1,000	N	>2,000	N
HM563C	<10	N	N	N	<10	20	N	>200	N	1,500	70	N	1,000	N	>2,000	N
HM564C	N	N	N	N	N	50	N	50	N	N	70	N	500	N	>2,000	N
HM565C	<10	N	N	N	<10	20	N	>200	N	>10,000	70	<100	700	N	>2,000	N
HM566C	<10	N	N	N	<10	30	N	>200	N	7,000	70	N	1,500	N	>2,000	N
HM567C	<10	N	N	N	<10	20	N	>200	N	1,000	70	<100	1,500	N	>2,000	N
HM568C	N	<50	N	N	<10	70	N	70	N	N	70	N	700	N	>2,000	N
HM569C	<10	N	N	N	<10	20	N	>200	N	500	50	<100	1,000	N	>2,000	N
HM570C	<10	N	N	N	<10	20	N	>200	N	1,500	70	<100	1,000	N	>2,000	N
HM571C	<10	<50	N	N	N	70	N	50	N	700	70	N	700	N	>2,000	N
HM572C	<10	50	N	N	<10	50	N	70	N	300	70	N	700	N	>2,000	N
HM573C	N	<50	N	N	<10	70	N	30	N	N	100	N	700	N	>2,000	N
HM574C	<10	N	N	N	<10	20	N	200	N	3,000	50	<100	500	N	>2,000	N
HM575C	<10	N	N	N	<10	20	N	150	N	3,000	30	<100	300	N	>2,000	N
HM576C	<10	N	N	N	<10	20	N	>200	N	3,000	100	<100	2,000	N	>2,000	<200
HM578C	<10	N	N	N	<10	20	N	100	N	2,000	30	<100	300	N	>2,000	N
HM600C	<10	50	N	N	N	70	N	50	<20	N	100	N	700	N	>2,000	N
HM601C	N	N	N	N	<10	70	N	50	N	700	100	N	700	N	>2,000	N
HM602C	N	N	N	N	<10	3,000	N	30	N	1,000	70	N	700	N	>2,000	N
HM603C	N	N	N	N	<10	70	N	50	N	N	150	N	700	N	>2,000	N
HM604C	N	<50	N	N	<10	70	N	70	N	N	70	N	700	N	>2,000	N
HM605C	<10	N	N	N	N	70	N	100	N	300	100	N	1,000	N	>2,000	N
HM606C	N	N	N	N	N	70	N	70	<20	N	100	N	1,000	N	>2,000	N
HM607C	N	N	N	N	N	50	N	50	N	N	70	N	500	N	>2,000	N
HM608C	N	N	N	N	<10	70	N	70	N	N	100	N	700	N	>2,000	N
HM609C	N	<50	N	N	<10	70	N	70	N	N	100	N	1,000	N	>2,000	N
HM610C	N	<50	N	N	N	70	N	50	<20	N	100	N	1,000	N	>2,000	N
HM611C	N	N	N	N	<10	70	N	30	20	N	70	N	700	N	>2,000	N
HM612C	<10	N	N	N	<10	70	N	70	30	N	150	N	1,000	N	>2,000	N
HM613C	N	<50	N	N	<10	70	N	70	N	N	100	N	1,000	N	>2,000	N
HM614C	<10	N	N	<50	<10	30	N	>200	N	1,000	100	<100	2,000	N	>2,000	<200
HM615C	<10	N	N	N	<10	30	N	>200	N	700	70	<100	1,500	N	>2,000	N
HM616C	<10	N	N	N	<10	30	N	>200	N	1,000	70	<100	1,500	N	>2,000	<200
HM617C	<10	N	N	<50	<10	20	N	>200	N	700	100	<100	1,500	N	>2,000	N

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah

[Abundance of minerals tentatively identified in the non-magnetic heavy-mineral fraction: -- = none observed; 1 = trace present, <1%; 2 = present, >2%; 3 = common, >5%; 4 = major, >20%; 5 = dominant, >50%; and 6 = ubiquitous, >85%. Observed crystal shape of zircon is denoted in column header by an R or E indicating round and euhedral, respectively.]

SAMPLE	LATITUDE	LONGITUD	ZIRCON-R	ZIRCON-E	SPHENE	RUTILE	ANATASE	BARITE	APATITE	SCHEELIT	EPIDOTE	PYRITE
HM225C	38 12 5	110 15 25	6	1	--	1	--	1	1	--	--	--
HM226C	38 10 10	110 17 30	6	1	--	2	2	1	3	--	--	--
HM227C	38 9 55	110 18 45	5	1	--	1	1	1	3	--	--	--
HM228C	38 10 0	110 19 25	5	1	--	2	--	2	3	--	--	--
HM229C	38 10 15	110 19 45	1	1	--	2	--	4	4	--	--	--
HM230C	38 10 7	110 20 5	5	1	1	2	--	3	2	--	--	--
HM231C	38 12 10	110 18 59	6	--	1	1	1	1	1	--	--	--
HM232C	38 12 15	110 14 5	6	1	1	1	--	--	2	--	--	1
HM233C	38 12 7	110 20 0	6	1	1	1	--	1	1	--	--	1
HM234C	38 12 47	110 20 20	6	1	1	1	--	2	1	--	--	1
HM235C	38 12 34	110 20 45	5	1	1	1	--	1	3	--	--	--
HM236C	38 12 53	110 20 45	5	1	--	2	--	--	2	--	--	--
HM237C	38 12 50	110 21 10	6	2	--	1	1	1	2	--	--	--
HM239C	38 12 55	110 21 50	6	1	--	1	1	--	2	--	--	--
HM240C	38 13 25	110 22 10	5	1	--	1	1	2	2	--	--	1
HM241C	38 13 33	110 22 15	3	1	2	1	1	3	4	--	--	--
HM243C	38 12 30	110 24 14	4	1	3	1	1	5	2	--	--	--
HM244C	38 11 50	110 25 59	4	2	3	2	1	4	2	--	1	--
HM245C	38 13 29	110 25 34	4	2	3	2	1	4	2	--	--	1
HM246C	38 14 37	110 25 17	5	2	2	1	1	4	2	--	--	--
HM247C	38 14 39	110 24 56	4	2	3	2	--	4	2	--	2	--
HM248C	38 14 20	110 26 55	5	--	2	2	1	4	2	--	1	1
HM249C	38 14 12	110 26 52	4	1	3	2	2	4	2	--	1	--
HM274C	38 20 56	110 33 56	4	--	2	2	2	5	2	--	1	1
HM276C	38 22 25	110 31 15	5	--	2	1	--	3	3	--	1	--
HM277C	38 20 37	110 31 44	4	--	2	2	2	3	2	--	--	1
HM278C	38 20 46	110 31 45	5	--	2	1	1	2	2	--	--	1
HM279C	38 20 11	110 32 5	5	2	3	2	2	2	2	--	--	1
HM280C	38 19 15	110 31 0	5	1	3	2	2	3	2	--	--	--
HM281C	38 19 32	110 30 55	4	2	3	2	2	4	3	--	--	--
HM282C	38 21 23	110 28 13	5	--	3	2	2	3	2	--	1	1
HM283C	38 20 56	110 29 6	4	--	3	2	1	4	2	--	--	--
HM284C	38 21 45	110 27 30	4	2	3	2	2	4	2	--	--	--
HM285C	38 21 40	110 27 19	4	--	3	2	2	3	3	--	--	--
HM286C	38 21 19	110 27 51	5	--	3	2	2	2	2	--	--	--
HM287C	38 22 28	110 21 30	4	1	3	2	1	4	2	--	1	--
HM288C	38 22 36	110 25 40	4	2	4	2	1	4	2	--	--	--
HM289C	38 22 29	110 25 46	4	2	3	2	2	4	2	--	--	--
HM290C	38 18 47	110 26 31	4	--	4	2	2	4	2	--	--	--
HM291C	38 28 37	110 26 30	4	2	4	2	2	2	2	--	--	--
HM292C	38 17 57	110 27 24	4	--	3	2	2	3	2	--	--	--
HM293C	38 17 26	110 29 4	5	--	2	2	1	2	2	--	1	--
HM294C	38 17 25	110 28 45	5	--	3	2	2	2	2	--	--	1
HM295C	38 17 16	110 28 41	5	--	2	2	1	2	3	--	--	1
HM296C	38 17 52	110 26 7	5	--	3	2	2	2	3	--	--	1

BLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	PYROXENE	ARSENOPY	AMPHIBOL	ROCK FRA
HM225C	--	--	1	--
HM226C	--	--	1	--
HM227C	--	--	1	2
HM228C	--	--	--	1
HM229C	--	--	--	2
HM230C	--	--	--	1
HM231C	--	--	--	--
HM232C	--	--	--	--
HM233C	--	--	1	--
HM234C	--	--	1	--
HM235C	--	--	1	1
HM236C	--	--	2	1
HM237C	--	--	1	1
HM239C	--	--	1	1
HM240C	--	--	1	1
HM241C	--	--	1	1
HM243C	--	--	2	--
HM244C	--	--	2	--
HM245C	--	--	2	--
HM246C	--	--	1	--
HM247C	--	--	2	--
HM248C	--	--	2	--
HM249C	--	--	1	--
HM274C	--	--	1	--
HM276C	--	--	1	--
HM277C	--	--	1	--
HM278C	--	--	1	--
HM279C	--	--	2	--
HM280C	--	--	2	--
HM281C	--	--	2	--
HM282C	--	--	1	--
HM283C	--	--	2	--
HM284C	--	--	2	--
HM285C	--	--	2	--
HM286C	--	--	2	--
HM287C	--	--	1	--
HM288C	--	--	2	--
HM289C	--	--	2	--
HM290C	--	--	2	--
HM291C	--	--	2	--
HM292C	--	--	2	--
HM293C	--	--	1	--
HM294C	--	--	2	--
HM295C	--	--	1	--
HM296C	--	--	1	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUD	ZIRCON-R	ZIRCON-E	SPHENE	RUTILE	ANATASE	BARITE	APATITE	SCHEELIT	EPIDOTE	PYRITE
HM297C	38 17 46	110 26 2	5	--	3	2	1	1	3	--	--	--
HM298C	38 15 25	110 26 55	5	1	3	2	2	1	3	--	--	--
HM299C	38 15 17	110 27 0	5	1	3	1	1	2	2	--	--	--
HM300C	38 15 5	110 28 26	5	1	2	2	1	3	3	--	1	1
HM301C	38 22 5	110 33 45	4	1	2	1	1	5	3	--	2	1
HM304C	38 21 25	110 33 2	3	--	2	1	1	2	4	--	1	--
HM305C	38 23 51	110 24 35	4	1	3	2	1	4	3	--	1	--
HM306C	38 23 44	110 24 31	4	1	3	2	2	4	3	--	1	--
HM307C	38 22 53	110 27 17	4	1	2	2	1	4	2	--	--	--
HM308C	38 23 0	110 27 18	4	1	2	2	1	3	2	--	1	--
HM309C	38 21 25	110 25 28	5	1	3	2	1	1	2	--	1	--
HM310C	38 21 30	110 25 20	4	2	3	1	1	1	2	--	1	--
HM311C	38 20 5	110 25 47	4	2	2	1	1	5	2	--	1	--
HM312C	38 20 0	110 25 49	4	1	2	2	--	2	2	--	--	--
HM313C	38 20 7	110 27 23	4	1	3	2	1	2	2	--	--	--
HM314C	38 18 52	110 31 34	4	--	2	2	1	2	2	--	1	--
HM315C	38 18 3	110 31 40	5	--	3	2	1	1	2	--	--	--
HM316C	38 17 42	110 32 12	4	1	2	2	1	4	2	--	1	--
HM317C	38 17 29	110 32 38	4	--	2	1	1	4	2	--	1	1
HM318C	38 22 15	110 31 18	4	1	2	2	2	4	2	--	1	--
HM319C	38 22 17	110 31 33	4	1	2	2	2	4	2	--	1	--
HM320C	38 21 13	110 31 33	5	--	2	2	2	1	1	--	1	--
HM321C	38 20 47	110 30 49	5	--	2	1	2	3	2	--	--	--
HM322C	38 20 50	110 30 58	5	--	2	1	2	2	2	--	1	--
HM323C	38 19 1	110 32 3	4	--	3	2	2	3	1	--	--	--
HM324C	38 17 4	110 32 14	5	--	2	1	2	2	2	--	--	--
HM325C	38 17 9	110 32 50	5	--	2	1	2	3	2	--	1	--
HM326C	38 16 34	110 33 3	4	--	2	2	2	4	2	--	1	--
HM327C	38 15 31	110 33 24	5	--	2	2	2	3	2	--	1	--
HM328C	38 15 15	110 33 43	4	2	2	2	2	5	2	--	--	--
HM330C	38 17 0	110 30 35	5	--	3	1	2	1	3	--	1	--
HM331C	38 15 7	110 29 57	5	--	3	1	2	2	2	--	1	--
HM334C	38 18 4	110 15 32	5	1	3	2	2	2	2	--	1	--
HM335C	38 18 4	110 15 28	5	--	3	2	2	2	2	--	--	--
HM336C	38 18 31	110 15 35	5	--	3	1	1	2	2	--	--	--
HM337C	38 18 45	110 15 25	4	--	3	1	--	4	2	--	--	--
HM338C	38 19 6	110 15 18	5	--	3	2	2	2	2	--	1	--
HM339C	38 19 12	110 15 12	5	--	4	2	2	2	2	--	--	--
HM340C	38 21 13	110 15 37	5	--	4	2	2	2	2	--	--	--
HM341C	38 21 12	110 15 46	4	1	4	2	1	4	2	--	--	--
HM342C	38 21 22	110 16 18	5	1	2	2	1	4	2	--	--	--
HM343C	38 24 12	110 15 6	2	1	2	1	1	5	--	--	1	--
HM344C	38 23 46	110 15 18	5	1	2	1	1	2	--	--	1	--
HM345C	38 23 38	110 15 46	5	1	3	2	2	3	2	--	--	--
HM346C	38 23 42	110 15 45	2	--	1	1	1	6	2	--	--	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	PYROXENE	ARSENOPY	AMPHIBOL	ROCK FRA
HM297C	--	--	2	--
HM298C	--	--	1	--
HM299C	--	--	1	--
HM300C	--	--	2	--
HM301C	--	--	2	--
HM304C	--	--	1	--
HM305C	--	--	2	--
HM306C	--	--	1	--
HM307C	--	--	1	--
HM308C	--	--	1	--
HM309C	--	--	2	--
HM310C	--	--	2	--
HM311C	--	--	2	--
HM312C	--	--	1	--
HM313C	--	--	1	--
HM314C	--	--	1	--
HM315C	--	--	2	--
HM316C	--	--	2	--
HM317C	--	--	1	--
HM318C	--	--	2	--
HM319C	--	--	2	--
HM320C	--	--	1	--
HM321C	--	--	--	--
HM322C	--	--	1	--
HM323C	--	--	1	--
HM324C	--	--	--	--
HM325C	--	--	--	--
HM326C	--	--	1	--
HM327C	--	--	1	--
HM328C	--	--	1	--
HM330C	--	--	1	--
HM331C	--	--	1	--
HM334C	--	--	1	--
HM335C	--	--	1	--
HM336C	--	--	1	--
HM337C	--	--	1	--
HM338C	--	--	1	--
HM339C	--	--	1	--
HM340C	--	--	1	--
HM341C	--	--	1	--
HM342C	--	--	1	--
HM343C	--	--	1	--
HM344C	--	--	1	--
HM345C	--	--	1	--
HM346C	--	--	1	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUD	ZIRCON-R	ZIRCON-E	SPHENE	RUTILE	ANATASE	BARITE	APATITE	SCHEELIT	EPIDOTE	PYRITE
HM347C	38 23 27	110 15 38	5	1	3	2	2	2	2	--	--	--
HM348C	38 14 0	110 12 15	5	1	3	2	2	3	2	--	--	--
HM349C	38 14 0	110 12 7	4	1	3	2	2	4	2	--	--	--
HM350C	38 12 43	110 14 13	5	1	4	2	2	4	2	--	--	--
HM351C	38 12 40	110 14 3	3	1	3	2	2	5	2	--	--	--
HM352C	38 12 18	110 14 21	4	1	2	2	2	4	2	--	--	--
HM353C	38 11 44	110 14 16	4	1	2	2	2	5	2	--	--	--
HM354C	38 11 41	110 14 13	4	1	3	2	2	5	2	--	--	--
HM355C	38 10 45	110 13 23	3	1	2	2	2	5	2	--	--	--
HM356C	38 11 4	110 11 5	4	1	2	2	2	4	2	--	1	--
HM357C	38 11 1	110 11 1	4	1	3	2	2	5	2	--	1	--
HM358C	38 10 39	110 11 13	3	--	2	2	2	5	2	--	--	--
HM359C	38 10 17	110 11 30	4	--	3	2	2	4	2	--	--	1
HM360C	38 12 17	110 11 43	4	--	3	2	2	4	2	--	--	--
HM361C	38 12 15	110 11 38	5	--	4	2	2	3	2	--	--	--
HM362C	38 25 22	110 13 40	5	1	3	2	2	3	2	--	--	--
HM363C	38 25 22	110 13 30	5	--	2	2	2	2	2	--	--	--
HM364C	38 24 2	110 13 10	5	--	4	2	2	2	2	--	--	--
HM365C	38 24 6	110 13 7	5	--	3	2	2	4	2	--	--	--
HM366C	38 24 18	110 11 30	4	--	2	1	1	4	2	--	--	--
HM367C	38 24 12	110 11 30	5	--	3	2	2	3	2	--	--	--
HM368C	38 23 46	110 12 4	4	--	3	2	2	4	3	--	--	--
HM369C	38 23 41	110 12 13	4	--	3	2	2	4	2	--	--	--
HM372C	37 27 13	110 28 29	5	--	2	2	--	4	2	--	--	--
HM377C	38 18 8	110 21 0	2	1	1	1	--	6	1	--	1	--
HM380C	38 22 52	110 13 19	5	--	2	2	--	1	--	--	--	1
HM381C	38 22 39	110 13 40	5	--	2	2	--	2	1	--	1	--
HM382C	38 21 38	110 14 0	5	--	2	1	--	2	3	--	1	--
HM383C	38 21 21	110 14 0	5	1	2	2	--	2	1	--	1	--
HM384C	38 21 25	110 13 51	5	--	2	2	--	2	1	--	--	1
HM385C	38 20 48	110 13 59	5	1	2	2	--	3	1	--	--	--
HM386C	38 19 14	110 14 43	4	1	2	2	--	3	1	--	--	1
HM387C	38 18 27	110 14 22	5	--	2	2	1	4	1	--	--	--
HM388C	38 18 4	110 13 58	4	--	3	2	--	3	1	--	--	--
HM389C	38 18 9	110 13 48	5	--	2	2	1	2	1	--	--	--
HM390C	38 17 31	110 13 14	4	--	3	2	1	2	1	--	--	1
HM391C	38 17 21	110 13 10	4	1	3	2	1	2	1	--	--	--
HM392C	38 17 10	110 12 18	3	3	3	2	--	2	1	--	--	--
HM393C	38 16 39	110 12 11	4	2	4	2	--	2	2	--	--	--
HM394C	38 16 16	110 12 10	4	1	3	1	2	2	2	--	--	--
HM395C	38 16 22	110 12 20	5	1	4	2	1	2	2	--	--	1
HM396C	38 22 56	110 11 30	5	2	2	2	2	3	2	--	--	--
HM397C	38 22 49	110 11 33	5	2	3	2	1	2	2	--	--	--
HM398C	38 22 41	110 12 1	5	1	3	2	2	2	2	--	--	--
HM399C	38 22 45	110 11 50	5	1	3	2	2	2	2	--	--	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	PYROXENE	ARSENOPY	AMPHIBOL	ROCK FRA
HM347C	--	--	1	--
HM348C	--	--	--	--
HM349C	--	--	1	--
HM350C	--	--	1	--
HM351C	--	--	1	--
HM352C	--	--	1	--
HM353C	--	--	1	--
HM354C	--	--	1	--
HM355C	--	--	1	--
HM356C	--	--	1	--
HM357C	--	--	1	--
HM358C	--	--	1	--
HM359C	--	--	1	--
HM360C	--	--	1	--
HM361C	--	--	1	--
HM362C	--	--	2	--
HM363C	--	--	1	--
HM364C	--	--	1	--
HM365C	--	--	2	--
HM366C	--	--	1	--
HM367C	--	--	1	--
HM368C	--	--	1	--
HM369C	--	--	1	--
HM372C	--	--	1	--
HM377C	--	--	1	--
HM380C	--	--	1	--
HM381C	--	--	1	--
HM382C	--	--	1	--
HM383C	--	--	1	--
HM384C	--	--	1	--
HM385C	--	--	2	--
HM386C	--	--	--	1
HM387C	--	--	1	--
HM388C	--	--	2	--
HM389C	--	--	1	--
HM390C	--	--	2	--
HM391C	--	--	2	--
HM392C	--	--	2	--
HM393C	--	--	2	--
HM394C	--	--	2	--
HM395C	--	--	2	--
HM396C	--	--	2	--
HM397C	--	--	2	--
HM398C	--	--	2	--
HM399C	--	--	2	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	LATITUDE	LONGITUD	ZIRCON-R	ZIRCON-E	SPHENE	RUTILE	ANATASE	BARITE	APATITE	SCHEELIT	EPIDOTE	PYRITE
HM558C	38 15 30	110 29 9	5	1	--	2	--	2	3	--	--	--
HM559C	38 16 8	110 28 4	4	--	3	1	1	4	2	--	1	--
HM560C	38 16 1	110 28 4	5	1	--	1	1	1	2	--	1	--
HM561C	38 16 57	110 26 56	6	1	--	1	1	--	2	--	--	--
HM562C	38 17 4	110 26 56	6	1	--	1	1	2	2	--	--	--
HM563C	38 16 9	110 26 45	6	1	--	1	--	2	2	--	--	--
HM564C	38 16 6	110 26 29	4	1	2	2	1	1	--	--	--	--
HM565C	38 16 50	110 25 15	6	1	--	1	--	2	1	--	--	--
HM566C	38 15 34	110 24 31	6	1	--	1	--	1	--	--	--	--
HM567C	38 15 41	110 24 38	6	1	--	1	--	1	--	--	--	--
HM568C	38 14 59	110 22 58	5	2	2	2	2	2	1	--	--	--
HM569C	38 15 7	110 23 2	6	1	--	1	--	--	--	--	--	--
HM570C	38 14 28	110 23 22	6	1	--	1	1	2	--	--	--	--
HM571C	38 14 4	110 23 50	5	1	2	2	1	4	2	--	1	--
HM572C	38 13 58	110 25 26	4	1	3	2	1	4	2	--	--	1
HM573C	38 25 23	110 13 52	5	--	2	2	2	1	1	--	--	--
HM574C	38 13 4	110 26 46	4	1	--	1	--	4	--	--	--	--
HM575C	38 13 13	110 27 4	4	1	--	1	1	4	--	--	--	--
HM576C	38 13 4	110 27 49	5	1	--	2	--	3	--	--	--	2
HM578C	38 14 20	110 28 53	5	1	--	2	--	3	--	--	--	--
HM600C	38 21 47	110 11 35	5	1	3	2	2	2	3	--	1	--
HM601C	38 21 26	110 11 41	4	1	2	2	2	3	3	--	--	--
HM602C	38 21 25	110 11 45	4	1	--	2	2	4	2	--	--	--
HM603C	38 20 55	110 10 38	5	1	3	2	2	2	2	--	--	--
HM604C	38 20 40	110 10 22	5	1	3	2	2	2	2	--	--	1
HM605C	38 20 46	110 10 15	5	--	2	2	2	3	2	--	--	--
HM606C	38 20 10	110 11 50	5	1	3	2	2	2	2	--	--	--
HM607C	38 19 37	110 11 40	5	1	3	2	2	3	2	--	--	--
HM608C	38 18 57	110 11 25	5	1	3	1	2	2	2	--	--	--
HM609C	38 18 33	110 11 3	5	1	3	2	1	2	2	--	--	--
HM610C	38 18 36	110 10 54	5	--	3	2	2	3	1	--	--	--
HM611C	38 17 8	110 10 25	4	--	3	2	2	1	1	--	--	--
HM612C	38 17 4	110 10 17	5	--	3	2	2	2	1	--	1	--
HM613C	38 19 6	110 15 18	4	--	3	2	2	2	2	--	--	--
HM614C	38 18 45	110 15 25	--	--	--	--	--	--	--	--	--	--
HM615C	38 18 31	110 15 35	--	--	--	--	--	--	--	--	--	--
HM616C	38 18 4	110 15 32	--	--	--	--	--	--	--	--	--	--
HM617C	38 18 4	110 15 28	--	--	--	--	--	--	--	--	--	--

TABLE 5.--Mineralogical analysis of heavy-mineral-concentrate samples from Dirty Devil, French Spring-Happy Canyon, and Horseshoe Canyon Wilderness Study Areas, Utah (continued)

SAMPLE	PYROXENE	ARSENOPY	AMPHIBOL	ROCK FRA
HM558C	--	--	--	--
HM559C	--	--	1	--
HM560C	--	--	--	--
HM561C	--	--	--	--
HM562C	--	--	--	--
HM563C	--	--	--	--
HM564C	--	--	1	--
HM565C	--	--	--	--
HM566C	--	--	--	--
HM567C	--	--	--	--
HM568C	--	--	2	--
HM569C	--	--	--	--
HM570C	--	--	--	--
HM571C	--	--	2	2
HM572C	--	--	2	--
HM573C	--	--	1	--
HM574C	--	--	--	2
HM575C	--	--	--	2
HM576C	--	--	--	2
HM578C	--	--	--	2
HM600C	--	--	2	--
HM601C	--	--	2	--
HM602C	--	--	2	--
HM603C	--	--	2	--
HM604C	--	--	2	--
HM605C	--	--	2	--
HM606C	--	--	2	--
HM607C	--	--	2	--
HM608C	--	--	1	--
HM609C	--	--	2	--
HM610C	--	--	2	--
HM611C	--	--	1	--
HM612C	--	--	1	--
HM613C	--	--	2	--
HM614C	--	--	--	--
HM615C	--	--	--	--
HM616C	--	--	--	--
HM617C	--	--	--	--