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Analytical results, sample locality map, geochemical maps, and histograms for samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho

By

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

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CONTENTS

ILLUSTRATIONS

TABLES

CONTENTS--continued

INTRODUCTION

Stibnite is located in Valley County, Idaho, about 96 miles north of Boise, and about 9 miles southeast of Yellow Pine (fig 1). The town is abandoned except for recent seasonal use as a site for heap leaching gold ore. The mill tailings pond site is located adjacent to the townsite of Stibnite, along Meadow Creek, a tributary of the East Fork of the South Fork of the Salmon River. The tailings pond received tailings from ores processed for antimony, tungsten, gold, and silver. The main period of its use began in 1932 and concluded in 1952.

During the early 1970s the USGS conducted a geochemical study in an area just south of Stibnite (Curtin and King, 1974). The purpose of the study was to test and compare the usefullness of various sample media, including rocks, soils, mull, and assorted vegetation types, in an area that was considered to have potential for mineral deposits concealed by glacial debris and alluvium. A possibility considered during that study was that materials sampled, particularly in the northern end of the study area, next to Stibnite, may have been contaminated by windblown material from the tailings pond. To help determine if any anomalous values found in samples from the study area might be due to enrichment by windblown material from the tailings pond, samples were collected, in August, 1971, from 20 sites on the pond's surface, and analyzed. This report presents analytical results, sample locality map, histograms, and geochemical maps showing the distribution of selected elements on the tailings pond. This report was prompted by current interest and concerns about affects on the environment resulting from mining operations, past and present. The main purpose of this report is to release the analytical data. The geochemical maps and histograms are included for the convenience of readers interested in the distribution of elements considered most pertinent, based on the history of ore processing at Stibnite.

HISTORY

The area developed for mill tailings was described (Mining World, 1947, p. 31) as 1,300 feet wide and 5,500 feet long with an area of 171.60 acres, with good possibilities for storing over twenty million tons of waste. Meadow Creek was diverted at the upper end of the area to a canal along the south hillsides. Initially an earth embankment 900-feet long and 20-feet high was built to contain the tailings pond.

The pond initially received tailings from the Yellow Pine 150-ton mill which was constructed on Meadow Creek at Stibnite in 1931. The mill processed antimony-gold ore from the underground Meadow Creek mine at Stibnite from 1932 to 1938, when the mine was closed. Production at the mill continued with ores from the Yellow Pine open-pit mine, located about two miles north of Stibnite. The Yellow Pine ores included four types: gold ore, antimony-gold ore, tungsten-antimony-gold ore, and oxidized gold

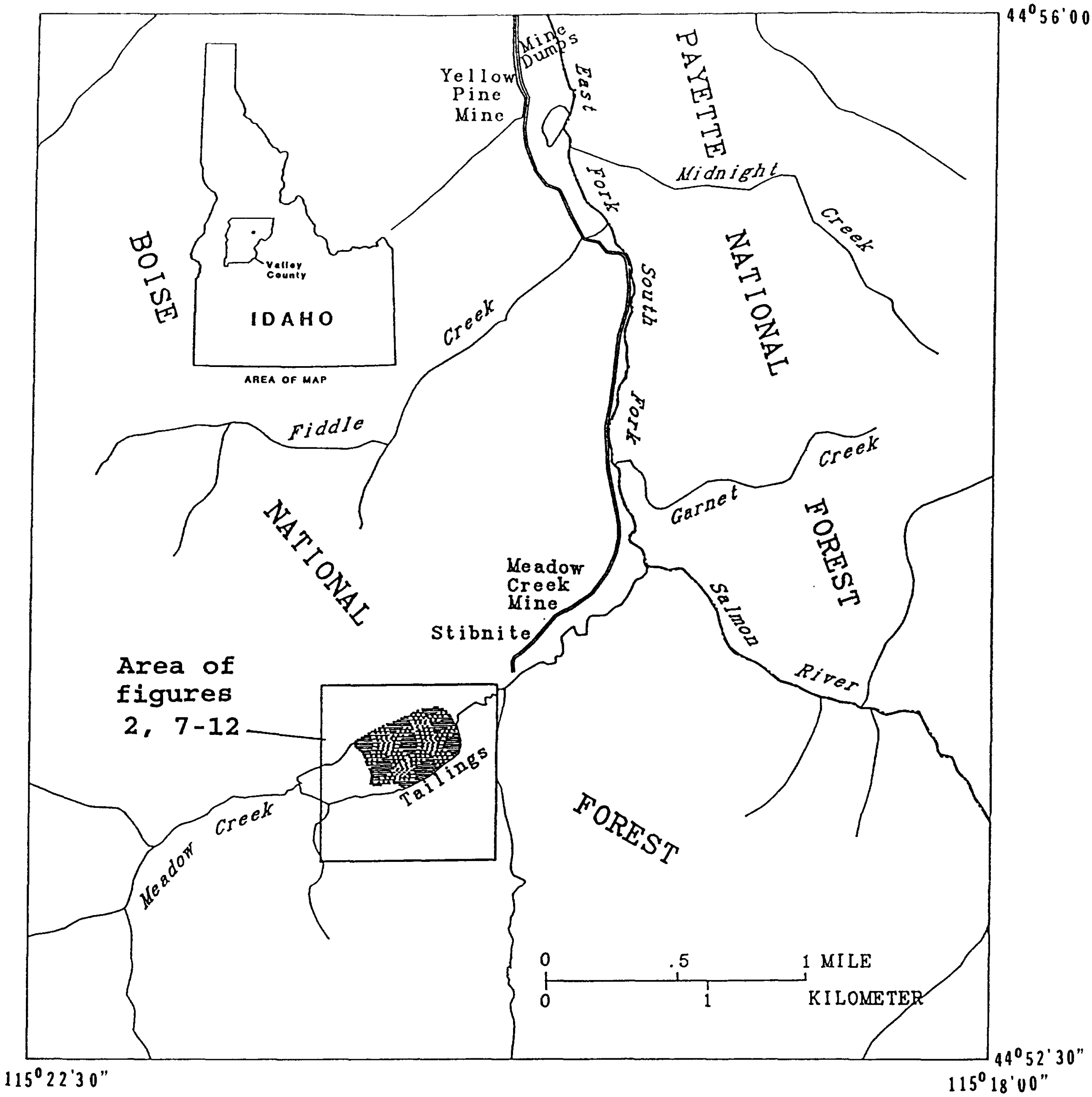

Figure 1. Index map showing the location of the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

ore (Mining World, 1947). For several years during World War II the mill tonnage varied between 500 and 800 tons a day. By the end of 1945 production from the Meadow Creek and Yellow Pine mines totaled 1,184,079 tons of ore which yielded 95,358 tons of concentrate, containing 14,981 tons of metallic antimony, 831,829 units of WO_3 (a unit of WO_3 is 20 pounds of tungsten trioxide), 101,437 ounces of gold, and 592,211 ounces of silver (Cole and Bailey, 1948, p. 4). In 1946 the mill was completely remodeled. In 1949, the Yellow Pine antimony smelter, designed to produce annually 5,000 contained tons of antimony metal, went into operation (Mining World, 1951). During summer, 1952, mining operations at the Yellow Pine mine were suspended due to a depressed market for antimony, and the mill and smelter were closed. In 1952, the mill processed 310,201 tons of ore and 3,622 tons of waste materials from metallurgical operations (Kauffman, Jr., and others, 1952).

SAMPLE COLLECTION, PREPARATION, AND ANALYSIS

The "tailings pond" was no longer a pond at the time when the samples were collected; the surface of the tailings disposal area was predominantly dry. A sampling plan, intended to give a representative coverage of the entire tailings area, developed as sampling progressed, producing a crude grid. A Brunton compass and a 100-foot woven cloth tape were used in locating the 20 sites (figure 2). Samples were collected with a shovel and placed in 9 X 14-in. sample bags. The depth interval of the samples was from the surface down to approximately 6 in.

The material collected, and generally present at the surface of the tailings area, ranged in size from very coarse sand (about 2-mm diameter) down to fine powder. The samples were passed through a 2-mm stainless-steel sieve and a split of each minus-2-mm fraction was taken using a Jones splitter. This fraction was analyzed and is referred to as the "bulk sample." The remaining sample was sieved using a stack of four sieves with size openings, from top to bottom, as follows: 0.249 mm, 0.119 mm, 0.061 mm, and 0.037 mm, producing the five size fractions: >0.249 mm <2 mm; >0.119 mm <0.249 mm; >0.061 mm <0.119 mm; >0.037 mm <0.061 mm; <0.037 mm. A sample was obtained for each size fraction, except for the >0.249-mm fraction, for which only 16 samples were obtained, resulting in a total of 116 samples. The coarser fractions were pulverized with mortar and pestle prior to analysis.

All samples were analyzed for 30 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

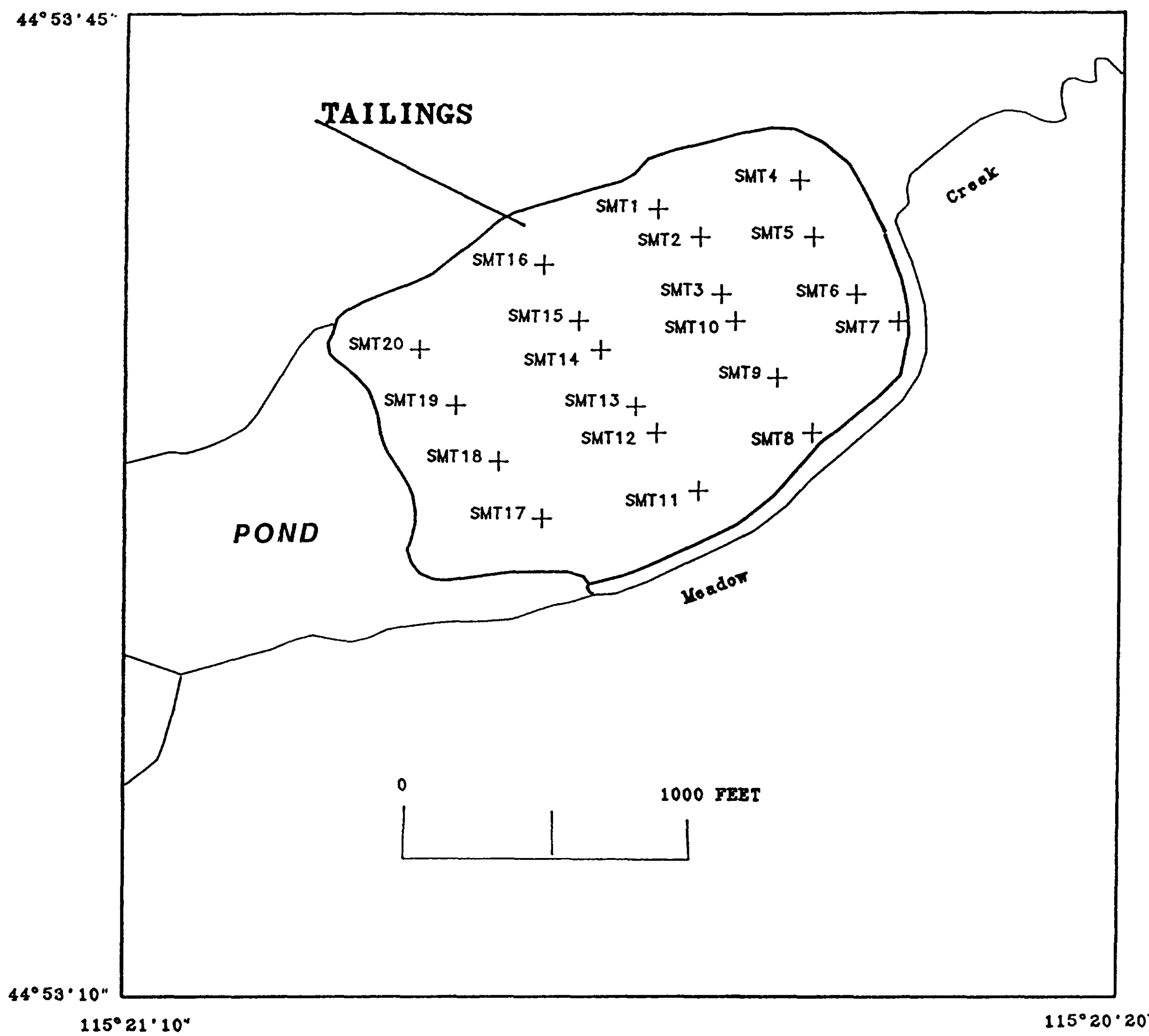

Figure 2. Location map of tailings samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

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). The bulk samples were also analyzed for arsenic by a colormetric method (Almond, 1953), and for gold and mercury by atomic absorption (Thompson and others, 1968; Vaughn and McCarthy, 1964). Analytical data for the samples are given in tables 2-7.

DATA STORAGE SYSTEM

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

DESCRIPTION OF DATA TABLES

Tables 2-7 list the results of analyses. For these tables, the data are arranged so that column 1 contains the USGS-assigned sample numbers. These numbers, as given in table 2, correspond to the numbers shown on the site location map (fig. 2). These numbers, in tables 3-7, were modified by suffixes "AA", "A", "B", "C", and "D", to identify the various size fractions; the prefixes in those sample numbers correspond to the site numbers on the site location map. Fe, Mg, Ca, and Ti are reported in percent as indicated by "%" next to the element symbol in the column headings; all other values are in parts per million. Columns in which the letter "S" appears preceding the element symbol are emission spectrographic analyses; "AA" and "Inst" indicate atomic absorption analyses; and "CM" indicates colormetric analyses. A letter "N" in the tables indicates that a given element was looked for but not detected. A "less than" symbol (<) entered in the tables in front of the lower limit of determination indicates that an element was observed but was below the lowest reporting value. 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.

GEOCHEMICAL MAPS AND HISTOGRAMS

Geochemical maps showing the distribution of six selected elements including antimony, arsenic, silver, and tungsten, determined by emission spectrography, and gold and mercury, determined by atomic absorption, in bulk samples are shown in figures 7-12. These elements were found in abundance in most of the samples, for which the elements were analyzed. Base used for these maps is the USGS 1:24,000-scale topographic map of 1973, enlarged to 1:8,000 scale.

Histograms (stacked bar) showing the distribution of antimony, arsenic, silver, and tungsten, in the various size fractions (bulk samples not included) are shown in figures 3-6.

ACKNOWLEDGEMENTS

Several of our colleagues participated in the analyses of the samples. We would like to extend our appreciation to these colleagues--Jerry Hassemer, Jim Hoffman, and Eric Welsch.

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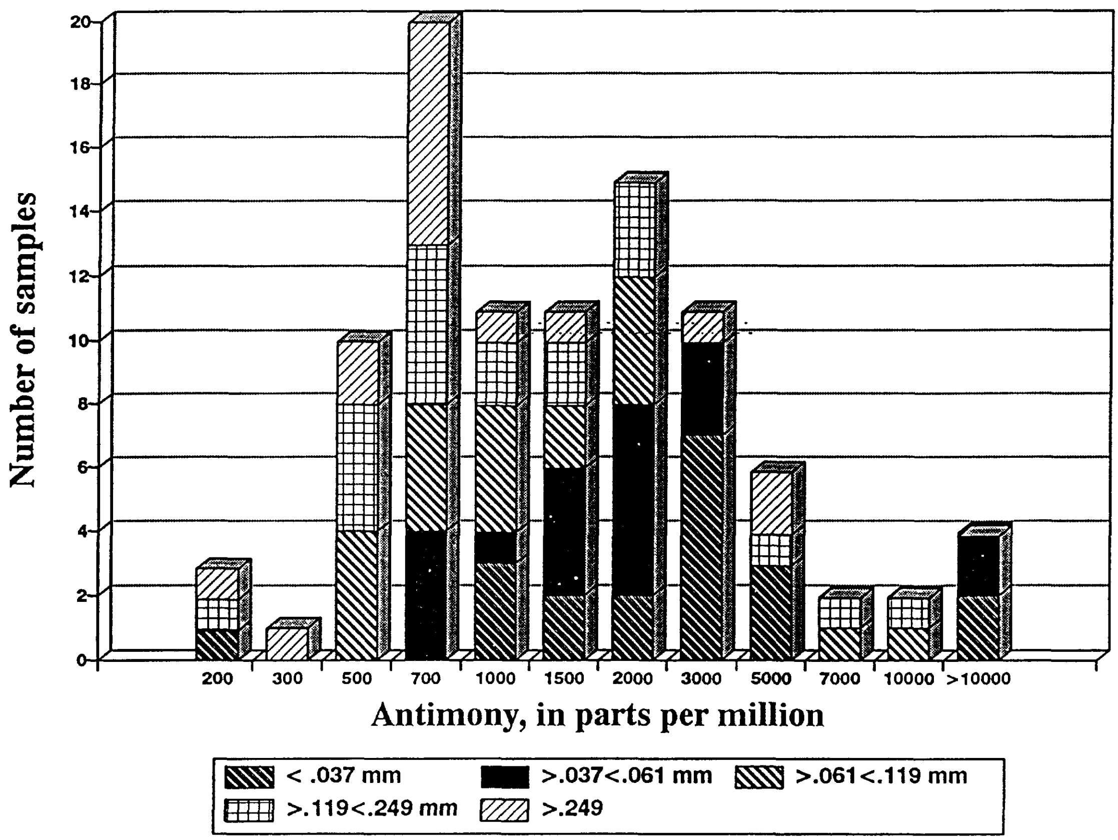

Figure 3. Histogram showing the distribution of antimony in five size fractions of samples from the Stibnite mill tailings pond.

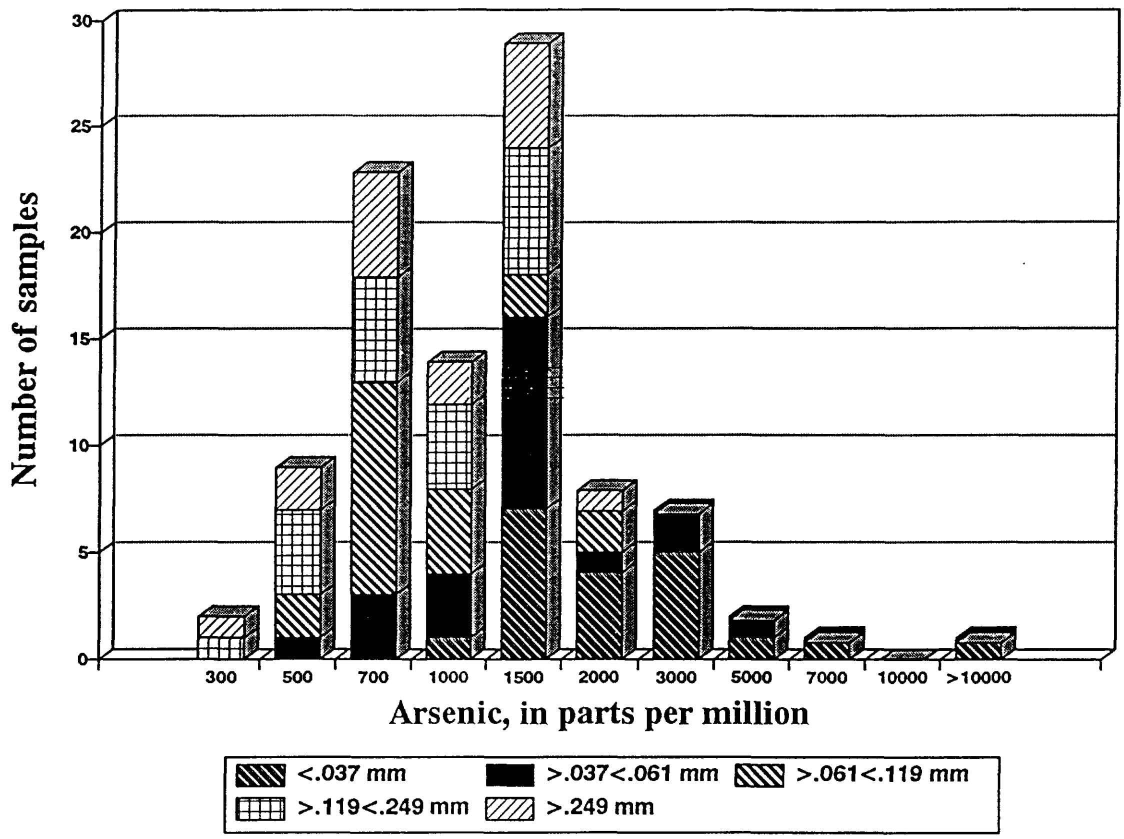

Figure 4. Histogram showing the distribution of arsenic in five size fractions of samples from the Stibnite mill tailings pond.

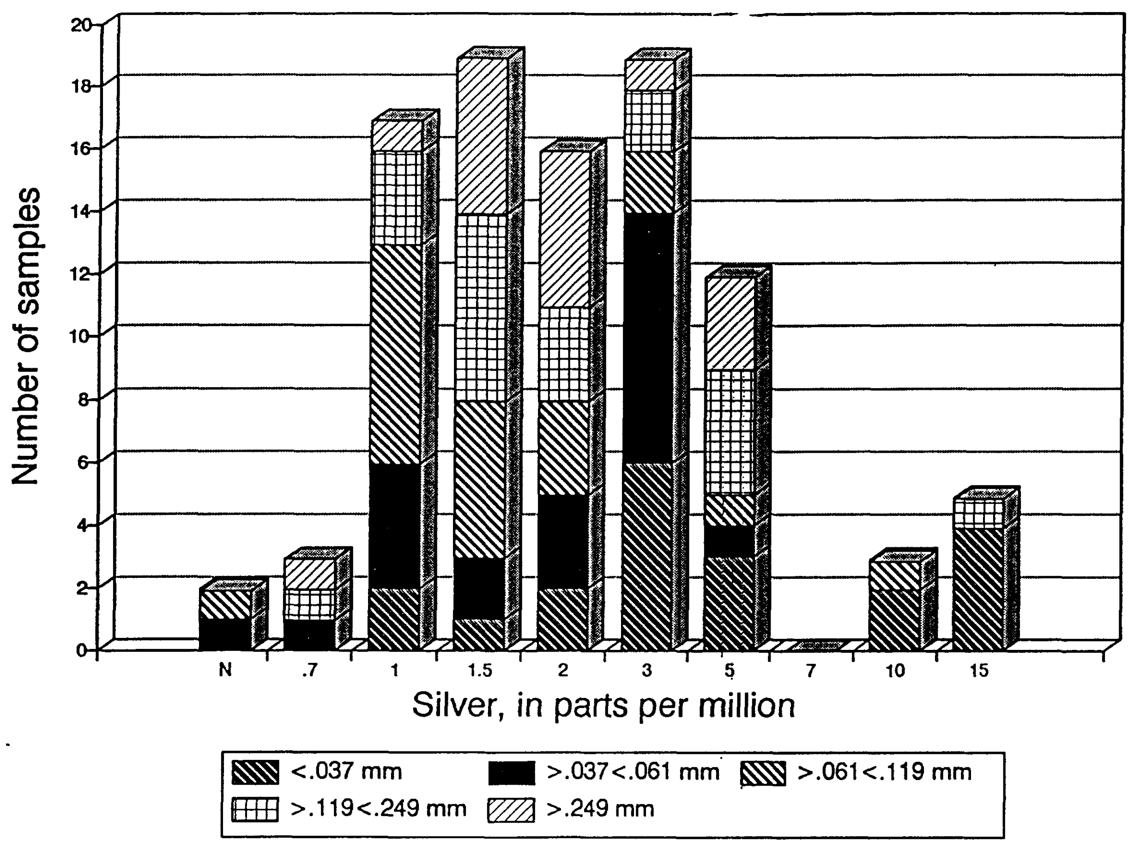

Figure 5. Histogram showing the distribution of silver in five size fractions of samples from the Stibnite mill tailings pond.

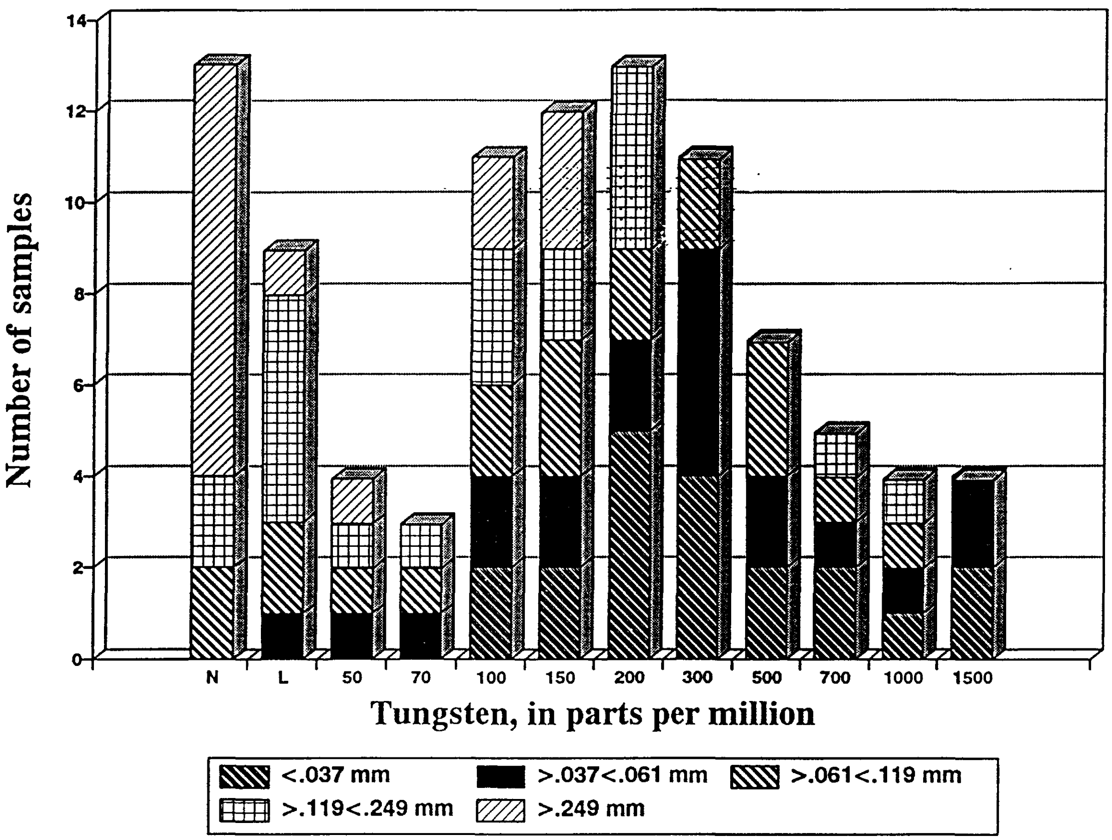

Figure 6. Histogram showing the distribution of tungsten in five size fractions of samples from the Stibnite mill tailings pond.

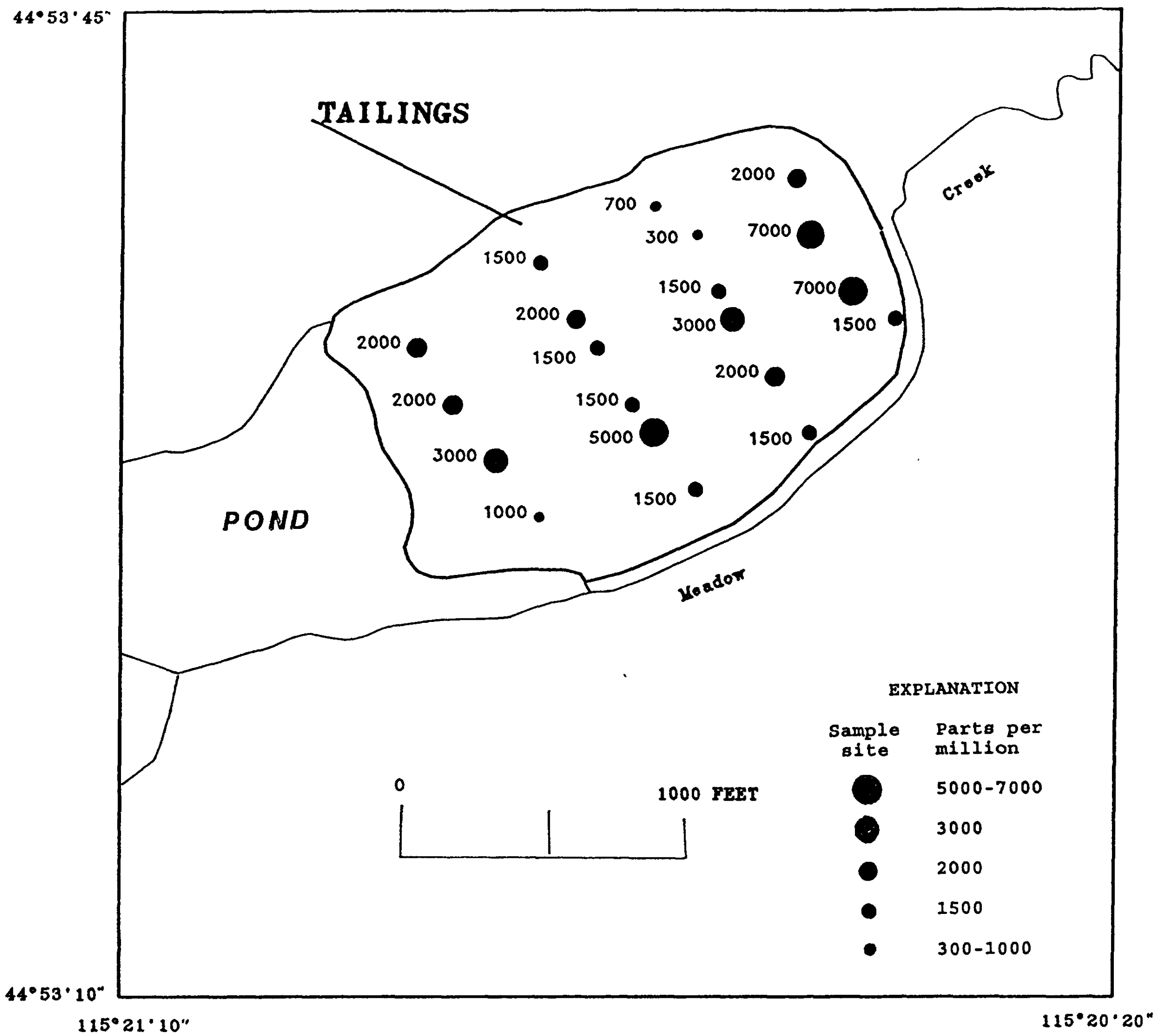

Figure 7. Geochemical map showing the distribution of antimony in bulk samples from the Stibnite mill tailings pond.

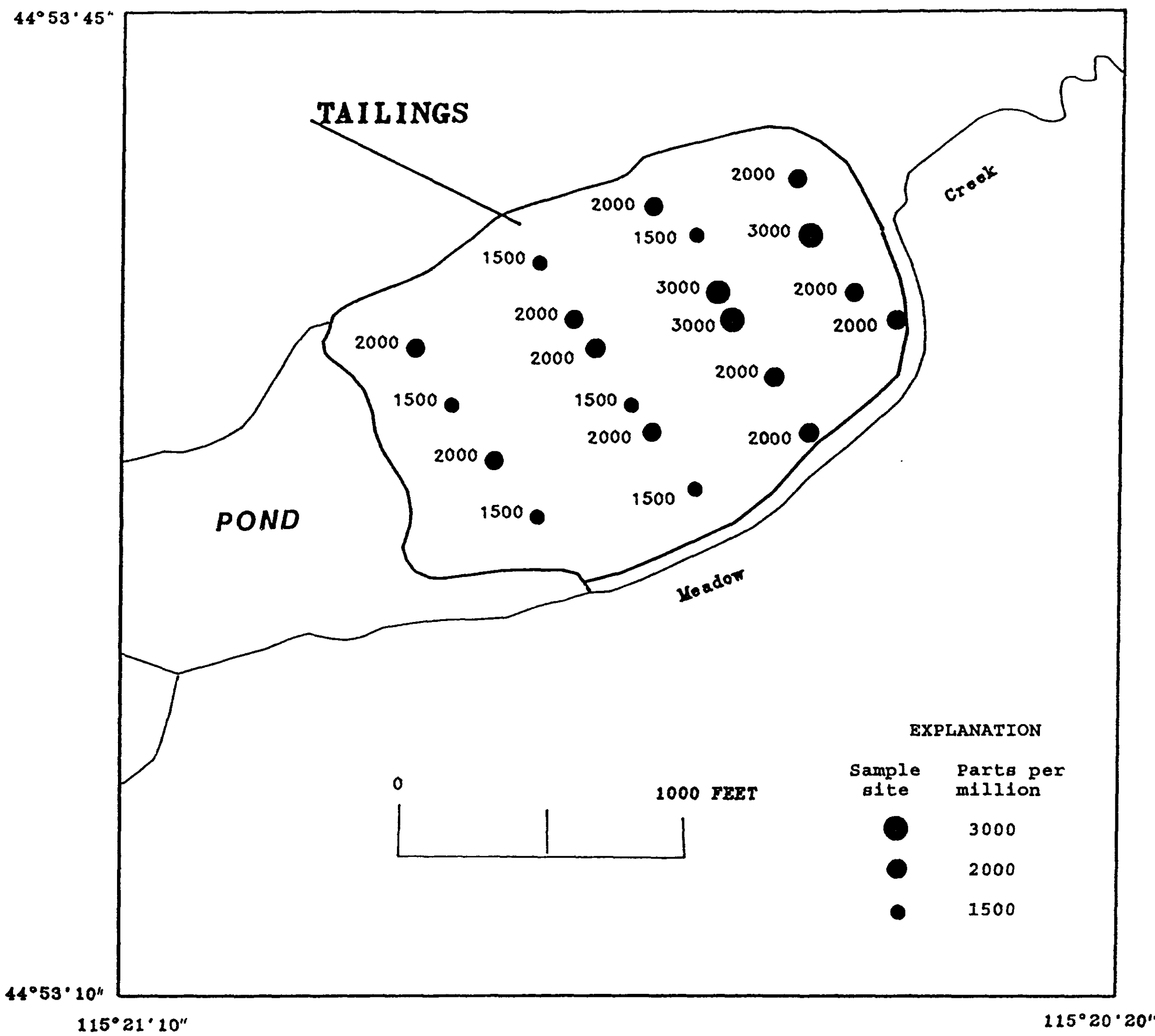

Figure 8. Geochemical map showing the distribution of arsenic in bulk samples from the Stibnite mill tailings pond.

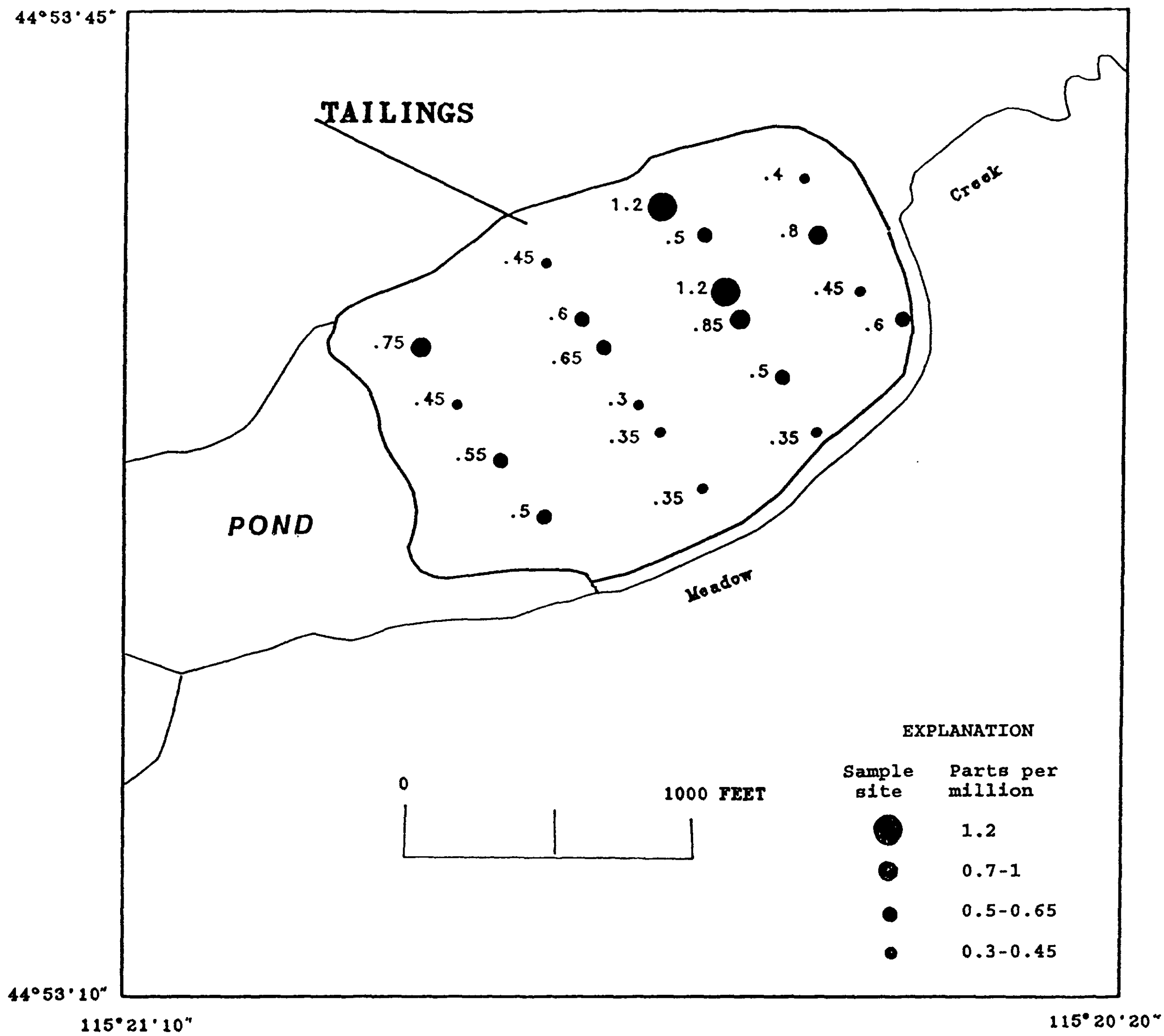

Figure 9. Geochemical map showing the distribution of gold in bulk samples from the Stibnite mill tailings pond.

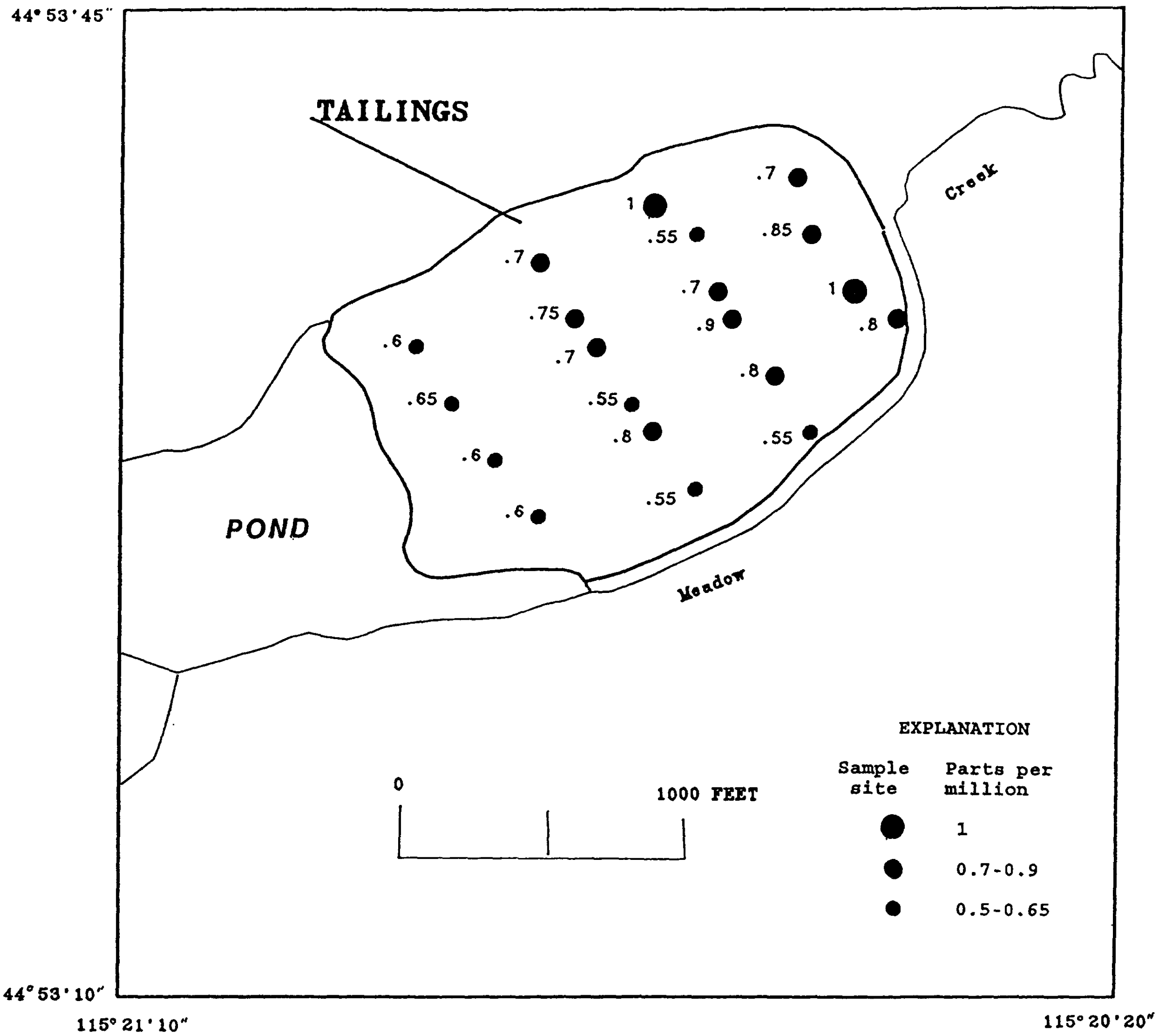

Figure 10. Geochemical map showing the distribution of mercury in bulk samples from the Stibnite mill tailings pond.

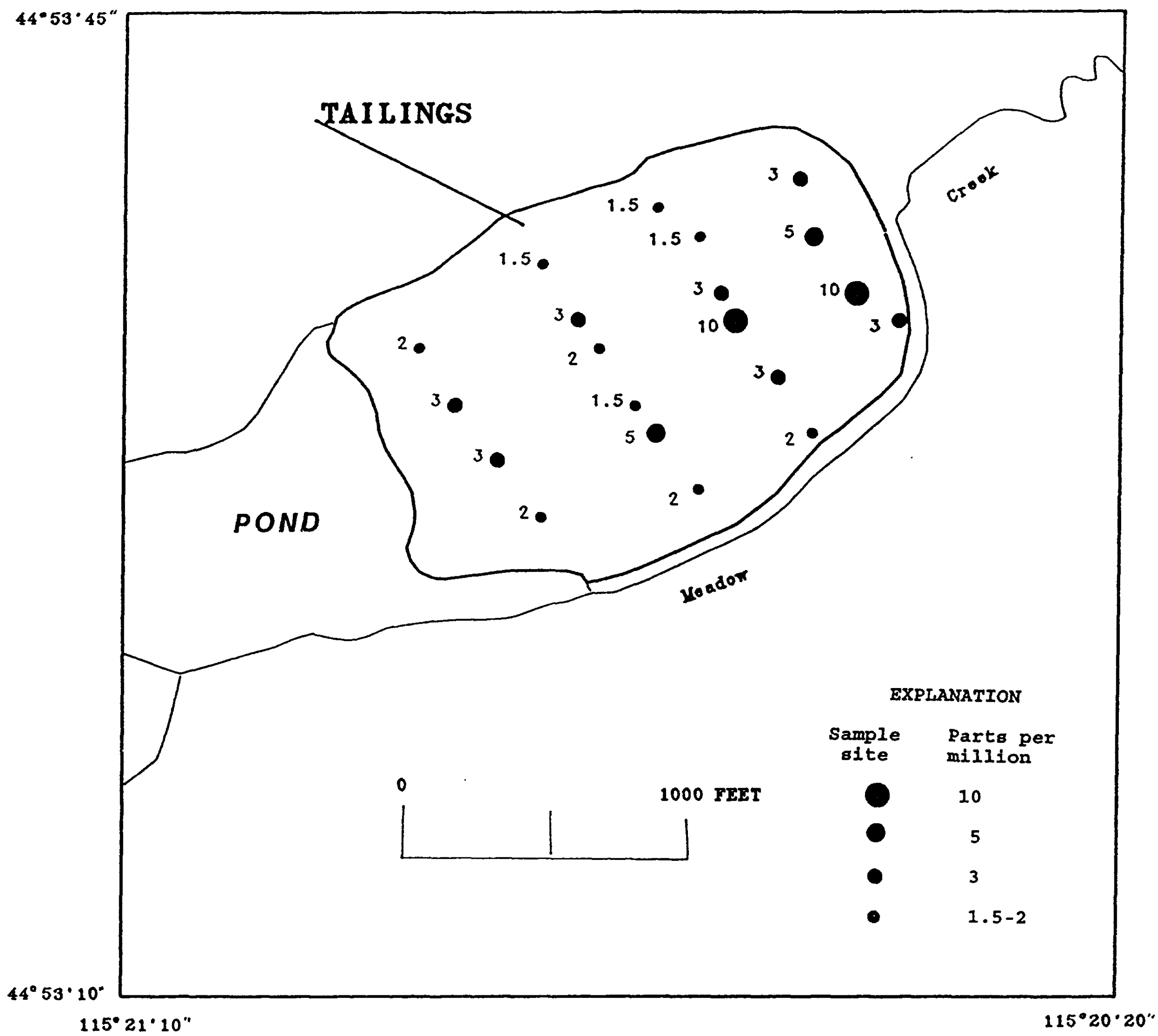

Figure 11. Geochemical map showing the distribution of silver in bulk samples from the Stibnite mill tailings pond.

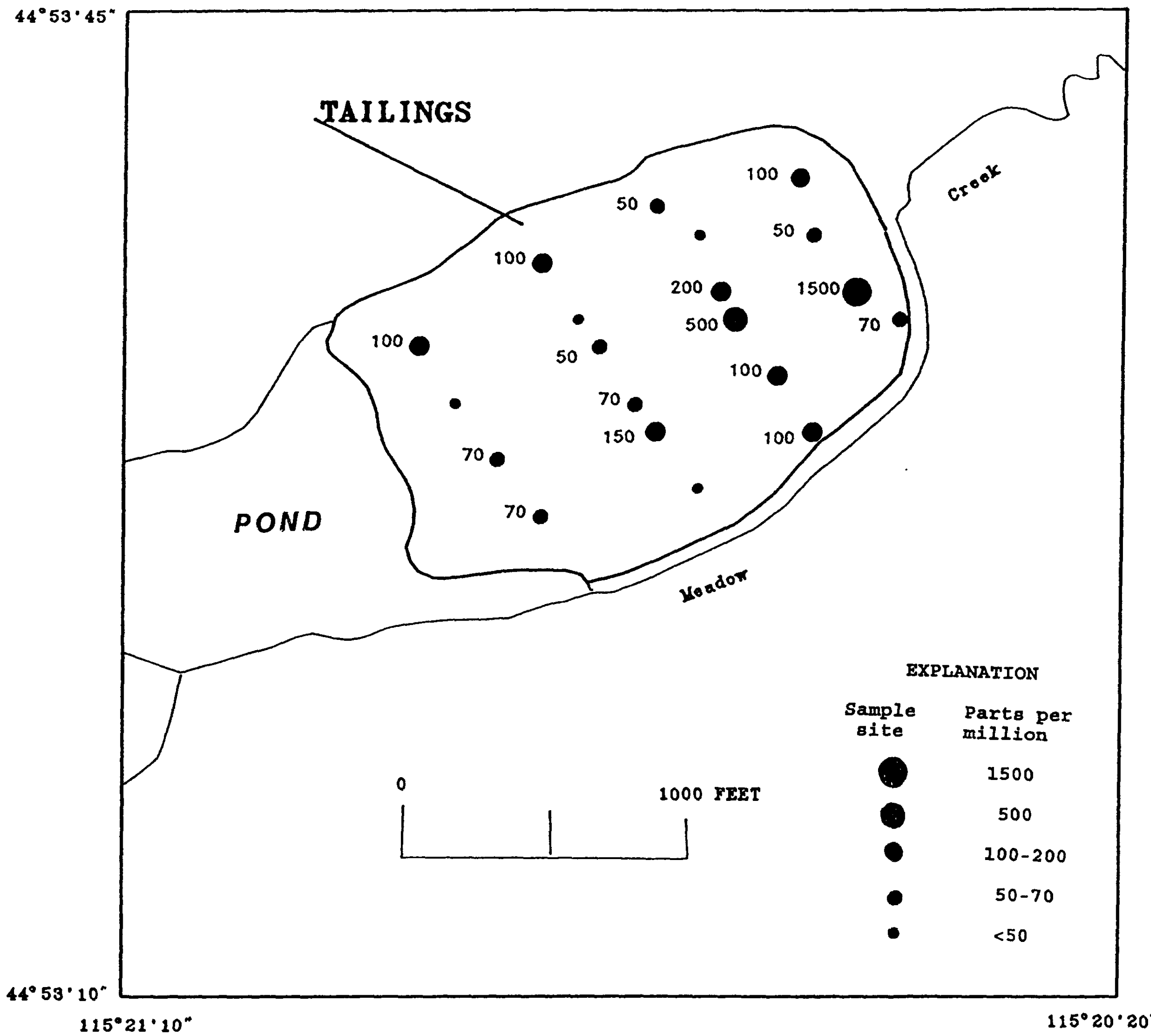

Figure 12. Geochemical map showing the distribution of tungsten in bulk samples from the Stibnite mill tailings pond.

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

Elements	Lower determination limit	Upper determination limit
	Weight Percent	
Calcium (CA)	0.05	20
Iron (Fe)	0.05	20
Magnesium (Mg)	0.02	10
Titanium (Ti)	0.002	1
	Parts per million	
Silver (Ag)	0.5	5,000
Arsenic (As)	200	10,000
Gold (Au)	10	500
Boron (B)	10	2,000
Barium (Ba)	20	5,000
Beryllium (Be)	1	1,000
Bismuth (Bi)	10	1,000
Cadmium (Cd)	20	500
Cobalt (Co)	5	2,000
Chromium (Cd)	10	5,000
Copper (Cu)	5	20,000
Lanthanum (La)	20	1,000
Manganese (Mn)	10	5,000
Molybdenum (Mo)	5	2,000
Niobium (Nb)	10	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

Table 2. Results of analyses of bulk samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings--bulk (unsieved) samples

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

Sample	LATITUDE	LONGITUD	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
SMT1	44 53 38	115 20 43	.7	.3	.3	.07	200	1.5	2,000	N	50	500	1.5	N	N	5	N
SMT2	44 53 37	115 20 41	1	.3	.5	.1	200	1.5	1,500	N	30	500	2	N	N	5	N
SMT3	44 53 35	115 20 40	1.5	.5	.3	.2	200	3	3,000	N	100	700	3	N	N	5	N
SMT4	44 53 39	115 20 36	.7	.5	.3	.15	200	3	2,000	N	30	700	2	N	N	<5	N
SMT5	44 53 37	115 20 35	1	.2	.3	.1	150	5	3,000	N	20	500	2	N	N	5	N
SMT6	44 53 35	115 20 33	1	.5	.5	.15	500	10	2,000	N	30	700	2	N	N	5	N
SMT7	44 53 34	115 20 31	1	.5	.3	.15	300	3	2,000	N	30	700	2	N	N	<5	N
SMT8	44 53 30	115 20 35	1	.5	.3	.15	300	2	2,000	N	30	700	2	N	N	<5	N
SMT9	44 53 32	115 20 37	.7	.3	.3	.15	300	3	2,000	N	30	700	2	N	N	N	N
SMT10	44 53 34	115 20 39	1.5	.5	.5	.15	300	10	3,000	N	30	700	2	N	N	5	N
SMT11	44 53 28	115 20 41	.7	.2	.3	.15	200	2	1,500	N	30	700	2	N	N	5	N
SMT12	44 53 30	115 20 43	2	.7	.5	.2	500	5	2,000	N	50	700	3	N	N	5	N
SMT13	44 53 31	115 20 44	.3	.2	.3	.1	300	1.5	1,500	N	30	700	2	N	N	N	N
SMT14	44 53 33	115 20 46	.7	.3	.3	.1	200	2	2,000	N	30	700	2	N	N	<5	N
SMT15	44 53 34	115 20 47	.7	.3	.3	.1	200	3	2,000	N	30	700	2	N	N	<5	N
SMT16	44 53 36	115 20 49	.7	.3	.3	.15	300	1.5	1,500	N	30	700	1.5	N	N	5	N
SMT17	44 53 27	115 20 49	1.5	.5	.3	.15	300	2	1,500	N	30	700	2	N	N	<5	N
SMT18	44 53 29	115 20 51	1	.5	.5	.2	500	3	2,000	N	70	700	2	N	N	5	N
SMT19	44 53 31	115 20 53	.7	.3	.3	.15	300	3	1,500	N	30	500	2	N	N	<5	N
SMT20	44 53 33	115 20 55	.5	.3	.3	.1	300	2	2,000	N	30	500	2	N	N	N	N

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	AA-Au	Inst-Hg	CM-As
SMT1	30	N	N	10	<5	15	700	N	N	100	20	50	<10	N	50	1.2	1	600
SMT2	50	<20	N	10	5	15	300	N	N	200	20	N	<10	N	70	.5	.55	300
SMT3	50	50	N	50	7	20	1,500	5	N	100	50	200	15	N	100	1.2	.7	800
SMT4	20	70	N	10	5	70	2,000	5	N	300	30	100	10	N	70	.4	.7	1,000
SMT5	30	70	N	10	5	15	7,000	5	N	300	20	50	<10	N	70	.8	.85	800
SMT6	30	50	N	10	7	70	7,000	5	N	200	30	1,500	10	N	100	.45	1	600
SMT7	30	50	N	10	5	30	1,500	5	N	200	30	70	10	N	100	.6	.8	800
SMT8	30	70	N	15	5	100	1,500	5	N	200	30	100	15	N	150	.35	.55	800
SMT9	70	70	N	10	5	100	2,000	5	N	200	30	100	10	N	70	.5	.8	800
SMT10	30	100	N	10	5	50	3,000	5	N	200	30	500	15	N	100	.85	.9	1,000
SMT11	15	70	N	20	5	70	1,500	<5	N	150	30	N	10	N	70	.35	.55	600
SMT12	150	70	N	15	10	300	5,000	7	N	300	70	150	20	N	150	.35	.8	800
SMT13	70	50	N	10	5	50	1,500	<5	N	150	20	70	10	N	70	.3	.55	600
SMT14	20	30	N	<10	5	50	1,500	5	N	150	20	50	10	N	70	.65	.7	1,000
SMT15	30	50	N	10	5	50	2,000	5	N	150	20	<50	10	N	70	.6	.75	800
SMT16	70	50	N	10	5	50	1,500	5	N	150	30	100	15	N	70	.45	.7	800
SMT17	70	50	N	10	5	30	1,000	5	N	150	20	70	10	N	70	.5	.6	800
SMT18	100	70	N	15	7	100	3,000	5	N	200	50	70	15	N	150	.55	.6	1,000
SMT19	70	30	N	10	<5	70	2,000	5	N	150	30	N	<10	N	70	.45	.65	800
SMT20	20	50	N	<10	<5	50	2,000	5	N	150	20	100	10	N	70	.75	.6	1,000

Table 3. Results of analyses of the <0.037-mm-fraction samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings--<0.037-mm size fraction

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

Sample	LATITUDE	LONGITUD	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
SMT1AA	44 53 38	115 20 43	10	.3	.3	.7	500	15	>10,000	<10	70	700	3	N	N
SMT2AA	44 53 37	115 20 41	3	.5	.7	.3	500	2	3,000	N	10	700	3	N	N
SMT3AA	44 53 35	115 20 40	5	.3	.3	.5	500	15	5,000	<10	70	500	3	N	N
SMT4AA	44 53 39	115 20 36	3	.2	.2	.3	150	5	2,000	N	50	500	2	N	N
SMT5AA	44 53 37	115 20 35	3	.2	.3	.5	300	10	2,000	N	50	500	2	N	N
SMT6AA	44 53 35	115 20 33	3	.3	.5	.3	700	15	3,000	N	30	700	2	N	N
SMT7AA	44 53 34	115 20 31	2	.5	.5	.5	500	1.5	1,500	N	50	700	3	N	N
SMT8AA	44 53 30	115 20 35	1	.3	.5	.2	300	3	1,500	N	30	700	3	N	N
SMT9AA	44 53 32	115 20 37	1.5	.3	.3	.2	300	5	2,000	N	30	700	2	N	N
SMT10AA	44 53 37	115 20 39	5	.3	.3	.7	500	15	7,000	<10	30	500	3	N	N
SMT11AA	44 53 28	115 20 41	1.5	.3	.3	.3	200	3	1,500	N	30	500	2	N	N
SMT12AA	44 53 30	115 20 43	2	.3	.5	.3	300	2	1,000	N	30	700	2	N	N
SMT13AA	44 53 31	115 20 44	.7	.2	.2	.15	150	1	1,500	N	30	500	2	N	N
SMT14AA	44 53 33	115 20 46	2	.5	.3	.3	500	10	3,000	N	70	700	2	N	N
SMT15AA	44 53 34	115 20 47	2	.3	.3	.3	300	3	3,000	N	70	500	3	N	N
SMT16AA	44 53 36	115 20 49	1	.5	.7	.3	700	1	1,500	N	50	700	3	N	N
SMT17AA	44 53 27	115 20 49	3	.5	.7	.5	500	5	3,000	N	50	700	3	N	N
SMT18AA	44 53 29	115 20 51	2	.5	.7	.5	500	3	1,500	N	50	500	2	N	N
SMT19AA	44 53 31	115 20 53	3	.5	.5	.3	300	3	1,500	N	30	700	2	N	N
SMT20AA	44 53 33	115 20 55	1.5	.3	.3	.3	200	3	2,000	N	50	500	2	N	N

Sample	S-Co	S-Cr	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
SMT1AA	10	10	70	200	N	70	10	150	3,000	7	N	100	70	1,500	50	N	>1,000
SMT2AA	5	20	50	50	N	30	5	100	1,000	5	N	300	50	200	20	N	300
SMT3AA	5	<10	70	100	N	50	5	100	3,000	7	N	N	70	700	30	N	500
SMT4AA	<5	<10	20	70	N	20	5	150	5,000	5	N	100	50	300	20	N	300
SMT5AA	<5	<10	70	70	N	20	5	70	>10,000	5	N	100	50	300	15	N	300
SMT6AA	<5	10	70	70	N	20	10	100	>10,000	5	N	150	50	700	10	N	200
SMT7AA	<5	10	30	70	N	50	5	70	1,500	5	N	100	50	100	30	N	500
SMT8AA	<5	<10	20	70	N	30	7	100	1,500	5	N	100	50	200	15	N	150
SMT9AA	<5	<10	70	70	N	20	7	200	3,000	5	N	100	50	500	15	N	200
SMT10AA	<5	15	70	300	N	70	10	150	5,000	10	N	150	70	1,500	50	N	>1,000
SMT11AA	5	<10	50	100	N	30	5	100	2,000	5	N	150	50	150	20	N	300
SMT12AA	5	<10	70	50	N	15	5	150	3,000	5	N	200	50	200	15	N	150
SMT13AA	5	N	15	70	N	20	5	50	1,000	5	N	100	30	150	15	N	200
SMT14AA	5	10	50	100	N	30	7	150	2,000	5	N	100	70	300	30	N	300
SMT15AA	N	10	50	70	N	30	5	100	3,000	5	N	100	70	200	20	N	300
SMT16AA	<5	<10	30	100	N	20	7	50	1,000	5	N	200	70	300	30	N	200
SMT17AA	<5	<10	50	200	N	30	10	70	200	5	N	150	70	1,000	50	N	1,000
SMT18AA	<5	N	30	70	N	20	5	100	5,000	5	N	150	50	200	20	N	500
SMT19AA	5	15	50	100	N	30	7	100	3,000	5	N	100	70	100	30	N	200
SMT20AA	<5	<10	20	100	N	20	5	70	3,000	5	N	100	50	500	20	N	300

Table 4. Results of analyses of the >0.037 <0.061-mm-fraction samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings--<0.061 mm >0.037-mm size fraction

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

Sample	LATITUDE	LONGITUD	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
SMT1A	44 53 38	115 20 43	2	.3	.3	.3	300	3	3,000	N	70	700	2	N	N
SMT2A	44 53 37	115 20 41	3	.3	4	.3	500	1	1,500	N	10	700	2	N	N
SMT3A	44 53 35	115 20 40	3	.3	.3	.3	500	3	5,000	N	70	500	2	N	N
SMT4A	44 53 39	115 20 36	1.5	.2	.2	.2	150	2	1,500	N	30	500	1.5	N	N
SMT5A	44 53 37	115 20 35	2	.15	.3	.3	200	3	1,500	N	30	700	2	N	N
SMT6A	44 53 35	115 20 33	2	.3	.5	.15	700	5	2,000	N	30	700	1.5	N	N
SMT7A	44 53 34	115 20 31	1.5	.3	.5	.3	300	2	1,500	N	50	700	2	N	N
SMT8A	44 53 30	115 20 35	.5	.3	.5	.2	500	1.5	1,500	N	50	700	2	N	N
SMT9A	44 53 32	115 20 37	2	.5	.5	.3	300	3	1,500	N	30	700	2	N	N
SMT10A	44 53 34	115 20 39	2	.2	.3	.5	200	3	3,000	N	30	500	1.5	N	N
SMT11A	44 53 28	115 20 41	1	.3	.3	.3	200	1.5	700	N	30	700	1.5	N	N
SMT12A	44 53 30	115 20 43	2	.3	.3	.3	300	2	700	N	30	700	2	N	N
SMT13A	44 53 31	115 20 44	.2	.2	.3	.15	200	N	1,000	N	50	700	1.5	N	N
SMT14A	44 53 33	115 20 46	1	.3	.3	.2	300	1	1,500	N	70	700	2	N	N
SMT15A	44 53 34	115 20 47	1.5	.3	.5	.3	300	3	1,500	N	50	700	2	N	N
SMT16A	44 53 36	115 20 49	.7	.5	.5	.15	500	.7	500	N	50	700	2	N	N
SMT17A	44 53 27	115 20 49	2	.5	.5	.3	300	1	1,000	N	50	700	2	N	N
SMT18A	44 53 29	115 20 51	1	.5	.7	.2	500	1	700	N	70	700	1.5	N	N
SMT19A	44 53 31	115 20 53	1.5	.3	.5	.2	300	3	1,000	N	50	700	1.5	N	N
SMT20A	44 53 33	115 20 55	1	.3	.3	.2	300	3	1,500	N	50	700	2	N	N

Sample	S-Co	S-Cr	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
SMT1A	5	10	20	150	N	20	5	70	1,500	<5	N	100	50	1,000	30	N	150
SMT2A	<5	10	50	100	N	30	5	70	700	5	N	300	30	150	15	N	200
SMT3A	<5	<10	70	70	N	30	5	70	2,000	5	N	100	70	300	20	N	150
SMT4A	<5	<10	15	50	N	15	5	70	3,000	<5	N	100	30	200	10	N	200
SMT5A	<5	10	50	100	N	30	7	70	>10,000	5	N	150	50	300	30	N	150
SMT6A	<5	10	20	70	N	20	10	70	>10,000	5	N	200	50	700	15	N	70
SMT7A	<5	<10	50	50	N	30	5	70	1,500	5	N	100	50	50	30	N	150
SMT8A	<5	<10	50	70	N	10	5	100	1,500	5	N	100	30	150	10	N	150
SMT9A	<5	<10	70	70	N	20	5	150	2,000	5	N	150	50	500	15	N	300
SMT10A	<5	<10	30	150	N	50	7	70	2,000	5	N	100	70	1,500	50	N	300
SMT11A	5	<10	30	70	N	20	5	70	1,500	5	N	150	50	100	10	N	150
SMT12A	5	<10	70	30	N	20	7	100	2,000	5	N	200	50	300	15	N	150
SMT13A	5	<10	10	100	N	20	7	30	700	5	N	150	30	70	10	N	70
SMT14A	5	<10	30	70	N	30	7	70	1,000	5	N	<100	50	300	20	N	150
SMT15A	N	10	30	100	N	30	5	70	3,000	5	N	150	50	200	30	N	150
SMT16A	<5	<10	30	70	N	15	5	30	700	5	N	100	50	500	20	N	150
SMT17A	<5	<10	10	150	N	20	7	30	700	5	N	100	50	1,500	30	N	200
SMT18A	<5	<10	20	50	N	15	7	70	3,000	5	N	100	30	100	10	N	150
SMT19A	<5	<10	20	70	N	15	7	70	2,000	5	N	150	50	<50	15	N	150
SMT20A	5	<10	15	100	N	20	5	70	2,000	5	N	150	50	300	15	N	200

Table 5. Results of analyses of the >0.061 <0.119-mm-fraction samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings-->0.061 mm <0.119-mm size fraction
[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown]

Sample	LATITUDE	LONGITUD	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
SMT1B	44 53 38	115 20 43	1	.3	.3	.2	200	1.5	2,000	N	70	500	1.5	N	N
SMT2B	44 53 37	115 20 41	2	.3	.7	.3	300	1	700	N	10	500	2	N	N
SMT3B	44 53 35	115 20 40	1	.3	.3	.3	300	1.5	1,500	N	70	700	2	N	N
SMT4B	44 53 39	115 20 36	.7	.2	.2	.15	150	1.5	700	N	30	700	1	N	N
SMT5B	44 53 37	115 20 35	1	.2	.3	.2	200	5	1,000	N	30	700	1.5	N	N
SMT6B	44 53 35	115 20 33	1	.3	.5	.2	500	10	1,000	N	30	700	1.5	N	N
SMT7B	44 53 34	115 20 31	.7	.3	.3	.15	200	1	1,000	N	30	700	2	N	N
SMT8B	44 53 30	115 20 35	.7	.3	.5	.15	300	1	700	N	50	700	2	N	N
SMT9B	44 53 32	115 20 37	1	.3	.5	.15	300	2	700	N	50	700	2	N	N
SMT10B	44 53 34	115 20 39	1	.3	.3	.2	200	3	2,000	N	30	500	1.5	N	N
SMT11B	44 53 28	115 20 41	.7	.3	.3	.15	150	1.5	500	N	30	500	1.5	N	N
SMT12B	44 53 30	115 20 43	2	.3	.5	.2	500	2	700	N	30	700	2	N	N
SMT13B	44 53 31	115 20 44	.3	.2	.3	.07	200	N	700	N	50	700	1.5	N	N
SMT14B	44 53 33	115 20 46	.5	.2	.3	.15	200	1	1,500	N	50	500	2	N	N
SMT15B	44 53 34	115 20 47	.7	.3	.3	.2	150	2	700	N	50	500	1.5	N	N
SMT16B	44 53 36	115 20 49	.7	.5	.5	.2	500	1	700	N	30	700	1.5	N	N
SMT17B	44 53 27	115 20 49	1	.5	.5	.3	200	1.5	500	N	50	700	1.5	N	N
SMT18B	44 53 29	115 20 51	.7	.2	.3	.15	200	1	700	N	50	500	1.5	N	N
SMT19B	44 53 31	115 20 53	1	.5	.5	.3	300	3	700	N	50	700	2	N	N
SMT20B	44 53 33	115 20 55	.5	.2	.3	.1	150	1	1,000	N	50	500	1.5	N	N

Sample	S-Co	S-Cr	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
SMT1B	<5	<10	15	50	N	15	5	70	700	<5	N	100	30	500	<10	N	50
SMT2B	<5	10	15	70	N	30	5	20	500	5	N	300	70	200	10	N	70
SMT3B	<5	<10	50	30	N	15	5	20	700	<5	N	100	30	300	15	N	70
SMT4B	<5	N	10	30	N	10	5	50	1,500	<5	N	100	20	150	<10	N	30
SMT5B	<5	<10	20	30	N	20	5	50	10,000	<5	N	100	30	150	10	N	30
SMT6B	<5	10	30	70	N	10	7	70	7,000	5	N	150	30	1,000	10	N	150
SMT7B	<5	<10	5	70	N	10	5	20	700	5	N	150	30	<50	10	N	30
SMT8B	<5	<10	50	30	N	10	5	70	700	5	N	100	30	70	10	N	50
SMT9B	5	<10	50	50	N	10	5	70	1,000	5	N	150	50	500	30	N	100
SMT10B	5	<10	20	70	N	10	5	50	2,000	<5	N	150	30	700	<10	N	50
SMT11B	5	N	20	30	N	10	5	50	1,000	<5	N	150	30	N	10	N	50
SMT12B	5	<10	70	30	N	20	7	100	2,000	5	N	200	50	150	10	N	100
SMT13B	5	N	15	<20	N	10	7	15	500	<5	N	150	30	100	<10	N	20
SMT14B	<5	N	20	20	N	<10	5	70	1,000	5	N	100	30	N	10	N	50
SMT15B	N	<10	20	30	N	30	5	50	1,500	5	N	100	50	200	10	N	100
SMT16B	5	<10	15	50	N	30	7	20	500	5	N	100	50	500	15	N	150
SMT17B	<5	<10	20	70	N	50	5	30	500	5	N	150	50	300	30	N	150
SMT18B	<5	N	20	30	N	10	5	50	2,000	5	N	100	30	<50	10	N	50
SMT19B	<5	<10	20	50	N	20	7	70	2,000	5	N	150	50	100	10	N	100
SMT20B	5	<10	15	50	N	<10	5	30	1,000	5	N	100	20	50	10	N	30

Table 6. Results of analyses of the >0.119 <0.249-mm-fraction samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings-->0.119 mm <0.249-mm size fraction

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

Sample	LATITUDE	LONGITUD	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
SMT1C	44 53 38	115 20 43	1	.3	.3	.15	200	1	1,500	N	70	700	1.5	N	N
SMT2C	44 53 37	115 20 41	1.5	.3	.7	.2	200	.7	500	N	10	500	1.5	N	N
SMT3C	44 53 35	115 20 40	.7	.3	.3	.15	150	1.5	1,500	N	50	700	1.5	N	N
SMT4C	44 53 39	115 20 36	.5	.15	.15	.07	150	2	700	N	30	300	1.5	N	N
SMT5C	44 53 37	115 20 35	1.5	.2	.3	.2	150	15	1,500	N	30	700	1.5	N	N
SMT6C	44 53 35	115 20 33	.7	.3	.5	.1	500	5	1,000	N	20	700	1.5	N	N
SMT7C	44 53 34	115 20 31	.7	.3	.3	.15	200	1.5	1,500	N	30	700	2	N	N
SMT8C	44 53 30	115 20 35	2	.5	.5	.3	300	3	1,500	N	70	700	3	N	N
SMT9C	44 53 32	115 20 37	1	.3	.3	.1	200	1	700	N	30	500	1.5	N	N
SMT10C	44 53 34	115 20 39	1	.5	.5	.2	300	5	1,500	N	50	700	1.5	N	N
SMT11C	44 53 28	115 20 41	.7	.3	.2	.15	150	2	300	N	30	700	1.5	N	N
SMT12C	44 53 30	115 20 43	1	.3	.3	.15	300	3	700	N	50	500	2	N	N
SMT13C	44 53 31	115 20 44	.5	.3	.2	.1	150	1.5	500	N	30	700	1.5	N	N
SMT14C	44 53 33	115 20 46	.7	.3	.3	.15	200	1.5	1,000	N	70	700	2	N	N
SMT15C	44 53 34	115 20 47	.7	.3	.3	.15	150	5	700	N	50	700	1.5	N	N
SMT16C	44 53 36	115 20 49	.7	.3	.3	.15	300	1.5	500	N	50	700	2	N	N
SMT17C	44 53 27	115 20 49	.7	.3	.3	.07	150	1.5	500	N	30	700	1.5	N	N
SMT18C	44 53 29	115 20 51	1.5	.5	.5	.3	500	5	1,000	N	70	700	2	N	N
SMT19C	44 53 31	115 20 53	.5	.2	.3	.1	200	2	700	N	50	700	2	N	N
SMT20C	44 53 33	115 20 55	.7	.2	.2	.1	150	1	1,000	N	50	700	1.5	N	N

Sample	S-Co	S-Cr	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
SMT1C	<5	<10	10	20	N	15	5	10	500	<5	N	<100	30	150	<10	N	50
SMT2C	<5	<10	15	30	N	10	5	10	200	<5	N	300	30	100	10	N	50
SMT3C	<5	<10	70	20	N	10	5	20	700	<5	N	100	30	150	10	N	50
SMT4C	<5	<10	10	20	N	<10	5	20	1,500	<5	N	100	20	50	<10	N	30
SMT5C	<5	<10	70	30	N	20	5	50	10,000	5	N	100	30	200	<10	N	50
SMT6C	<5	<10	50	20	N	10	7	20	5,000	5	N	150	30	700	<10	N	50
SMT7C	<5	<10	15	20	N	10	5	20	1,000	5	N	100	30	N	<10	N	30
SMT8C	<5	10	70	50	N	30	10	300	2,000	5	N	100	70	200	15	N	70
SMT9C	5	<10	15	<20	N	10	5	50	700	<5	N	150	30	100	<10	N	30
SMT10C	5	<10	50	30	N	15	5	30	2,000	<5	N	150	50	1,000	10	N	70
SMT11C	5	<10	20	30	N	10	5	20	700	5	N	150	30	N	<10	N	50
SMT12C	5	<10	70	30	N	20	7	150	2,000	<5	N	150	30	200	<10	N	70
SMT13C	5	N	10	30	N	10	7	10	500	<5	N	150	30	<50	<10	N	70
SMT14C	<5	N	30	20	N	<10	5	50	700	5	N	100	30	200	10	N	50
SMT15C	N	<10	30	30	N	10	7	30	1,000	<5	N	150	30	<50	10	N	70
SMT16C	100	150	30	20	N	10	200	10	500	5	N	100	30	70	10	N	70
SMT17C	5	N	50	20	N	N	5	10	500	N	N	100	20	<50	10	N	30
SMT18C	5	<10	50	50	N	20	10	150	7,000	5	N	150	50	100	10	N	150
SMT19C	<5	N	50	<20	N	N	5	50	1,500	<5	N	100	20	<50	N	N	30
SMT20C	5	N	15	N	N	10	5	30	700	<5	N	100	20	<50	<10	N	50

Table 7. Results of analyses of the >0.249 <2-mm-fraction samples from the Stibnite mill tailings pond, Stibnite, Valley County, Idaho.

Stibnite mill tailings-->0.249 mm <2.0-mm size fraction

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

Sample	LATITUDE	LONGITUD	S-Fe%	S-Mg%	S-Ca%	S-Ti%	S-Mn	S-Ag	S-As	S-Au	S-B	S-Ba	S-Be	S-Bi
SMT1D	44 53 38	115 20 43	1	.3	.3	.15	150	3	2,000	N	50	700	1.5	N
SMT2D	44 53 37	115 20 41	1.5	.3	.5	.15	150	.7	700	N	20	700	1.5	N
SMT3D	44 53 35	115 20 40	.7	.3	.2	.15	150	1.5	1,500	N	50	700	1.5	N
SMT4D	44 53 39	115 20 36	.7	.2	.2	.1	150	2	1,000	N	30	700	1.5	N
SMT5D	44 53 37	115 20 35	1	.2	.3	.15	150	5	1,500	N	30	700	1.5	N
SMT6D	44 53 35	115 20 33	.7	.2	.3	.07	300	5	1,500	N	30	700	1.5	N
SMT7D	44 53 34	115 20 31	1.5	.3	.3	.15	200	5	1,500	N	30	700	2	N
SMT8D	44 53 30	115 20 35	2	.5	.3	.2	300	2	1,500	N	100	700	3	N
SMT9D	44 53 32	115 20 37	.7	.3	.15	.1	150	2	700	N	30	500	1.5	N
SMT10D	44 53 34	115 20 39	.7	.2	.15	.1	150	2	700	N	30	700	1.5	N
SMT13D	44 53 31	115 20 44	.7	.2	.15	.07	150	1.5	700	N	30	700	1.5	N
SMT14D	44 53 33	115 20 46	.7	.3	.3	.1	300	1.5	1,000	N	70	700	2	N
SMT15D	44 53 34	115 20 47	1	.3	.3	.15	150	1.5	700	N	50	700	1.5	N
SMT16D	44 53 36	115 20 49	.7	.2	.3	.1	150	1.5	500	N	50	700	2	N
SMT17D	44 53 27	115 20 49	.7	.2	.2	.07	100	2	300	N	30	700	1.5	N
SMT19D	44 53 31	115 20 53	.5	.2	.15	.07	150	1	500	N	50	700	1.5	N

Sample	S-Cd	S-Co	S-Cr	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
SMT1D	N	<5	<10	70	20	N	10	5	20	1,000	<5	N	300	30	100	<10	N	30
SMT2D	N	5	<10	5	20	N	10	5	10	200	<5	N	300	20	N	10	N	70
SMT3D	N	<5	N	10	<20	N	10	5	15	500	<5	N	100	30	N	N	N	50
SMT4D	N	<5	<10	15	20	N	10	5	20	700	<5	N	100	30	100	<10	N	50
SMT5D	N	<5	<10	15	30	N	10	5	10	5,000	5	N	150	30	N	10	N	50
SMT6D	N	<5	10	30	30	N	10	5	30	5,000	<5	N	100	20	150	<10	N	30
SMT7D	N	<5	<10	50	30	N	20	7	20	700	5	N	100	30	N	10	N	70
SMT8D	N	<5	10	70	30	N	20	10	500	3,000	5	N	100	70	150	10	N	70
SMT9D	N	10	<10	100	20	N	10	7	30	700	5	N	100	30	50	<10	N	70
SMT10D	N	5	<10	10	20	N	10	5	15	1,500	<5	N	150	30	150	<10	N	70
SMT13D	N	5	N	15	20	N	10	5	15	700	<5	N	150	20	N	<10	N	50
SMT14D	N	<5	<10	15	20	N	10	5	50	700	<5	N	100	30	N	<10	N	50
SMT15D	N	N	<10	10	20	N	15	7	20	700	<5	N	150	30	<50	10	N	50
SMT16D	N	<5	<10	30	20	N	10	5	10	500	5	N	150	30	N	10	N	20
SMT17D	N	5	N	10	<20	N	<10	5	10	300	N	N	150	20	N	10	N	30
SMT19D	N	<5	N	20	20	N	10	7	30	700	<5	N	100	20	N	10	N	30