Base from U.S. Geological Survey, Hillsboro, 1940 and San Lorenzo, 1956, 1:62,500

SCALE 1:48 000

Geology mapped by D. C. Hedlund, 1977

MAP SHOWING AREAS OF DETRITAL FLUORITE AND CASSITERITE, AND THE LOCALITIES OF ROCK SAMPLES HILLSBORO AND SAN LORENZO QUADRANGLES EXCLUSIVE OF THE BLACK RANGE PRIMITIVE AREA SIERRA AND GRANT COUNTIES, NEW MEXICO

By
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DISCUSSION

Two types of data are shown on this map: (1) The distribution of detrital fluorite and cassiterite in the nonmagnetic (NM-1) fraction observed during microscopic study of the panned concentrates. These concentrates are derived from drainages within the map area and are the basic sample medium for geochemical exploration in this study. (2) The location of all rock samples collected as a supplement to the basic drainage sediment survey and the localities of those rock samples deemed to have an unusually high content in at least one metallic element as shown by semiquantitative spectrographic analysis. A table listing the anomalous metal content and a brief description of each rock sample containing higher than normal metal content(s) is provided. This map is part of a series of geochemical maps for several metals that accompany this folio.

Sample Type

The sample material consists of the portion of pan-concentrated stream sediment having a specific gravity greater than that of bromoform. Prior to bromoform separation magnetite was removed from the pan-concentrate sample with a hand magnet and discarded. The remaining heavy mineral sample was subsequently separated magnetically into two fractions magnetic and nonmagnetic. The magnetic (M-1) fraction is that portion of such material not magnetic at 0.1 ampere, but magnetic at a 1.0 ampere setting on a Franz Isodynamic Separator (forward slope 25°, side slope 15°). The other sample fraction is not magnetic at a 1.0 ampere setting and is called nonmagnetic (NM-1) fraction. The nonmagnetic (NM-1) fraction is composed dominantly of light-colored rock-forming accessory minerals and primary and secondary ore minerals. If high metal values occur in this fraction they are predominately due to the presence of sulfides.

Analytical Methods

Rock samples were pulverized to -150 mesh prior to analysis for 30 elements by the semiquantitative spectrographic method of Grimes and Marranzino (1968). Results of these spectrographic analyses are reported within geometric intervals having the boundaries 1,200, 830, 560, 380, 180, 120, and so on in ppm, but are shown in the histograms by approximate geometric midpoints such as 1,000, 700, 500, 300, 200, 150, and 100. Precision of a reported value is approximately plus or minus one interval at 68 percent confidence, or plus or minus two intervals at 95 percent confidence.

Detrital mineral grains in the heavy mineral concentrates were routinely identified with the binocular microscope prior to the pulverization and spectrographic analysis. The identifications result from general scans, often made in the field, and were not intended to identify every detrital mineral occurring in the sample. The purpose was to obtain gross identification and relative proportions of minerals. When unusual minerals were recurrently encountered, a reference sample was taken for further study. Some samples were also scanned under the ultraviolet lamp, but not consistently enough to provide complete data over the entire map area. In addition to providing information on the type of detrital minerals in the concentrate samples, the microscope scan provided a check on the quality of the bromoform and magnetic separations and revealed contamination where it occasionally occurred.

Neither of the minerals fluorite and cassiterite shown on this map may be of commercial interest providing sufficient concentrations exist, but the areal distribution of these minerals as detrital grains cannot be inferred from the geochemical maps being shown in this series.

The most promising areas for fluorite prospecting appear to be in the vicinities of Noonday Peak, Pine Flat Mountain, and Pine Spring Mountain (south-central part of map area). Subeconomic fluorite was observed in outcrop at Larkins Spring Mountain (Hedlund, 1975a), which is located within the large area shown to contain detrital fluorite. Judging from the size of the area containing detrital fluorite, the occurrence of Larkins Spring Mountain is only a portion of fluorite present. As shown on the map, fluorite and cassiterite are spatially associated with each other in the south-central part of the map area and therefore they may be related genetically. Exploring for one of these commodities in that area may therefore include concomitant exploration for the other. A buried intrusive is inferred to underlie the area near Noonday Peak and if so the cassiterite which is localized in the area would indicate the intrusive to be granitic in composition. The vicinity may be a source area for some of the Mimbres Peak rhyolite flows, which appear to have tin affinities.

Other areas where fluorite may be found in economic quantities are around Kingston, and other areas to the southwest where fluorite occurs with base and precious metal deposits, and in the Copper Flat area (northeastern part of map area). The fluorite at Copper Flat seems to form a zonal halo about the areas of known base and precious metal deposits though it also overlaps on areas of these deposits. Much of the fluorite that may have existed in these areas may have been already mined. The fluorite patterns therefore cover areas of only minor promise for future fluorite mining.

The Pierce Canyon area (south-central part of map area) and northward shows only moderate promise for fluorite deposits. The fluorite patterns in this area form a sporadic linear trend, oriented north-south. The fluorite occurs in the generally north-trending fault zone that extends from the vicinity of Signal Peak northward at least as far as Kingston Ranger Station. Base and precious metals are associated with this zone, which indicates the fluorite occurrences may be related to base and precious mineralization in the area. Any fluorite exploration should be directed toward the faults associated with this zone.

Other fluorite areas delineated on the map have unknown potentials for economic fluorite deposits.

Most rock samples were collected within 30-100 m of the stream sediment sample site, but some additional rock samples were collected where alteration was conspicuous or where stringers, breccia, jasperoid, or limonite zones were encountered elsewhere. The rock samples are of two types. One type was comprised of altered rock, gossan, fracture fillings, fault gouge and breccia, veins, and favorable lithologic contacts; all of these materials were sampled in an attempt to detect leakage halos and delineate the general outline of mineralized rock. The other type of rock sample was representative of the unmineralized lithologic types within the map area. These were collected for the purpose of obtaining data on the average metal content for the different unmineralized rock units.

Several areas of possible interest for exploration were identified as a result of rock sampling. For example the Percha Shale-Fusselman Dolomite contact at one locality (site 45), and some intrusive-host rock contacts (sites 48, 112, and 114), several fault and breccia zones (sites 67, 69, 74, 101, and 115), and some areas containing fracturing and stringers (sites 46, 47, 55, and 100) were all situations where unusually high amounts of a metal or metals were found. Some samples of silicified, ferruginous limestone (jasperoid) contained unusually high amounts of some metals (sites 41, 43, 111, and 113). Areas where these jasperoids contain high metal values may overlie concealed mineral deposits. Certainly the locations of these high metal content rocks represent places where solutions carrying metals have reacted with limestone. The distance these solutions have traveled through the limestone from the source before precipitating the metals may be short because of the high reactivity of the limestone.

Any of the rocks of high metal content occurring at the surface could represent portions of leakage halos around concealed deposits at depth. The fault zones containing high metal concentrations in gouge, breccia, or wallrock may have served as conduits for mineralizing solutions or provided loci for igneous intrusion. Both of the conditions may provide guides for exploration. Northeast-southwest-trending faults in the southwest corner of the map area (sites 109, 110, and 115) and the generally north-south Pierce Canyon zone (sites 56, 57, and 61) are localities where anomalous rock samples occur and these faults may therefore have constituted ore solution conduits.

Significantly, several samples of brecciated, faulted or otherwise altered volcanic rock generally considered post mineralization contained unusually high quantities of metals (sites 55, 76, 92, and 105). Most of these anomalous samples are of Kneeling Nun tuff, some are altered Mimbres Peak Rhyolite of Jicha, 1954. From the sparse data available it would seem the unusual quantities of metal in the volcanic rocks were brought to the surface by way of faults or fractures as in the cases at sites 55 and 105. If this be the case, possibilities for concealed deposits may exist beneath these and other of the tenuous leakage halos within the volcanic terrain.

On the map, all rock sample sites are shown but only those where rock samples were unusually high in at least one metallic element are numbered on the map and listed in the accompanying table.

Additional sampling of rocks as well as other media, and other detailed followup is required in all areas where anomalous rocks are shown on the map if the extent and viability of these areas as exploration targets is to be determined.

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Table 1.--Description of rocks containing higher than normal metal content

[L, metal detected, but below the lowest limit of emission spectrographic standard; metals for which L is shown are considered anomalous]

Map No.	Field No.	Anomalous metals (in ppm)	Brief description
1	SL-522	Zn-L	Limestone, limonite staining.
2	HB-119R	Cu-100 Zn-L	Andesite of Copper Flat, relatively unaltered.
3	HB-106R	Cu-100 Zn-200	Do.
4	HB-103R	Zn-200	Quartz latite dike light gray, aphanitic.
5	HB-104R	Cu-150 Zn-200	Andesite of Copper Flat, propylitic alteration.
6	HB-105R	Zn-L	Biotite latite.
7	HB-118R	Zn-L	Andesite of Copper Flat, propylitic alteration.
8	HB-117R	Zn-200 Cu-150	Do.
9	HB-108R1	Zn-200	Andesite of Copper Flat, propylitic alteration near contact with quartz latite dike.
10	HB-110R	Zn-200	Quartz monzonite, relatively fresh.
11	HB-111R	Cu-300 Zn-200 Mo-50 Ag-1.5	Andesite of Copper Flat, intensely (argillic?) altered.
12	HB-112R	Cu-150 Mo-5 Pb-100 Bi-20	Do.
13	HB-101R	Cu-200	Andesite of Copper Flat, intensely altered
14	HB-116R	Bi-L	Quartz monzonite, altered.
15	HB-114R	Bi-L	Quartz monzonite, silicified, Fe-stained, contains disseminated pyrite.
16	HB-113R	Cu-200 Mo-5 Ag-L Bi-50	Quartz monzonite, contains disseminated pyrite.
17	HB-121R	Cu-5,000 Ag-1	Quartz monzonite, altered.
18	HB-124R	Cu-1,000 Ag-1	Quartz monzonite, relatively fresh, contains disseminated pyrite.
19	HB-125R	Cu-5,000 Ag-3	Quartz monzonite, relatively unaltered, pink.
20	HB-123R	Cu-1,000 Ag-1	Quartz monzonite.
21	HB-49R	Cu-150 Zn-L	Andesite of Copper Flat, fine grained, chloritized.
22	HB-161R	Zn-L	Andesite of Copper Flat, propylitic alteration.
23	HB-162R	Zn-L	Andesite of Copper Flat.
24	HB-157R	Zn-300	Andesite of Copper Flat, altered.
25	HB-160R	Zn-L	Andesite of Copper Flat, intensely altered.
26	HB-158R	Zn-L	Andesite of Copper Flat.
27	HB-145R	Cu-100	Do.
28	HB-154R	Mo-5	Andesite of Copper Flat, altered.
29	HB-151R	Cu-100	Do.
30	HB-150R	Cu-100	Do.
31	HB-140R	Zn-L	Andesite of Copper Flat.
32	HB-137R	Zn-200	Andesite, coarse porphyritic.
33	HB-139R	Zn-L	Andesite of Copper Flat.
34	HB-133R	Zn-L	Andesite of Copper Flat, propylitic alteration.
35	HB-132R	Zn-L	Do.
36	HB-39R3	Cu-1,000 Mo-10 Ag-10 Bi-50 Au-15 Co-100	Float, vein mat, siliceous; contains oxidized sulfides.
37	HB-37R	Mo-10	Quartz latite dike, altered.
38	------		No samples.
39	HB-45R	Cu-500 Mo-7 Ag-5	Quartz latite. Contains disseminated sulfides, bleached.
40	HB-47R1	Cu-150 Zn-200 Pb-300	Fracture filling in altered rock. 6-8 in. wide, contains sulfides, limonite.
	HB-47R2	Zn-200 Pb-1,500	Altered rock, white, intensely altered, contains limonite streaks and some sulfides.
41	HB-472R	Mo-5 Pb-300 W-50 Be-15	Jasperoid and fluffy limonite composite.
42	HB-417R	Mo-30 Zn-500 Pb-1,000 W-50 As-700	Fault gouge(?) limonitic clay.
43	HB-470R	Cu-100 Mo-50 Pb-200 Ag-L	Altered limestone, includes yellow-brown, fluffy limonite in strongly altered zone. Some clay and silicification.
44	HB-469R	Pb-200 Ag-0.5	Dolomite, yellow coatings; contains red disseminations.
45	HB-467R	Zn-1,500 Mo-30 Pb-3,000 W-300 As-300 Sb-300 Be-15	Contact Percha Shale and underlying Fusselman Dolomite. Ferruginous and manganiferous clay. Composite sample of Fe-oxide and Mn-oxide-rich material.
46	HB-600R1	Mo-7	Veinlets in intrusive andesite sill; composite of limonite and calcite stringers.
47	HB-479R	Mo-70	Pyrite, calcite, limonite fracture filling in limestone.
48	HB-475R2	Zn-700 Mo-L As-700 B-70	Contact, intrusive andesite sill with overlying shaly limestone. No evidence of extreme alteration. Some hornfels but zone very thin.
49	HB-476R	Zn-300 Mo-L	Veinlets in intrusive andesite; contain calcite, limonite, and dark opaques; composite sample.
50	HB-551R	Mo-L	Andesite, Rubio Peak Formation, unaltered.
51	HB-744R	Ag-3	Limestone, dark-gray.
52	HB-742R	Ag-15	Andesite, Rubio Peak Formation.
53	HB-750R	Ag-3	Mimbres Peak Rhyolite of Jicha, 1954; flow banded.
54	HB-752R	Ag-L	Rhyolite, glassy.
55	HB-902R	Mo-7 W-70 Be-15	Veinlet containing Mn-oxide in fractured Kneeling Nun Tuff.
56	HB-668R	Ag-2	Intrusive rhyolite. Contains abundant disseminated pyrite.
57	HB-842R	Mo-L	Sandstone, hematitic, flinty with magnetite and chlorite.
58	HB-669R	Mo-15	Pollack Quartz Latite of Jicha, 1954, platy, medium-gray, porphyritic with sparse hornblende phenocrysts.
59	HB-841V	Zn-1,500 Mo-7 Pb-7,000 Ag-500 W-300 Au-L Cd-L	Dump material, limonitic, with silica, Mn-oxide and chlorite.
60	HB-576R	Mo-30 Ag-1.5	Float, silicified breccia.
61	HB-712R	Ag-0.5	Intrusive rhyolite.
62	HB-769R	Ag-1.5	Andesite, Rubio Peak Formation.
63	HB-628R	Mo-L	Percha Shale, black, fissile, no evidence of mineralization.
64	HB-617R	Mo-L	Kneeling Nun Tuff, quartz latite tuff, hydrothermal alteration, punky, limonitic, contains stringers.
65	HB-620R	Ag-L	Kneeling Nun Tuff, quartz latite tuff, Fe-oxide staining along fractures.
66	HB-648R	Mo-L	Rhyolite, white, aphanitic, limonite stained.
67	HB-647R1	Zn-300 Mo-L Pb-150 Ag-0.5	Fault breccia, dolomite contains fluffy limonite, and siliceous sponge; appears leached.
	HB-647R2	Ag-1.0	Dolomite, unaltered, gray, fossiliferous.
68	HB-643R	Cu-100 Mo-L Ag-15	Limestone, brecciated, calcite veining, visible disseminated sulfide; mostly pyrite.
69	HB-179R	Pb-200 Ag-7	Limestone, brecciated, Fe-stained.
70	HB-178V	Mo-L Ag-7	Float, siliceous, Fe-stained, contains pyrite.
71	HB-180V	Cu-2,000 Zn->10,000 Mo-500 Pb-20,000 Ag-2,000 As-3,000 Sb-1,500 Cd->500	Dump sample from silicified fault zone. Contains galena, sphalerite, chalcopyrite.
72	HB-182V	Zn-300 Mo-L Pb-200 Ag-15	Float, pyritic limestone.
	HB-182R	Ag-10	Limestone.
73	HB-184R	Cu-150 Zn-300 Ag-L	Precambrian amphibolite, contains silica veinlets, epidote and pyrite.
74	HB-190V	Zn-L Mo-L Ag-1 W-70	Breccia, silicified, Fe-stained.
75	HB-315V	Cu-5,000 Zn->10,000 Pb-10,000 Ag->5,00C As-500 Sb-3,000 Cd-300	Vein in granodiorite host rock.
76	HB-318R	Zn-300 Pb-100 Ag-15	Kneeling Nun Tuff, quartz latite tuff.
77	HB-316R	Zn-1,500 Pb-200 Ag-50	Precambrian granite of Dumm Canyon.
78	HB-361R	Cu-200	Precambrian amphibolite, dense, dark green.
79	HB-355R	Zn-300 Ag-2	Felsite breccia.
80	HB-352V	Mo-500 Pb-150 Ag-50	Quartz vein; some sulfides.
81	HB-301V	Zn-7,000 Pb-100	Mine dump composite.
82	HB-199R	Cu-150	Precambrian granite, altered.
83	HB-188R	Zn-300	Andesite, Rubio Peak Formation, altered.
84	HB-196R	Zn-200 Mo-L	Precambrian amphibolite; contains pyrite.
85	HB-194V1	Cu-150 Zn-300 Mo-L Ag-15	Float, abundant Fe and Mn oxides.
86	HB-664R	Zn-700 Pb-200	Intrusive andesite porphyry, large white phenocrysts of plagioclase in olive-tan groundmass.
87	HB-663V	Cu-3,000 Zn-3,000 Mo-70 Pb-1,000 Ag-30	Vein material contains galena, chalcopyrite, azurite, malachite.
88	HB-624R	Ag-L	Precambrian granite, contains coarse pyrite, epidote, and Fe-oxide along fractures.
89	HB-625R	Mo-30 Pb-300 Ag-L	Precambrian granite, contains disseminated pyrite and limonite.
90	HB-689R	Mo-L	Andesite, Rubio Peak Formation, fine-grained propylitic with disseminated pyrite; composite.
91	HB-811R	Mo-L	Fracture filling in highly altered andesite; Mn-oxide and yellow clays.
92	HB-901R	Pb-100 Ag-7	Mimbres Peak Rhyolite of Jicha, 1954.
93	SL-408R	Pb-150	Altered tuff breccia; yellow matrix, Mn-oxide staining.
94	SL-173R	Mo-5	Mimbres Peak Rhyolite of Jicha, 1954.
95	SL-122R	Pb-100	Do.
96	SL-120R	Pb-100	Kneeling Nun Tuff, quartz latite tuff.
97	SL-116V	Cu-2,000 Mo-20 Pb->20,000 Ag-300 Cd-300 Co-100 Sb-L	Vein material in altered, pyritic rhyolite.
98	SL-117R	Zn-200 Pb-700 Ag-0.5	Andesite, sheared, altered.
99	SL-106R	Cu-700 Zn->10,000 Mo-70 Pb-7,000 Ag-50	El Paso Limestone.
100	SL-123R	Mo-30	Percha Shale, altered, Fe-oxide stained, veinlets Fe-oxide.
101	SL-280V	Cu-100 Zn-1,000 Mo-100 Pb-5,000 Ag-5	Fault breccia, much sooty black Mn-oxide.
102	SL-243R	Zn-200 Pb-100	Marble, contains calc-silicate minerals, garnet, veinlets of pink carbonate. Composite.
103	SL-275R	Mo-10	Intrusive rhyolite porphyry; Fe-stained, aphanitic groundmass.
104	SL-227R	Ag-1	Kneeling Nun Tuff, quartz latite tuff.
105	SL-232R	Pb-100 Ag-0.7	Fault gouge with Percha Shale, brecciated Kneeling Nun Tuff.
106	SL-361R	Bi-15	Intrusive rhyolite porphyry.
107	SL-515R	Cu-100	Bliss(?) Sandstone, no evidence of mineralization.
108	$SL-517R_2$	Zn-3,000 Ag-1	Precambrian greenstone, no evidence of mineralization.
109	SL-692R	Zn-200 Mo-5 Ag-5	Fault gouge, limonite and clay.
110	SL-692R	Zn-500 Mo-7 Ag-0.5	Fault gouge, much Fe-oxide staining.
111	SL-501R	Zn-300 Pb-100 Ag-0.5	Limonitic jasperoid.
112	$SL-503R_2$	Zn-10,000 Mo-7 Pb-500	Limestone, limonitic, siliceous, near contact with quartz latite intrusive.
113	SL-636R	Zn-200 Pb-100 Ag-2	Jasperoid, vuggy, with red Fe-staining.
114	SL-638R1	Zn-300 Mo-5 Ag-0.5	Contact, shaly limestone with porphyritic quartz diorite, reddish ocherous Fe-oxide and clay.
115	SL-642R	Zn-3,000 Mo-500 Pb-1,000 Ag-7	Fault breccia, silicified; some cellular sponge.
116	SL-650R	Zn-300 Mo-5 Ag-0.5	Beartooth Quartzite, reddish stain.
117	SL-663R	Zn-2,000 Mo-5	Mn-oxide coatings; intense Mn-oxide staining in vertical joints and along bedding in Beartooth Quartzite.
118	SL-655R	Zn-3,000 Pb-100	Float, dark black, dense, wavy bands, flinty.
119	SL-656R	Zn-500	Limestone, altered red Fe-stained fractures. Calcite veinlets.
120	HB-589V	Cu-3,000 Zn-3,000 Mo-10 Ag-5,000 Au-20 As-L Sb-1,000	Vein material in brecciated, silicified limestone; visible sulfides.
121	HB-171R	Zn-L	Andesite of Copper Flat.
122	HB-320R	Ag-5	Limestone, no evidence of mineralization.
123	HB-195R	Mo-L	Rhyolite intrusive, altered, contains disseminated pyrite.

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS
Qs QUATERNARY

SEDIMENTARY AND VOLCANIC ROCKS
QTs, QTb — QUATERNARY AND TERTIARY
Tv, Tr, Trn, Trl — TERTIARY
Kv, Ks — CRETACEOUS
Pzu — PALEOZOIC

IGNEOUS AND METAMORPHIC ROCKS
pEu — PRECAMBRIAN
INTRUSIVE ROCKS
Tri, Trs, Tas — TERTIARY
Tql, Ta, Trsd — TERTIARY
Kai, Kqm, Kql — CRETACEOUS

LIST OF MAP UNITS

Qs	UNCONSOLIDATED SEDIMENTARY DEPOSITS (QUATERNARY)
QTs	GILA AND SANTA FE FORMATIONS (QUATERNARY AND TERTIARY)
QTb	BASALTIC LAVA AND GILA AND SANTA FE FORMATIONS (QUATERNARY AND TERTIARY)
Tv	LAVAS AND ASH-FLOW TUFFS (OLIGOCENE)
Tr, Trl, Trn	RHYOLITE FLOWS AND DOMES (OLIGOCENE)
Tri, Trs	RHYOLITE PLUGS, STOCKS AND SILLS (OLIGOCENE)
Tas	ANDESITE SILLS AND DIKES (OLIGOCENE?)
Tql	QUARTZ LATITE DIKE OR SILL (OLIGOCENE?)
Ta	ANDESITE SILLS (OLIGOCENE?)
Trsd	RHYOLITE SILLS AND DOMES (OLIGOCENE?)
Kai	ANDESITE DIKES AND SILLS (UPPER CRETACEOUS)
Kqm	QUARTZ MONZONITE, GRANITE, MONZODIORITE AND DIORITE (UPPER CRETACEOUS)
Kql	QUARTZ LATITE DIKES OF COPPER FLAT (UPPER CRETACEOUS)
Kv	ANDESITIC FLOWS OF COPPER FLAT (UPPER CRETACEOUS)
Ks	BEARTOOTH QUARTZITE (UPPER? CRETACEOUS)
Pzu	UNDIVIDED SEDIMENTARY ROCKS (PALEOZOIC)
pEu	UNDIVIDED GRANITIC AND HORNBLENDE ROCKS (PRECAMBRIAN)

CONTACT—Dotted where concealed

FAULT—Dashed where approximately located; dotted where concealed. Where known, ball and bar on the downthrown side. U, upthrown side; D, downthrown side

ANTICLINAL AXIS—Showing crestline. Dashed where approximately located

Geochemical Explanation

DRAINAGE AREAS—Approximately delineated
Stream sediment concentrates containing fluorite
Stream sediment concentrates containing cassiterite
STREAM SEDIMENT SAMPLE LOCALITY
ROCK SAMPLE LOCALITY—Number identifies anomalous rock sample locality described in table
ROCK AND STREAM SEDIMENT SAMPLE LOCALITY—Number identifies anomalous rock sample locality described in table

Table 2.--The probable value of spectrograph category L for different metals

[L, metal detected but below the lowest limit]

Metal	Lower detection limit (in ppm)	Probable value (in ppm)
Mo---	5	3
Zn---	200	100 or 150
As---	200	100 or 150
Ag---	0.5	0.2 or 0.3
Cd---	50	20 or 30
Au---	10	5 or 7

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978
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