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NEVADA BUREAU OF MINES & GEOLOGY
REPORT 39

TRACE ELEMENT ASSOCIATIONS IN MINERAL DEPOSITS

BARE MOUNTAIN (FLUORINE) MINING DISTRICT

SOUTHERN NYE COUNTY, NEVADA

JOSEPH V. TINGLEY

A reconnaissance study of trace element associations in mineral deposits of the Bare Mountain area, southern Nye County, Nevada, and the relationship of these deposits to the regional geology.

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1984

ABSTRACT

The Bare Mountain (Fluorine) mining district, located on and around Bare Mountain, southern Nye County, Nevada, has produced gold, mercury, fluorite, clay, silica, and some marble beginning in about 1905. Gold and fluorite production from separate deposits continues from the district. Mineral deposits at Bare Mountain consist of gold-base metal-quartz vein deposits that are mainly confined to Precambrian and Cambrian host rocks and are located along the west slopes of the range. Gold-mercury-fluorite deposits in Precambrian-Cambrian sedimentary rocks and Tertiary volcanic rocks are located mainly along the north and east margins of the range. Copper, lead, zinc, cadmium, silver, and antimony are associated in the gold-base metal-quartz vein deposits and are interpreted to represent an early period of mineralization at Bare Mountain. Gold, molybdenum, arsenic, and mercury are associated with fluorite in breccias and breccia pipes along the north and east margins of the range and are interpreted to represent a separate, later period of mineralization, possibly related to outer ring fracture zones of the nearby Crater Flat or Timber Mountain—Oasis Valley caldera complexes.

INTRODUCTION

Bare Mountain lies along the northeast side of U.S. Highway 95 for about 15 miles south of the town of Beatty in southern Nye County, Nevada. Crater Flat, Yucca Mountain, and the Nevada Test Site lie to the east of Bare Mountain. The wide Amargosa Valley and the California border are to the southwest of Bare Mountain, and the Bullfrog Hills are located to the northwest, west of the town of Beatty (fig. 1).

Bare Mountain stands out as an island of Paleozoic rocks, nearly surrounded by young volcanic rocks. It appears as a mass of older bedrock situated along the margins of the large caldera complexes that scallop it on its northern and eastern sides. Bare Mountain itself is an impressive but barren mountain mass composed mainly of colorful, zebra-striped sedimentary rocks which are almost totally lacking in vegetative cover.

The first mining activity at Bare Mountain is credited to Mormons who found gold on the west slopes of Wildcat Peak on the southern tip of the mountain in about 1861. Ores were supposedly transported to the camp of Gold Center, on the Amargosa River south of present-day Beatty, for smelting (Carper, 1921).

The present era of mining activity, however, dates back to early 1905 when gold was discovered on the northeast end of Bare Mountain (Lincoln, 1923, p. 167). Mercury was discovered in deposits on the northeast flank of the mountain in 1908, and the fluorite deposits in the north and east portions of the mountain were discovered in 1918 (Lincoln, 1923, p. 18). At Carrara, on the western side of the range, attempts were made between 1904 and 1936 to quarry marble for building material, but this activity never succeeded. The most recent mining and exploration activity in the range is centered around the Sterling gold mine where disseminated gold deposits were discovered in 1980.

The geology of the Bare Mountain area was first described in a reconnaissance study by Ball (1907). Kral (1951) described the mining operations in the area, and detailed studies of the regional geology were made in 1960–1961 by Cornwall and Kleinhampl (1961). Geological investigations carried on by the U.S. Geological Survey over the years since World War II within the Nevada Test Site, immediately to the east of Bare Mountain, have contributed to the understanding of the regional setting, while not specifically focusing on Bare Mountain.

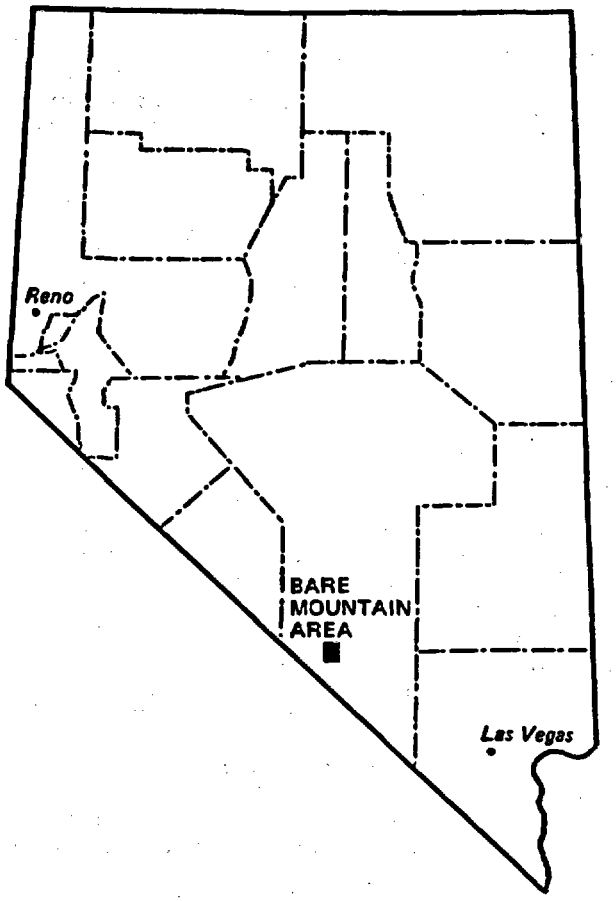

FIGURE 1. Index map of Nevada showing Bare Mountain area.

During 1982–1983, the Nevada Bureau of Mines and Geology conducted a mineral inventory of the Bare Mountain area as part of a larger project completed under contract from the Bureau of Land Management. Field data were collected by Jack Quade, J. V. Tingley, L. J. Garside, Nevada Bureau of Mines and Geology geologists, assisted by Peggy Smith, NBMG research associate. Sampling completed during the inventory project disclosed the geochemical relationships described in this report.

GEOLOGICAL SETTING

Bare Mountain is composed almost entirely of late Precambrian and early to mid-Paleozoic sedimentary rocks that have been intensely deformed by folding and faulting. In general, Precambrian and Cambrian rocks crop out along the western slope and the southeast-trailing tail of Bare Mountain, while Ordovician through Mississippian formations make up the eastern half of the wide north end of the mountain mass. For the most part, the sedimentary rocks dip northward in successive blocks separated by right-lateral tear faults and flat thrusts (Cornwall, 1972, p. 31).

Some of the features mapped as thrusts may be alternately interpreted as gravity slide blocks and could be related to the collapse of the large caldera structures that border the Paleozoic bedrock of Bare Mountain. The area of lower relief, north of Bare Mountain and generally north of Fluorspar Canyon, is underlain by Miocene volcanic rocks. These volcanic rocks, which rim Crater Flat to the east as well, are highly faulted and consist largely of welded ash-flow tuffs (Carr, 1982, p. 6). The ash-flow tuffs are interpreted by Carr (1982) as having two distinctly separate sources. The oldest tuff unit, Crater Flat Tuff, had as its source calderas in the area now occupied by Crater Flat. This unit has been dated at 14–15 m.y. (Christiansen and others, 1977, p. 947). The Crater Flat Tuff is overlain by the younger Paintbrush Tuff and Timber Mountain Tuff that are interpreted to have originated from the large Timber Mountain–Oasis Valley caldera complex which lies to the north of Bare Mountain (Carr, 1982, p. 6).

Altered rhyolite to rhyodacite dikes crop out generally along the eastern margin of Bare Mountain and cut across the narrow midsection of the range from northeast to southwest, transecting the Paleozoic bedrock. Carr (1982) reports a date of 13.9 m.y. for these dikes and states that they are the same age as lava flows that underlie the oldest Crater Flat Tuff unit. The dikes, in outcrop, form an arcuate pattern gently concave toward Crater Flat. Carr (1982) postulates that these dikes could represent outer ring dikes beyond the west wall of the Crater Flat collapse. Fluorite-rich breccia pipes occur in conjunction with dikes at the Diamond Queen (Goldspar) Mine on the east edge of Bare Mountain, and the gold mineralization at the Sterling Mine occurs in an area cut by these dike rocks. Generalized geologic relationships in the Bare Mountain area are shown on figure 2.

MINERAL DEPOSITS

Mineral deposits on and around Bare Mountain fall into two general categories: gold-base metal-quartz vein deposits hosted by Precambrian and Cambrian sedimentary rocks and gold-mercury-fluorite deposits that occur both in Cambrian sedimentary rocks and Miocene volcanic rocks. The base-metal vein occurrences are scattered along the western slopes of Bare Mountain, and the gold and mercury occurrences are clustered in four general areas along the eastern and northern edges of the mountain.

Gold-Base Metal-Quartz Vein Deposits

WEST SLOPE VEINS

Gold-bearing quartz veins, high in base metals, occur in the west-draining canyons and along the western slopes of Bare Mountain. The veins commonly contain calcite as well as quartz, and they fill fault zones and shears that cut Precambrian-Cambrian quartzites, dolomites, and schists. The veins follow northeast, north-south, and some east-west shears and faults. Veins on some properties are described as following thrust fault zones. Weak skarns, with associated tungsten mineralization, have been reported from two areas, the Silver Peak claims just north of Steves Pass and the Bonanza and Grand Junction claims in Tungsten Canyon.

The metal sought at most of the properties in this area was gold, but silver, copper, lead, and zinc commonly provide the most visible minerals at the various properties.

VIDANO AREA

At the Vidano property, gold-silver and associated base metals occur in a wide gossan that fills a shear zone in Cambrian dolomite. The locality is at the foot of Secret Pass just west of Meiklejohn Peak on the north-central part of Bare Mountain. The Vidano deposit is along a prominent N. 45° W. shear zone.

Gold-Mercury-Fluorite Deposits

Gold, mercury, and fluorite occurrences are located in four distinct clusters along the northern and eastern margins of Bare Mountain. Two, the Thompson Mine area and the Telluride area, are old mercury mining areas. The third area, Panama-Sterling, has both historic and present gold production. The remaining area, the Daisy Mine, is an area of fluorite production. Mercury is present in all four areas, either as an ore or as a trace element; fluorite is reported present in all areas but one (the Thompson mercury deposit); and gold is reported present at the Telluride camp as well as the major gold area at the Panama-Sterling Mines.

THOMPSON MERCURY MINE AREA

The Thompson Mine and surrounding prospects are located on the western tip of Yucca Mountain near Beatty Wash, about 5 miles to the north of Bare Mountain. At the Thompson Mine, cinnabar occurs in altered, silicified rhyolite flows and tuffs associated with alunite, kaolinite, and opal. Nearby properties have been located for clay minerals. At the Silicon Mine (near the Thompson Mine), small amounts of ceramic-grade silica have been mined from a zone of hydrothermal alteration in volcanic rocks. Trace amounts of cinnabar are also reported at some of these silicia deposits (Lincoln, 1923, p. 168).

TELLURIDE MERCURY MINE AREA

The Telluride Mine lies on the northern tip of Meiklejohn Peak. Small amounts of mercury have been mined at the Telluride from pipelike breccias in limestone and dolomite. Cinnabar occurs as disseminations in zones with fluorite, calcite, opal, and alunite. Porphyry dikes are present and cut the area along a north-northwest trend. Trace amounts of gold are reported and some gold prospecting activity occurred in the area in 1908 (Bailey and Phoenix, 1944, p. 142). V. P. Gianella examined this deposit in 1940. He noted the presence of fine-grained opal similiar to that of the Steamboat mercury deposit south of Reno and stated that there was little doubt that both occurrences had similiar origins (Gianella, 1940, p. 2).

PANAMA-STERLING GOLD AREA

Gold associated with fluorite in breccias and breccia pipes occurs at a number of mines and prospects north of Wildcat Peak, on the east slope of Bare Mountain. The Diamond Queen (Goldspar) and Panama Mines were involved in the early prospecting activity at Bare Mountain in 1905. Fluorspar was mined from the Diamond Queen and Mary Mines beginning in the 1950's and continuing into the early 1970's. Current activity in this area is once again focused on gold and is centered around the Sterling Mine north of the old Panama Mine. At the Sterling Mine, disseminated gold occurs along a thrust fault between

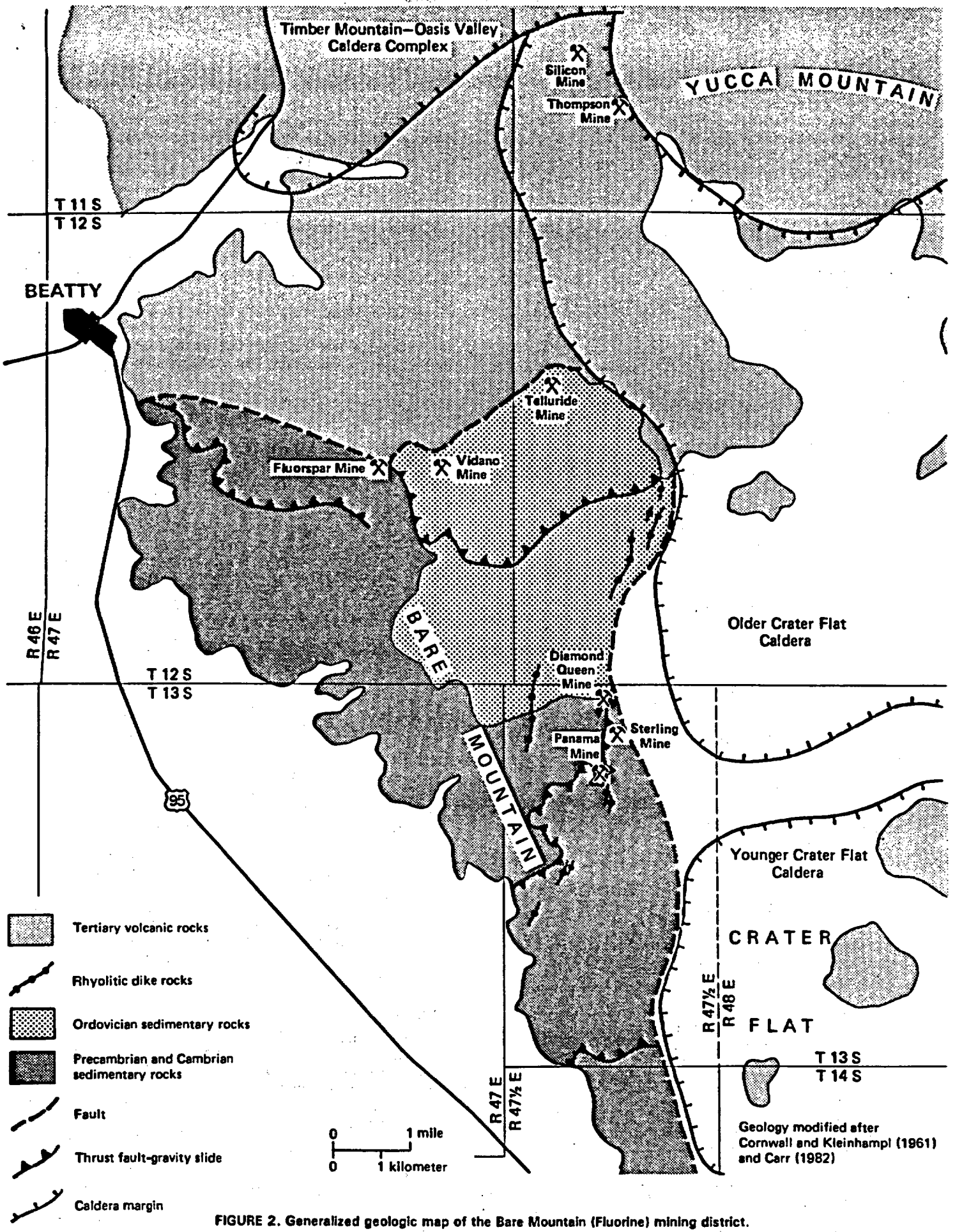

FIGURE 2. Generalized geologic map of the Bare Mountain (Fluorine) mining district.

upper plate Precambrian siltstone (Johnnie Formation) and lower plate Cambrian dolomite (Bonanza King Formation). Hydrothermal breccias are common in the ore zone, and fluorite is locally present. At the Mary and Diamond Queen Mines to the north of the Sterling, fluorite with trace gold occurs in breccia pipes that appear to follow along the trend of a number of northeast-striking rhyolite dikes. The breccias exposed in the Diamond Queen pit cut Cambrian limestone (Nopah Formation) and contain fragments of altered dike rocks as well as fragments of the host sedimentary rocks. Fluorite occurs as breccia fragments and as later open-space fillings, suggesting more than one period of fluorite mineralization and brecciation. At one locality in the Diamond Queen, the exposed breccia contains large blocks of material that displays crude graded bedding. Fluorite-bearing fragments compose some of the bedded material, and the large blocks are themselves caught up in the large breccia pipe. Fluorite also fills open spaces around the blocks. This bedding structure could have developed around the pipe as an apron deposit or could have formed within the pipe itself as the result of brecciated material falling back into the pipe following an explosive venting.

All of the breccia deposits extending from the Panama Mine north to the Mary fluorite mine are aligned along a general north-south zone of argillic alteration and bleaching which accompanies the swarm of rhyolitic dikes that transect the mine area.

DAISY FLUORITE MINE AREA

The Daisy Mine and several other fluorite occurrences are located in a small basin at the head of Fluorspar Canyon at the north end of Bare Mountain. The orebodies at the Daisy occur as hydrothermal replacement bodies in dolomite of Late Cambrian age (Papke, 1979, p. 41). The mineralized zone and the individual orebodies within it have a northeasterly trend and, generally, a steep southeasterly dip. Several fluorspar bodies have a nearly vertical, pipelike form (Papke, 1979, p. 42). Cinnabar is reported in areas of the Daisy Mine, as thin red stringers between fluorite and calcite bands (Nevada Bureau of Mines and Geology, 1974). At the Shorter White Mine, west of the Daisy, banded yellow and purple fluorite has been mined from a steeply dipping, pipelike body that also contains rindlike bands of iron-stained jasperoid around and throughout the pipe.

TRACE ELEMENT STUDIES

During the inventory study of Bare Mountain, 59 rock samples were taken for geochemical analysis. The samples were selected from mine dumps or from mineralized outcrops to investigate geochemical relationships rather than to establish ore-grade information. Each sample represents the best looking ore that could be found on the dumps or in the outcrops sampled. Geochemical analyses of these samples were done by the Branch of Exploration Geochemistry laboratory, U.S. Geological Survey, Denver, Colorado, through a cooperative agreement between that agency and the Nevada Bureau of Mines and Geology. All samples were analyzed for 31 elements using a semiquantitave emission spectrographic method. Sample descriptions and analyses are given in appendixes 1 and 2.

For the purposes of this report, statistical studies of geochemical results were not attempted. Rather, nine metallic elements were selected for study, and the range of values for each element for the samples within the Bare Mountain area was simply divided, by visual inspection, into logical groups. The extreme range of values displayed by each of the selected elements allows this method to be used to display geochemical relationships in the sampling area. Figures 3–11 show sample locations, each coded to show ranges of values for the selected elements. There is a separate figure for each of the nine elements: antimony, arsenic, cadmium, copper, gold, lead, molybdenum, silver, and zinc. For gold (fig. 7), there is only one category depicted, gold present. For the other eight elements, value ranges have been grouped into three categories that should be viewed only as low, medium, or high.

In addition to the geochemical samples, six rock samples were taken and fire-assayed for gold and silver by the Nevada Mining Analytical Laboratory. These samples were taken to confirm analytical results from some of the previous geochemical samples. Sampling was confined to two prospects near the Daisy fluorite mine and to one area in the Diamond Queen pit. Fire assay results are shown in appendix 3.

TRACE ELEMENT ASSOCIATIONS

Gold-Base Metal-Quartz Vein Deposits

WEST SLOPE VEINS

No gold was detected in any of the samples taken along the western front of the range. The spectrographic analysis method used in this study has a high detection limit (10 ppm), and the lack of detectable gold in samples does not rule out the presence of gold in this area. High silver values were reported from a number of properties and two samples exceeded 2000 ppm (over 58 oz/ton), the upper limit of detection for silver. Arsenic values were generally low along the western area, and only one sample, no. 1211 from the Irene claims, contained significant arsenic. Copper values are found throughout Bare Mountain, but high and moderate values are confined to the vein deposits along the western base of the mountain. Molybdenum, however, does not occur in these areas of high copper and the deposits along the western front generally are very low in molybdenum. Lead values are high in the quartz vein occurrences, and exceptionally high values were found in samples from the properties on the west slopes of Wildcat Peak on the southern tip of the mountain. At these occurrences, high cadmium values are associated with the lead. Antimony values are high and generally follow the high values for lead and cadmium in the vein occurrences. Zinc values were also high, mainly in the southernmost vein occurrences. Samples taken from Tungsten Canyon and from the canyon immediately to the south of it showed high values in tungsten.

VIDANO AREA

The Vidano area, although included in this section on gold-base metal-quartz vein deposits, has significantly different geochemical associations. No gold or silver is present at the established detection limits. Moderate to high arsenic values are present, and both copper and molybdenum values are low. Lead, cadmium, and zinc values are low to moderate, and as in the vein occurrences on the west, these three elements appear to be mutually associated. No detectable antimony was reported from this area. The significant difference between this area and the western vein occurrences is the presence of both cobalt and nickel. Several samples of gossan material from the Vidano area were high in both of these elements.

Gold-Mercury-Fluorite Deposits

THOMPSON MERCURY MINE AREA

Very low geochemical values were reported for lead and molybdenum from samples from this area, and no values (at the detection limits involved) were reported for gold, silver, arsenic, copper, antimony, cadmium, or zinc.

TELLURIDE MERCURY MINE AREA

No gold was detected in samples from this area. Moderate and high silver values were reported from two samples but the highest, 150 ppm in no. 1041, does not compare in value with the high values from the vein deposits west of Wildcat Peak. Moderate to high arsenic values are reported in several samples. Both copper and molybdenum values are low, but one sample, no. 1043A, does show moderate molybdenum (200 ppm). One sample reported moderate lead present, but with no associated cadmium. Moderate zinc was also reported present in this same sample. Antimony was reported present in low values in three samples from this area.

PANAMA-STERLING GOLD AREA

Gold was reported in samples analyzed spectrographically from three localities near the Sterling Mine and a sample collected from the Diamond Queen (Goldspar) Mine. Fire assays of these samples reported 0.04 ounces gold. Only two samples from this area contained detectable silver, and the values were only 5 ppm. High and moderate arsenic values were found, and one sample from the Sterling underground workings contained greater than 10,000 ppm As (+1% As). High molybdenum values were also reported from this area. One sample from the Sterling Mine contained 2000 ppm Mo, and one from the Diamond Queen contained 1000 ppm Mo. Very low values of copper were obtained from these same samples. High to moderate lead is present in the Sterling ore, but no cadmium and only low zinc values are present with the lead. Antimony is present in moderate to high amounts at both the Sterling Mine and the Diamond Queen deposits.

DAISY FLUORITE MINE AREA

Three samples from this area, from properties to the west of the Daisy Mine, showed detectable gold by spectrographic analysis. Two of these samples reported amounts roughly equivalent to one-third to one-half ounce gold. In later check sampling in this area, fire assay results ranged from 0.026 to 0.454 ounces per ton gold. Very low silver values were obtained, however, and the high for the area was only 10 ppm. Moderate to high arsenic values were reported in several samples. Very high molybdenum was reported in three samples. One sample from the Shorter White prospect, west of the Daisy Mine, reported +2000 ppm Mo present, which was off scale for the analytical method and roughly equivalent to +0.20% Mo. Copper is present in this area but in very low amounts (5–30 ppm). Low to moderate amounts of lead are present, but no associated cadmium or zinc were reported from any of the samples here. Moderate to high antimony values are present in several samples.

DISCUSSION OF TRACE ELEMENT ASSOCIATIONS

Examination of the maps showing the ranges of geochemical values for the nine selected elements (figs. 3–11) allows some broad generalizations to be made regarding geochemical associations. Base-metal values appear to be concentrated in the quartz vein occurrences found along the west flank of Bare Mountain and at the Vidano camp to the northeast. Copper, lead, cadmium, and zinc are all generally associated in the same samples and the highest values for the elements are found in samples from the quartz vein occurrences. Silver values are also largely confined to this same belt of deposits, indicating that all of these elements (copper, lead, cadmium, zinc, and silver) may be genetically related in this area.

A second grouping of associated elements includes arsenic, molybdenum, and gold. Mercury and fluorine could be added to these elements since the high arsenic-molybdenum-gold values were obtained from occurrences with reported mercury and fluorite. This association of elements is confined to deposits located along the eastern and northern margins of Bare Mountain.

Antimony is found at both the quartz veins occurrences and at the arsenic-molybdenum-gold areas described above.

It appears from these results that there are two distinct and separate mineral associations within the area sampled at Bare Mountain. Copper, lead, zinc, cadmium, silver (and antimony) are associated in vein deposits that occur in Precambrian and Cambrian host rocks. These deposits are mainly confined to the northwest-trending western flank of Bare Mountain and probably represent the earliest period of mineralization on Bare Mountain.

The gold-molybdenum-arsenic-mercury (and antimony) mineralization associated with fluorite in breccias and breccia pipes on the northern and eastern margins of Bare Mountain may represent a late period of mineralization possibly related to either the Crater Flat caldera system to the east or to the Timber Mountain–Oasis Valley caldera complex to the north. Altered fragments of dike rock are present in fluorite-filled breccias at the Diamond Queen Mine on the east side of Bare Mountain. These dikes have been dated at 13.9 m.y. and are interpreted to be related to outer ring fracture related to the Crater Flat caldera (Carr, 1982, p. 9). It follows, therefore, that at least some stages of gold-molybdenum-arsenic-mercury mineralization are younger than 13.9 m.y.

The relationship of the mercury camps north of Meiklejohn Peak to the mineralization to the south is not clear. The Telluride camp contains some fluorite in breccia zones and trace gold is reported present. Our sampling at Telluride shows the presence of weak arsenic, molybdenum, and antimony values. The Telluride area may, therefore, be related to mineralization to the south at Diamond Queen–Sterling and may simply represent weaker, higher level exposures of a mineral system. Similarly, farther to the north on Yucca Mountain, the Thompson Mine deposit may represent an even higher level exposure of a mineral center where mercury deposits occur in volcanic host rocks in association with clay and opaline silica in large alteration zones.

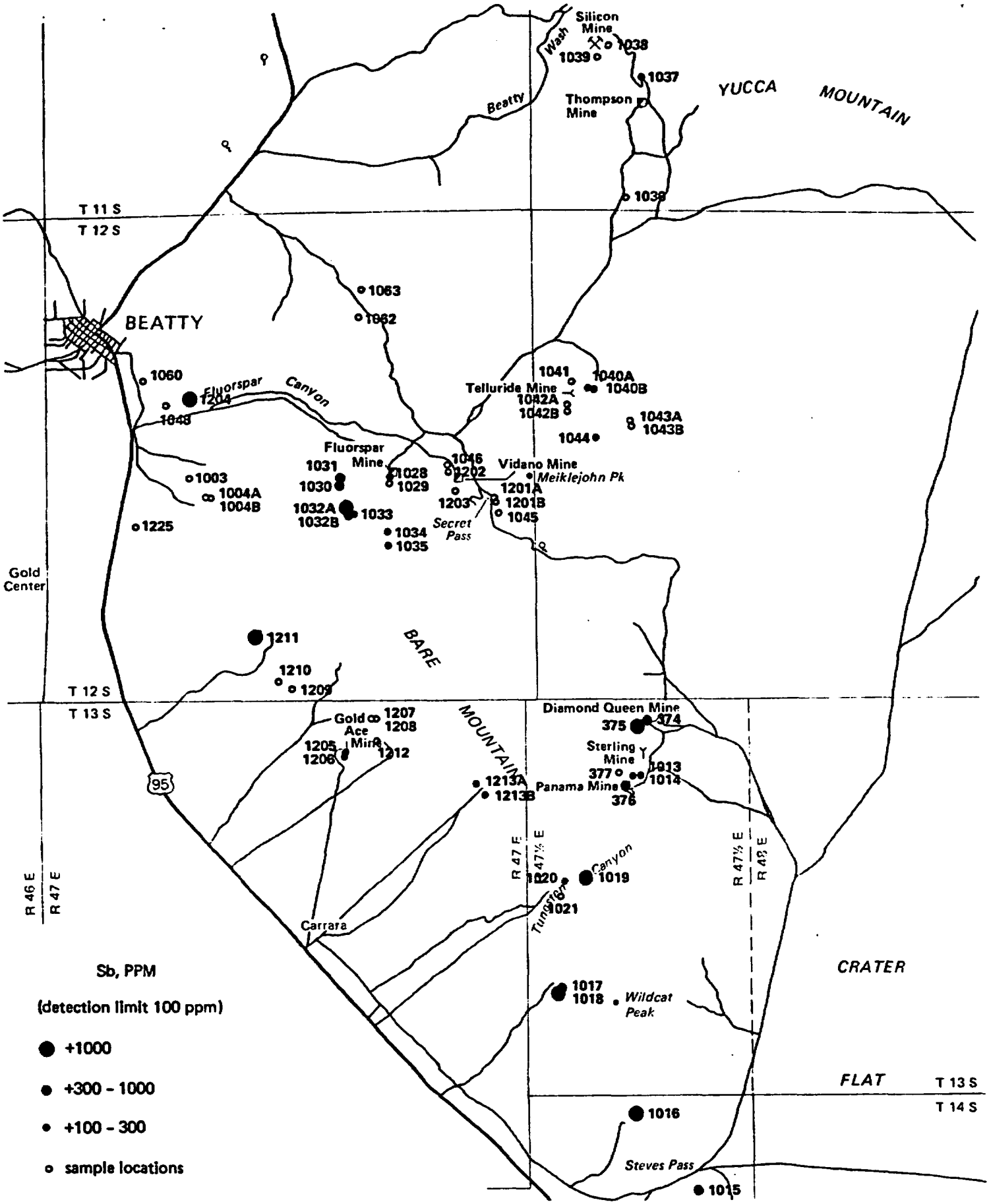

FIGURE 3. Geochemical map showing concentrations of antimony.

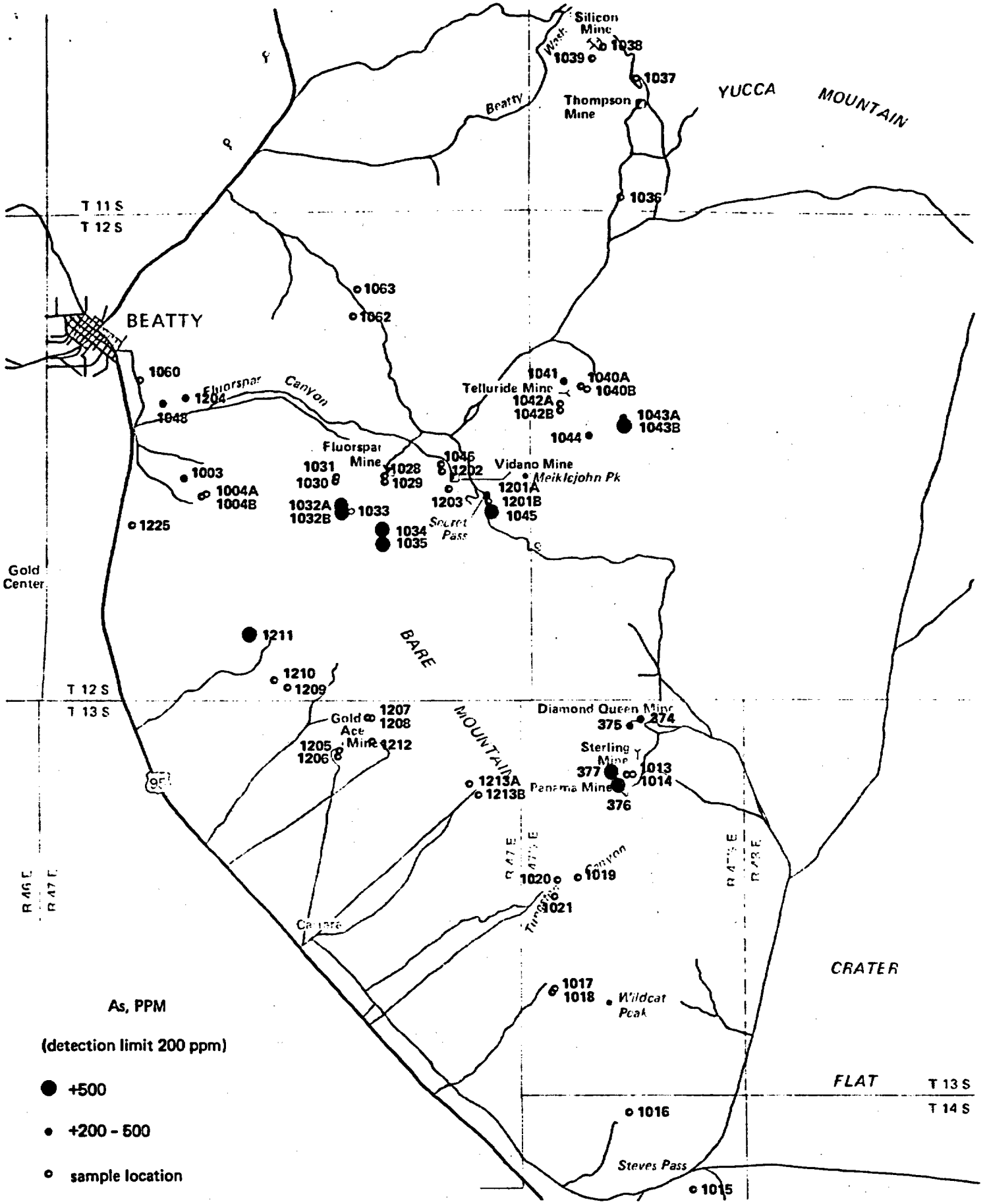

FIGURE 4. Geochemical map showing concentrations of arsenic.

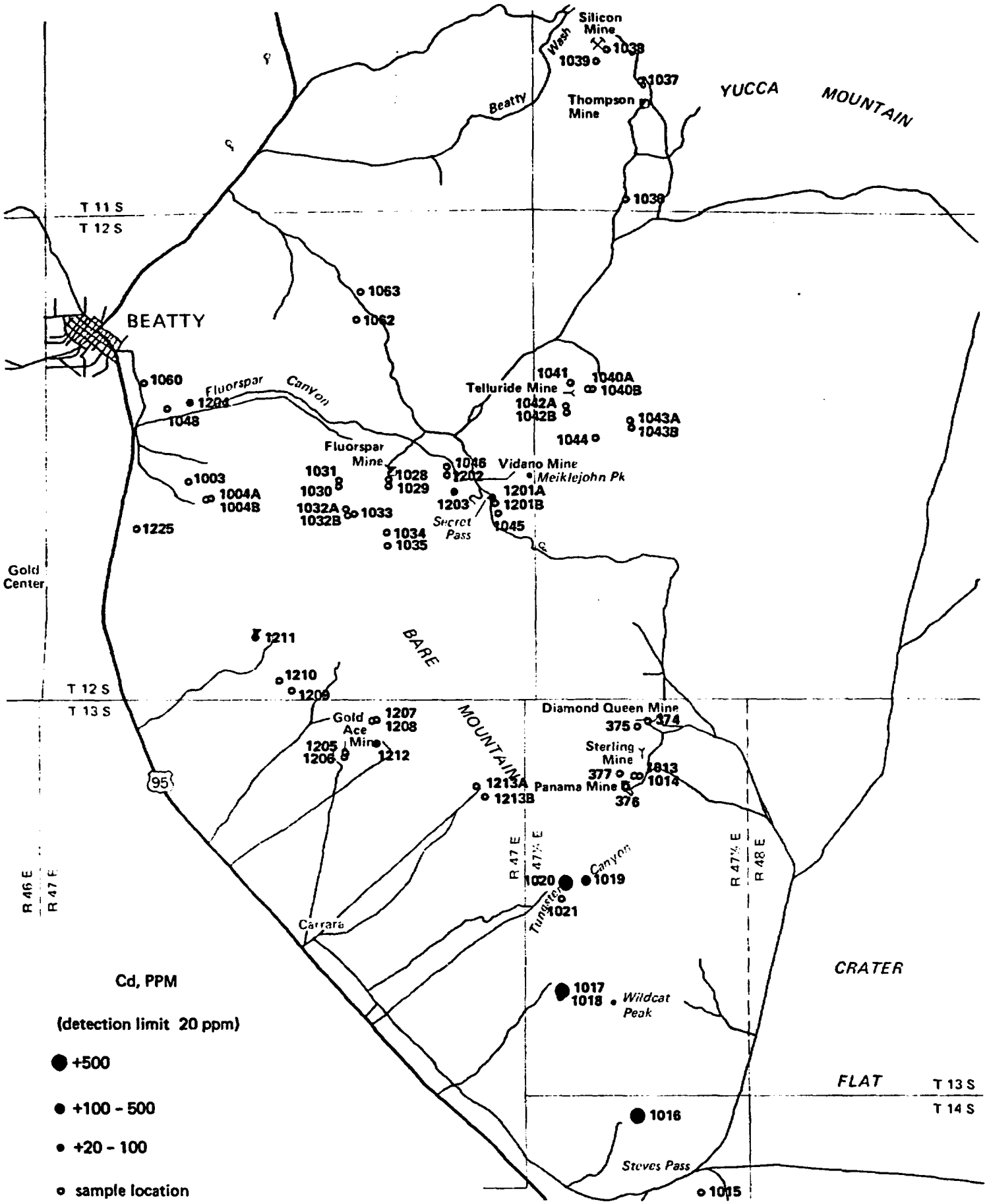

FIGURE 5. Geochemical map showing concentrations of cadmium.

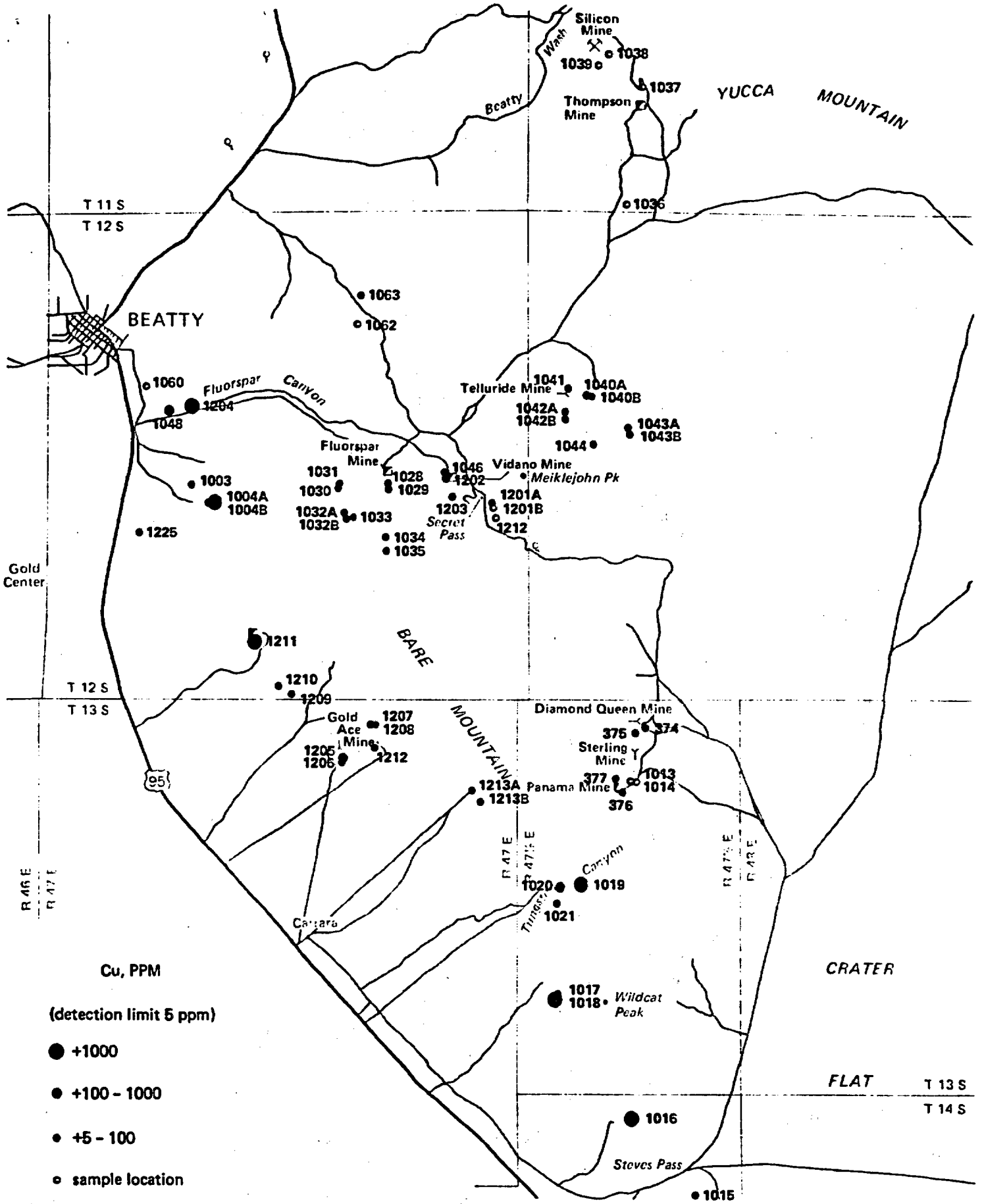

FIGURE 6. Geochemical map showing concentrations of copper.

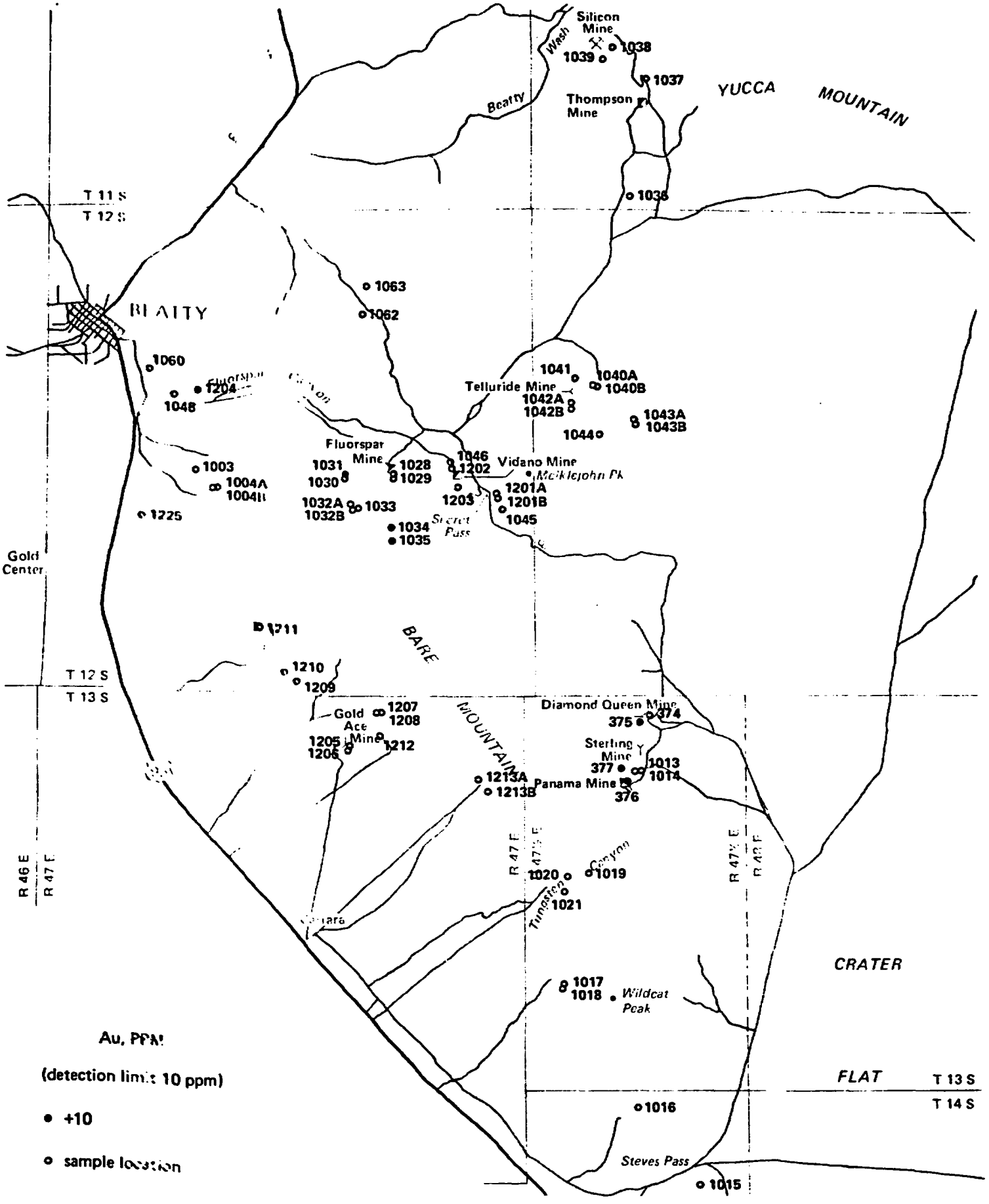

FIGURE 7. Geochemical map showing concentrations of gold.

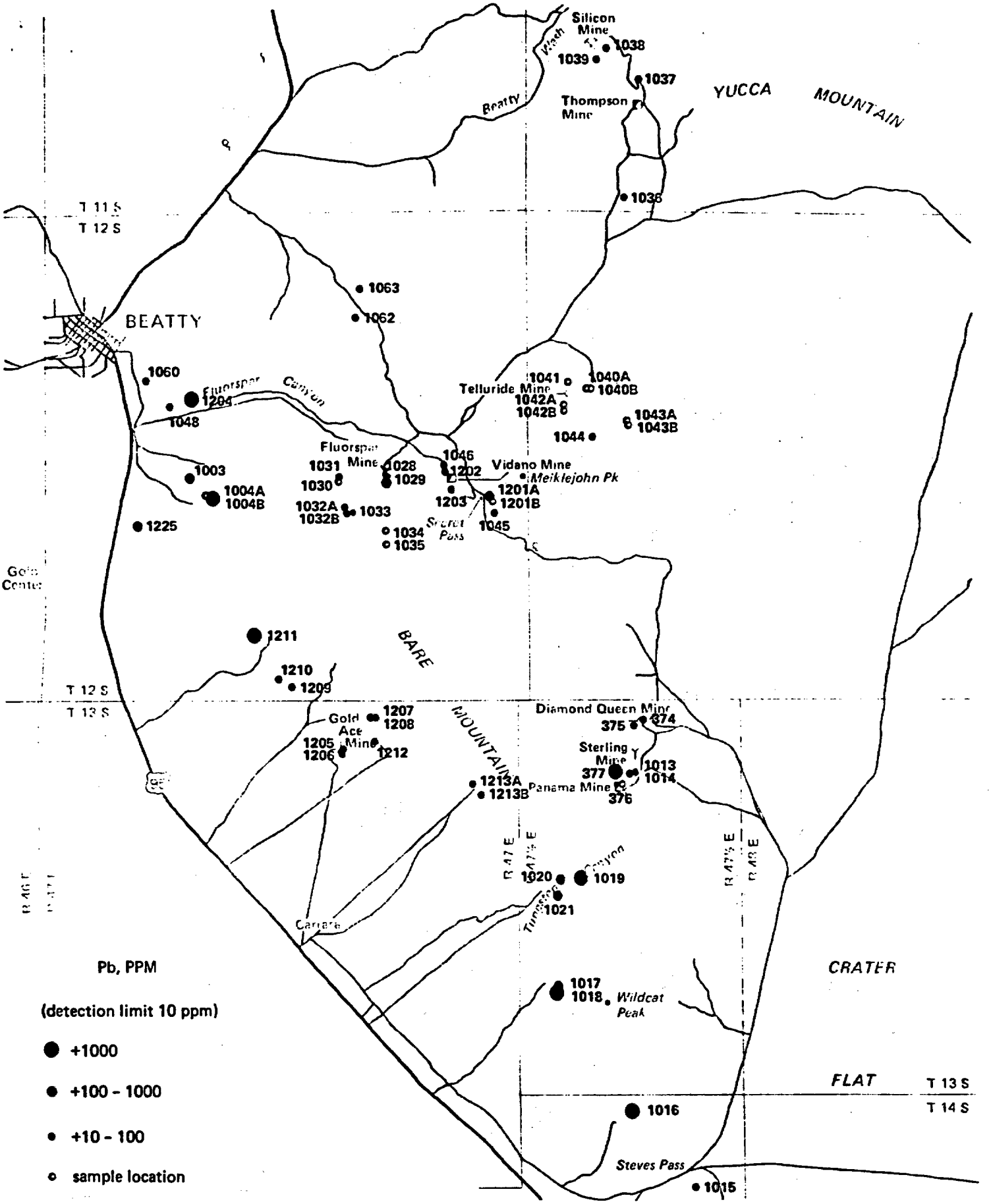

FIGURE 8. Geochemical map showing concentrations of lead.

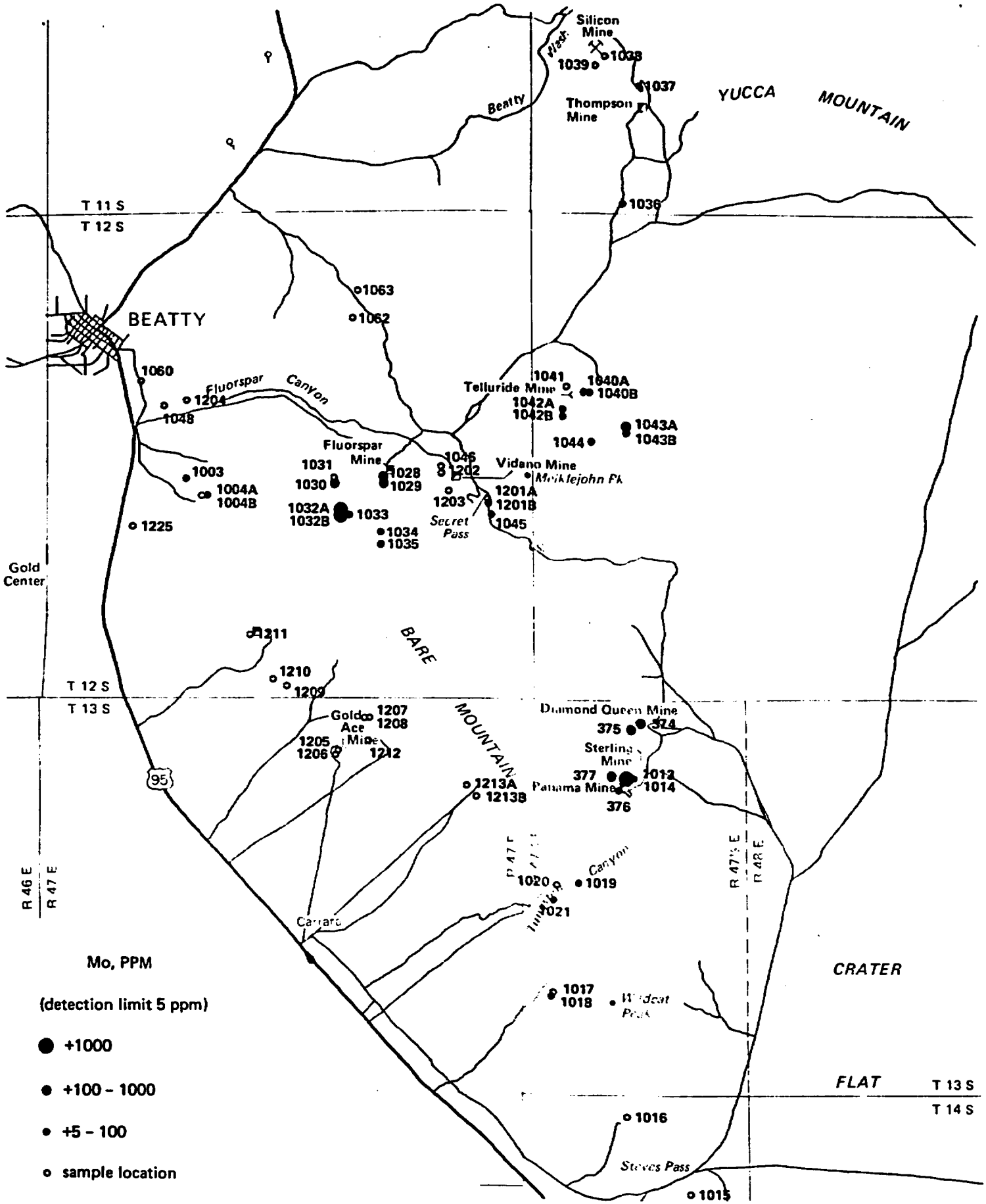

FIGURE 9. Geochemical map showing concentrations of molybdenum.

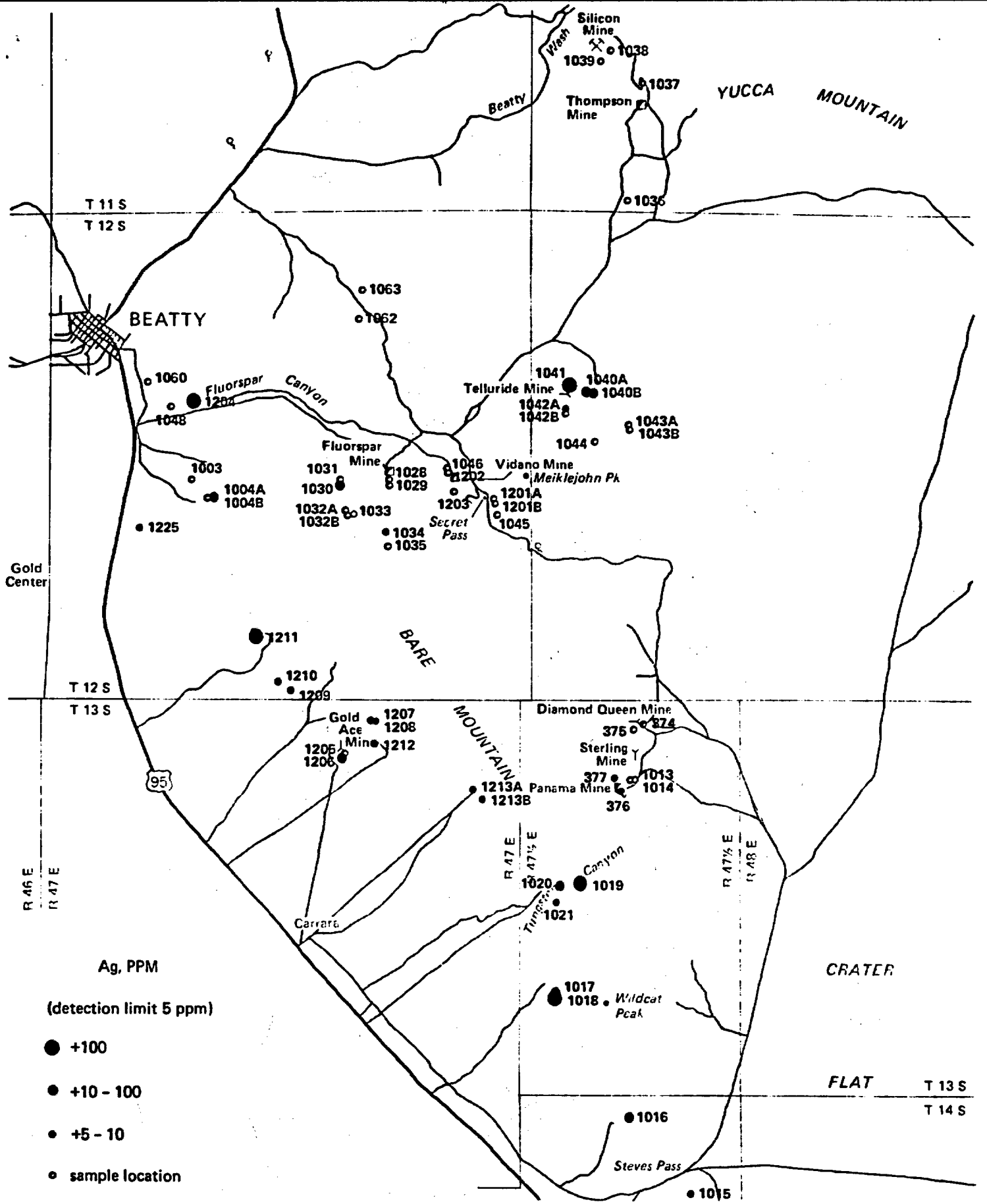

FIGURE 10. Geochemical map showing concentrations of silver.

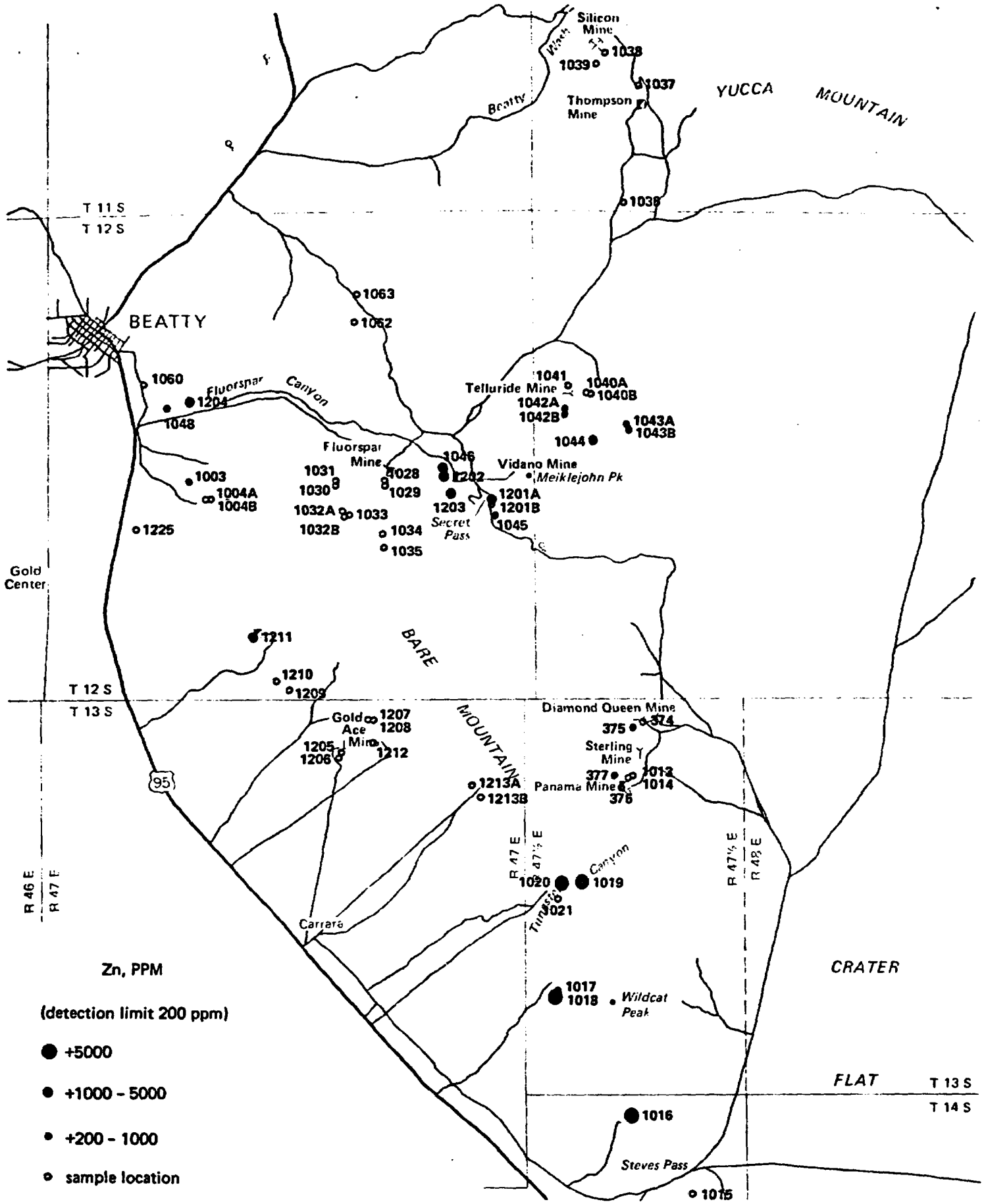

FIGURE 11. Geochemical map showing concentrations of zinc.

REFERENCES

Ahern, R., and Corn, R. M. (1981) Mineralization related to the volcanic center at Beatty, Nevada: Arizona Geological Society Digest, v. XIV, p. 283-286.

Bailey, E. H., and Phoenix, D. A. (1944) Quicksilver deposits in Nevada: Nevada Bureau of Mines and Geology Bulletin 41, p. 141-144.

Ball, S. H. (1907) A geologic reconnaissance in southwestern Nevada and south-eastern California: U.S. Geological Survey Bulletin 308, p. 218.

Byers, F. M., Jr., Carr, W. J., Orklid, P. P., Quinlivan, W. D., and Sargent, K. A. (1976) Volcanic suites and related cauldrons of Timber Mountain-Oasis Valley caldera complex, southern Nevada: U.S. Geological Survey Professional Paper 919, p. 70.

Carr, W. J. (1982) Volcano-tectonic history of Crater Flat, southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity: U.S. Geological Survey Open-file Report 82-457, p. 23.

Carper, A. F. (1921) Report on Thomas Group, Diamond Queen mining district, Nye County, Nevada: Nevada Bureau of Mines and Geology mining district file no. 228.

Christiansen, R. L., Lipman, P. E., Carr, W. J., Byers, F. M., Jr., Orklid, P. P., Sargent, K. A. (1977) Timber Mountain-Oasis Valley caldera complex of southern Nevada: Geological Society of America Bulletin, v. 88, p. 943-959.

Cornwall, H. R. (1972) Geology and Mineral deposits of southern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 77, p. 49.

Cornwall, H. R., and Kleinhampl, F. J. (1961) Geology of the Bare Mountain quadrangle, Nevada: U.S. Geological Survey Map GQ-157.

Garside, L. J. (1973) Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, p. 92.

Gianella, V. P. (1940) Report on the Harvey mercury property, near Beatty, Nevada: Nevada Bureau of Mines and Geology mining district file no. 228.

Kral, V. E. (1951) Mineral resources of Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 50, p. 60-69.

Lincoln, F. C. (1923) Mining districts and mineral resources of Nevada: Reno, Nevada, Nevada Newsletter Publishing Co., p. 167-169.

Modnikov, I. S. (1979) Distribution pattern of uranium-molybdenum mineralization in volcanic-tectonic complexes of regions of continental vulcanism: International Geology Review, v. 21, no. 1, p. 11-24.

Nevada Bureau of Mines and Geology (1974) Anonymous report: Nevada Bureau of Mines and Geology mining district file no. 228, item 1.

Papke, K. G. (1979) Fluorspar in Nevada: Nevada Bureau of Mines and Geology Bulletin 93, p. 40-47.

APPENDIX 1. Sample descriptions.

Sample Number	Location	Description
374	Quad: Bare Mtn. 15', S11,T13S,R47½E UTM: 4076880N, 0532400E Gold Spar (Diamond Queen), Bare Mtn. district	Fluorite-rich breccia; fragments of dolomite & shale, minor rhyolite dike fragments, FeOx, clay, breccia fragments, kaolinized; jarosite, calcite.
375	Quad: Bare Mtn. 15', S11,T13S,R47½E UTM: 4076800N, 0532250E Gold Spar (Diamond Queen), Bare Mtn. district	Cellular gossan breccia, white quartz, calcite, purple fluorite.
376	Quad: Bare Mtn. 15', S5,T13S,R48E UTM: 4075600N, 0531900E Ambrose Pit (Sterling), Bare Mtn. district	FeOx-stained brecciated siltstone, shale, silicified jasperoid, vugs lined with calcite, possibly some fluorite.
377	Quad: Bare Mtn. 15', S5,T13S,R48E(?) UTM: 4075800N, 0531900E Sterling gold mine, Bare Mtn. district	Brecciated dolomite with fluorite, kaolinized shale with jarosite, massive jasperoid with jarosite crystals.
1003	Quad: Bare Mtn. 15', S20,T12S,R47E UTM: 4081800N, 0523400E Balik claims, Bare Mtn. district	Limonite-MnO_2 gossan, specularite bands and coatings, some mammillary; irridescent limonite, very crumbly.
1004A	Quad: Bare Mtn. 15', S21,T12S,R47E UTM: 4081400N, 0523750E Balik claims (adit), Bare Mtn. district	Bull quartz vein material, moderately fractured with FeOx (mostly limonite) coating surfaces, flecks of pyrite/hematite, MnO_2 (surface coating & dendritic), pods & blotches of sericite, some fresh and bleached pods and veinlets of dark green, micaceous mineral, fragile.
1004B	Quad: Bare Mtn. 15', S21,T12S,R47E UTM: 4081400N, 0523750E Balik claims (above adit), Bare Mtn. district	White bull quartz vein, moderately fractured, FeOx-MnO_2 stained on fresh and fracture surfaces, pods of gossany material, with stringers and surface coatings of malachite; dendritic pyrolusite, country rock highly sericitized, almost mica schist, within pods of gossany material, smaller pods of chalcopyrite, rock very heavy/dense.
1013	Quad: Bare Mtn. 15', T13S,R48E UTM: 4075845N, 0532200E Sterling Mine, Bare Mtn. district	Gossan/breccia with disseminated, crystalline coatings and veinlets of white to purple fluorite, limonite/hematite staining the fluorite, breccia appears to be crystalline limestone/dolomite, fluorite acts as cement in breccia/shear, coats vugs.
1014	Quad: Bare Mtn. 15', T13S,R48E UTM: 4075845N, 0532200E Sterling Mine, Bare Mtn. district	Medium-gray, fine-grained sandstone breccia cemented with bleached calcite. Minor limonite-hematite staining from hematite grains dispersed in sandstone; calcite crystals line vugs, minor blotches of MnO_2, sandstone grains subrounded.
1015	Quad: Bare Mtn. 15', T14S,R47E UTM: 4067700N, 0533450E Black Marble Mtn. claim (north end), Bare Mtn. district	Highly altered, bleached shear/gouge, medium gray limestone, with FeOx staining, fractures/vugs lined with mammillary white calcite, calcite veinlets cement shear; some breccia.
1016	Quad: Bare Mtn. 15', T14S,R47E UTM: 4069150N, 0532250E Silver Peak claims, Bare Mtn. district	Brownish, bleached, sericitized shear/gouge material with pods and stringers argentiferous galena; fine-grained pods oxidized pyrite/hematite; drusy quartz cement; fine-grained copper and iron phosphate interspersed in galena pods; country rock phyllitic, almost schistose, rocks heavy/dense.
1017	Quad: Bare Mtn. 15', T13S,R48E UTM: 4071430N, 0530770E Lookout #1 claim (adit), Bare Mtn. district	Pyritic, phyllitic schist, quartz veinlets, oxidized pyrite/hematite; stained, seriticized, quartz/sericite banding.
1018	Quad: Bare Mtn. 15', T13S,R48E UTM: 4071430N, 0530770E Lookout #1 claims (N10E shaft), Bare Mtn. district	White quartz vein/breccia, seriticized, stained with MnO_2 and limonite; malachite, chrysocolla, hemimorphite coat surfaces and fill vugs; disseminated pods and stringers hematite/pyrite, minor bleaching, rock heavy/dense, minor patches of gossan, drusy quartz, patches of schist.
1019	Quad: Bare Mtn. 15', T13S,R48E UTM: 4073730N, 0531200E Bonanza claim, Bare Mtn. district	Pinkish, slightly bleached, sacchroidal quartzite, with pods and stringers; fresh and altered argentiferous galena, MnO_2 blotches and dendritic, crystalline and massive malachite, galena in sprays in shear/gouge, minor sericite.
1020	Quad: Bare Mtn. 15', T13S,R48E UTM: 4073600N, 0530750E Tungsten Canyon #2 claim, Bare Mtn. district	White quartz vein material, slightly fractured with FeOx stains, pyrite ghosts, dendritic and massive MnO_2, gossan, sericite.

APPENDIX 1. Sample descriptions (continued).

Sample Number	Location	Description
1021	Quad: Bare Mtn. 15', 113S,R48E UTM: 4073[illegible]N, 0630760E Tungsten Canyon #3, Bare Mtn. district	White quartz vein, slightly fractured, limonite stained, pods of country rock, light, greenish-gray quartzite, euhedral quartz, crystals coat surfaces and fill vugs, pyrite ghosts, dendritic MnO_2.
1028	Quad: Bare Mtn. 15', 123,T12S,R47E UTM: 4081[illegible]N, 0627350E Daisy Mine 400 level, Bare Mtn. district	Purple fluorite, crystalline & massive, with minor calcite crystals; minor limonite coating surface; rock fractured, almost brecciated.
1029	Quad: Bare Mtn. 15', 123,T12S,R47E UTM: 4081[illegible]N, 0627350E Daisy Mine 1[illegible] level, Bare Mtn. district	Limonite-stained mudstone/gouge with nodules; fluorite filling cavities, banding.
1030	Quad: Bare Mtn. 15', 122,T12S,R47E UTM: 4081[illegible]N, 0626750E Shorter White claims, Bare Mtn. district	Blue, green, purple crystalline fluorite vein material, fine to massive banding, limonite staining.
1031	Quad: Bare Mtn. 15', 122,T12S,R47E UTM: 4081[illegible]N, 0626750E Shorter White claim, Bare Mtn. district	Limonite-stained, kaolinized gouge material, dolomite, massive fluorite.
1032A	Quad: Bare Mtn. 15', 122,T12S,R47E UTM: 4081[illegible]N, 0626560E Shorter White claim, Bare Mtn. district	Heavily FeOx-stained gouge, fluorite crystals & bands, calcite.
1032B	Quad: Bare Mtn. 15', 122,T12S,R47E UTM: 4081[illegible]N, 0626560E Shorter White claim, Bare Mtn. district	Limonite-stained gouge, calcite, cellular boxworks, dark gray silicified limestone/dolomite, fluorite crystals coat surfaces & fill cavities.
1033	Quad: Bare Mtn. 15', 122,T12S,R47E UTM: 4081[illegible]N, 0626560E Shorter White claim, Bare Mtn. district	Crystalline yellow & purple fluorite, some banding.
1034	Quad: Bare Mtn. 15', 123,T12S,R47E UTM: 4080[illegible]N, 0627420E Lode Queen #2 claim, Bare Mtn. district	Limestone breccia cemented with crystalline calcite, abundant FeOx staining.
1035	Quad: Bare Mtn. 15', 123,T12S,R47E UTM: 4080[illegible]N, 0627400E Lode Queen claim, Bare Mtn. district	Heavily FeOx-stained limestone gouge material cemented with crystalline calcite, cellular boxworks, veining.
1036	Quad: Bare Mtn. 15', 123,T12S,R47E UTM: 4087[illegible]N, 0632100E Zeolite Deposit claim, Bare Mtn. district	White, light, slightly vuggy, massive zeolite.
1037	Quad: Bare Mtn. 15', 111S,R48E UTM: 4087[illegible]N, 0632100E Thompson Mine, Bare Mtn. district	Opaline vein & breccia, bearing finely disseminated cinnabar and possibly carnotite; host rock bleached & altered rhyolite.
1038	Quad: Bare Mtn. 15', 119,T11S,R48E UTM: 4090[illegible]N, 0631600E White claims, Bare Mtn. district	Opaline sinter, vuggy, coated with calcite, cinnabar interspersed throughout matrix, in fractures and breccia, calcareous.
1039	Quad: Bare Mtn. 15', 111S,R48E UTM: 4090[illegible]N, 0631500E Silicon Mine, near Bare Mtn. district	White, bleached, siliceous, slightly porphyritic rock coated with opaline silica calcite, alaskite dike.
1040A	Quad: Bare Mtn. 15', 112S,R48E UTM: 4083[illegible]N, 0631160E Telluride Mine (lower working), Bare Mtn. district	Medium gray to muddy brown limestone breccia with hematite staining, crystalline calcite cement with intergrown fluorite crystals, minor dendritic pyrolusite, calcite veinlets.
1040B	Quad: Bare Mtn. 15', 112S,R48E UTM: 4083[illegible]N, 0631160E Telluride Mine (lower working), Bare Mtn. district	Sandstone breccia, cellular boxworks, minor FeOx-MnO_2 staining, brecciated fluorite crystals with abundant cavities, calcareous cement.
1041	Quad: Bare Mtn. 15', 112S,R48E UTM: 4083[illegible]N, 0630950E Telluride Mine area, near Bare Mtn. district	Purplish-gray, altered, rhyolitic intrusive, quartz eyes, cellular boxworks, limonitic-MnO_2 stained.
1042A	Quad: Bare Mtn. 15', 118,T12S,R48E UTM: 4083[illegible]N, 0630900E Telluride Mine ([illegible]), Bare Mtn. district	Medium gray limestone stained with hematite, fractured, some breccia.

APPENDIX 1. Sample descriptions (continued).

Sample	Location	Description
[illegible]	Quad: Bare Mtn. 15', S18,T12S,R48E UTM: 4083700N, 0530900E Telluride Mine (main), Bare Mtn. district	Kaolinized, white to yellow to purple vein material, (altered fluorite) cellular boxworks, crumbly, slicks.
[illegible]	Quad: Bare Mtn. 15', S17,T12S,R48E UTM: 4083000N, 0532200E Unnamed prospect, Bare Mtn. district	Gossan, dense, extremely fine boxworks, FeOx stained.
[illegible]	Quad: Bare Mtn. 15', S17,T12S,R48E UTM: 4083000N, 0532200E Unnamed prospect, Bare Mtn. district	Gossany breccia, rest as 1043A.
[illegible]	Quad: Bare Mtn. 15', S18,T12S,R48E UTM: 4082640N, 0531575E Bare Mtn. district	Gossany limestone/dolomitic breccia, large cellular boxworks, heavily FeOx stained, fragments fractured, some silicification.
[illegible]	Quad: Bare Mtn. 15', S24,T12S,R48E UTM: 4081200N, 0529480E Bare Mtn. district	Gossan, dense, boxworks, FeOx-MnO_2 stained.
[illegible]	Quad: Bare Mtn. 15', S23,T12S,R48E UTM: 4081920N, 0528480E BVC claim, Bare Mtn. district	Gossan, FeOx-MnO_2, vuggy, specularite, flow banding.
[illegible]	Quad: Bare Mtn. 15', S17,T12S,R47E UTM: 4083380N, 0522920E Wildcat claim, near Bare Mtn. district	Platy gossan, MnO_2 stained, minor FeOx, specularite, flow banding.
[illegible]	Quad: Bare Mtn. 15', S10,T12S,R47E UTM: 4084900N, 0526730E BVC claim, Bare Mtn. district	Vesicular rhyolite filled with opaline silica, cinnabar coats surface, minor MnO_2.
1063	Quad: Bare Mtn. 15', S10,T12S,R47E UTM: 4085220N, 0526810E Bare Mtn. district	Blackish-gray, equigranular igneous extrusive with fine-grained red crystals, amygdaloidal, dark micas, acicular pyroxene.
1064	Quad: Bare Mtn. 15', S19,T11S,R48E UTM: 4091100N, 0530880E Bare Mtn. district	Heavily hematite-stained, bleached rhyolite, cut with siliceous veinlets, MnO_2 stains.
1201[illegible]	Quad: Bare Mtn. 15', S24,T12S,R47E UTM: 4081450N, 0529440E Secret Pass claims, Bare Mtn. district	Limonite-stained gossan, dense boxworks.
1201[illegible]	Quad: Bare Mtn. 15', S24,T12S,R47E UTM: 4081450N, 0529440E Secret Pass claims, Bare Mtn. district	Calcite & quartz vein material, slightly brecciated, hematite stained, oxidized Fe minerals.
1201[illegible]	Quad: Bare Mtn. 15', S24,T12S,R47E UTM: 4081450N, 0529440E Secret Pass claims, Bare Mtn. district	Limonite stained gossan, dense, boxworks.
1201[illegible]	Quad: Bare Mtn. 15', S24,T12S,R47E UTM: 4081450N, 0529440E Secret Pass claims, Bare Mtn. district	Calcite & quartz vein material, slightly brecciated, hematite stained, oxidized Fe minerals.
12[illegible]	Quad: Bare Mtn. 15', S23,T12S,R47E UTM: 4082000N, 0528460E BVC claim, Bare Mtn. district	Heavily FeOx-MnO_2-stained hydrothermal vein material, scaly, botryoidal, specularite.
12[illegible]	Quad: Bare Mtn. 15', S24,T12S,R47E UTM: 4081200N, 0528700E Vidano Group claim, Bare Mtn. district	Gossany, medium gray limestone, calcite & chalcedony fills vugs, specularite-coated boxworks, some silicification.
12[illegible]	Quad: Bare Mtn. 15', S17,T12S,R47E UTM: 4083280N, 0523400E Wildcat claim, Bare Mtn. district	White to gray quartz vein, fractured, copper minerals coat surfaces, minor sulfides, minor MnO_2.
12[illegible]	Quad: Bare Mtn. 15', S3,T13S,R47E UTM: 4076290N, 0526460E Gold Ace claim, Bare Mtn. district	White, anhedral quartz vein/breccia material, minor oxidized sulfide, along contact between vein & quartzite.

APPENDIX 1. Sample descriptions (continued).

Sample Number	Location	Description
1206	Quad: Bare Mtn. 15', S3,T13S,R47E UTM: 4076290N, 0526460E Gold Ace claim, Bare Mtn. district	Gouge material, slicks, sericite, in hematite-stained phyllitic rock.
1207	Quad: Bare Mtn. 15', S2,T13S,R47E UTM: 4077010N, 0527010E Arista Mine, Bare Mtn. district	Medium gray quartzite with quartz vein, crystalline pyrite & chalcopyrite disseminated throughout quartzite, sericite, minor FeOx-MnO_2 staining.
1208	Quad: Bare Mtn. 15', S2,T13S,R47E UTM: 4077010N, 0527010E Arista Mine, Bare Mtn. district	Light gray, fine-grained quartzite, minor FeOx staining, minor stringer sulfide, white quartz vein material.
1209	Quad: Bare Mtn. 15', S34,T12S,R47E UTM: 4077550N, 0525500E Irene claim, Bare Mtn. district	White quartz vein cutting Fe-stained quartzite, sericite with distinct schistosity, minor fine boxworks, phyllite zones.
1210	Quad: Bare Mtn. 15', S33,T12S,R47E UTM: 4077690N, 0525370E Irene claim, Bare Mtn. district	Pinkish gray quartzite, breccia cemented with massive white quartz, minor FeOx-MnO_2 staining, hematite-grains.
1211	Quad: Bare Mtn. 15', S33,T12S,R47E UTM: 4078590N, 0524795E Irene claim, Bare Mtn. district	White quartz vein material highly fractured & brecciated, FeOx-MnO_2 stained, oxidized sulfide, Cu minerals coating surface, sericite, minor gossany pods.
1212	Quad: Bare Mtn. 15', S2,T13S,R47E UTM: 4076480N, 0527260E Irene claim, Bare Mtn. district	Gossan with quartz vein, heavily FeOx stained, dense, cellular boxworks.
1213A	Quad: Bare Mtn. 15', S12,T13S,R47E UTM: 4075500N, 0529156E Carrara Quarry claim, Bare Mtn. district	Medium gray limestone gouge, calcite veining, kaolinized.
1213B	Quad: Bare Mtn. 15', S12,T13S,R47E UTM: 4075500N, 0529156E Carrara Quarry claim, Bare Mtn. district	White, crystalline platy limestone/marble, minor limonite staining, dendritic pyrolusite.
1225	Quad: Bare Mtn. 15', S20,T12S,R47E UTM: 4080830N, 0522350E Bare Mtn. district	Massive fractured quartz vein with fresh & chloritized biotite in bands, stringers & pods. FeOx stained, dendritic pyrlousite, siderite fragments associated with biotite.

APPENDIX 2. Sample analyses.[1]

Sample no.	374	375	376	1003	1004A	1004B	1013
ELEMENT							
Fe% (.05)	3	3	2	>20	0.3	10	5
Mg% (.02)	7	7	3	0.3	0.02	0.05	1.5
Ca% (.05)	20	15	10	0.2	N	0.15	>20
Ti% (.002)	0.02	0.007	0.3	0.005	0.03	0.03	0.05
Mn (10)	200	500	700	>5000	200	100	20
Ag (.5)	L	L	5	N	N	20	N
As (200)	500	500	1000	500	N	N	N
Au (10)	N	30	70	N	N	N	N
B (10)	N	N	50	150	10	20	N
Ba (20)	30	50	150	5000	20	20	20
Be (1)	1	2	1.5	50	N	N	1
Bi (10)	N	N	N	N	N	50	N
Cd (20)	N	N	N	N	N	N	N
Co (5)	N	N	7	50	7	15	N
Cr (10)	15	10	20	15	10	10	N
Cu (5)	15	20	30	70	7	7000	20
La (20)	20	20	20	20	20	N	20
Mo (5)	1000	200	70	20	N	30	2000
Nb (20)	N	N	N	N	N	N	N
Ni (5)	5	7	15	30	5	70	L
Pb (10)	50	100	150	700	N	1500	100
Sb (100)	1000	2000	500	N	N	N	100
Sc (5)	N	N	5	N	N	N	N
Sn (10)	N	N	N	N	N	N	N
Sr (100)	200	L	L	L	N	N	100
V (10)	30	70	50	10	10	10	10
W (50)	N	N	N	N	N	N	N
Y (10)	20	15	10	200	N	N	50
Zn (200)	N	300	N	1000	N	N	N
Zr (10)	30	L	70	N	L	N	50
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1014	1015	1016	1017	1018	1019	1020
ELEMENT							
Fe% (.05)	1	1.5	1.5	7	3	3	1
Mg% (.02)	5	7	3	7	10	5	0.7
Ca% (.05)	>20	>20	10	15	20	10	7
Ti% (.002)	0.07	0.2	0.15	0.5	0.05	0.2	0.015
Mn (10)	50	300	300	70	1000	3000	1000
Ag (.5)	N	1	2000	20	2000	700	30
As (200)	N	N	N	N	N	N	N
Au (10)	N	N	N	N	N	N	N
B (10)	20	70	150	200	50	100	30
Ba (20)	70	150	>5000	300	2000	700	50
Be (1)	1	1	1	5	N	1.5	N
Bi (10)	N	N	N	N	N	N	N
Cd (20)	N	N	>500	N	>500	500	>500
Co (5)	N	10	7	30	10	10	7
Cr (10)	N	30	30	150	15	30	10
Cu (5)	10	15	3000	70	7000	3000	300
La (20)	50	20	30	150	20	50	20
Mo (5)	100	N	N	N	20	10	L
Nb (20)	N	N	N	30	N	N	N
Ni (5)	L	15	10	70	7	7	5
Pb (10)	70	50	>20000	200	>20000	20000	1000
Sb (100)	100	1000	>5000	700	10000	3000	100
Sc (5)	N	5	5	20	5	10	L
Sn (10)	N	N	N	N	N	N	N
Sr (100)	100	1000	>5000	700	700	150	100
V (10)	20	50	30	150	20	30	10
W (50)	N	N	N	N	N	5000	3000
Y (10)	50	20	10	70	15	200	15
Zn (200)	N	N	>10000	N	>10000	10000	10000
Zr (10)	100	50	70	300	50	300	50
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1021	1028	1029	1030	1031	1032A	1032B
ELEMENT							
Fe (.05)	1	0.5	2	0.2	2	1.5	1.5
Mg% (.02)	0.07	2	1	0.15	0.2	0.2	3
Ca% (.05)	0.2	>20	15	>20	20	20	15
Ti% (.002)	0.15	0.1	0.1	0.007	0.02	0.02	0.03
Mn (10)	30	100	150	L	100	150	300
Ag (.5)	1.5	N	N	10	L	N	N
As (200)	N	N	700	L	200	1500	1000
Au (10)	N	N	N	20	N	N	N
B (10)	30	30	50	N	15	N	L
Ba (20)	300	50	30	20	100	30	30
Be (1)	N	1	2	N	L	3	L
Bi (10)	N	N	L	N	N	N	L
Cd (20)	N	N	N	N	N	N	N
Co (5)	5	L	7	N	5	L	L
Cr (10)	10	15	15	N	15	L	10
Cu (5)	10	5	7	10	15	5	5
La (20)	20	20	50	20	L	20	20
Mo (5)	20	200	500	700	2000	2000	>2000
Nb (20)	N	N	L	N	N	N	N
Ni (5)	2	7	7	10	10	L	5
Pb (10)	150	50	150	70	70	70	50
Sb (100)	N	150	L	1000	1000	2000	1500
Sc (5)	5	5	7	N	N	L	N
Sn (10)	N	N	15	N	N	N	N
Sr (100)	L	N	N	200	200	N	L
V (10)	20	100	70	20	50	200	150
W (50)	10000	N	N	N	N	N	N
Y (10)	15	20	70	70	30	15	10
Zn (200)	N	N	N	N	N	N	N
Zr (10)	500	50	150	N	10	15	10
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1033	1034	1035	1036	1037	1038	1039
ELEMENT							
Fe% (.05)	N	3	7	0.05	0.07	0.1	L
Mg% (.02)	0.03	0.3	0.5	0.15	0.1	0.01	L
Ca% (.05)	>20	>20	10	0.2	0.2	0.1	0.1
Ti% (.002)	L	0.07	0.5	0.07	0.1	0.01	0.07
Mn (10)	L	1500	1000	15	15	1	10
Ag (.5)	N	0.5	N	N	N	N	N
As (200)	N	2000	5000	N	N	N	N
Au (10)	N	L	15	N	N	N	N
B (10)	N	N	N	20	100	70	10
Ba (20)	N	50	150	30	20	20	300
Be (1)	1.5	L	1.5	L	N	N	1.5
Bi (10)	N	N	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	N
Co (5)	N	L	15	L	L	N	N
Cr (10)	N	20	70	L	10	15	10
Cu (5)	N	15	30	L	L	1	L
La (20)	L	20	30	L	20	1	L
Mo (5)	70	70	20	7	10	1	N
Nb (20)	N	N	L	30	30	20	L
Ni (5)	N	7	20	5	7	5	5
Pb (10)	20	50	50	70	30	30	70
Sb (100)	100	100	300	N	N	N	N
Sc (5)	N	5	10	L	N	N	N
Sn (10)	N	N	N	N	N	N	N
Sr (100)	150	200	N	L	N	N	N
V (10)	10	30	100	15	15	15	15
W (50)	N	N	N	N	N	N	N
Y (10)	N	20	30	L	L	N	N
Zn (200)	N	N	N	N	N	N	N
Zr (10)	N	20	150	50	200	150	70
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1040A	1040B	1041	1042A	1042B	1043A	1043B
ELEMENT							
Fe% (.05)	0.5	0.15	0.7	0.15	15	20	15
Mg% (.02)	3	1.5	0.3	10	3	0.03	1
Ca% (.05)	20	20	0.3	20	7	0.7	1
Ti% (.002)	0.15	0.015	0.3	0.005	0.02	0.02	0.05
Mn (10)	300	300	500	200	700	1000	200
Ag (.5)	15	50	150	0.5	L	N	N
As (200)	N	N	500	N	N	1000	500
Au (10)	N	N	N	N	N	N	N
B (10)	30	10	50	N	50	20	150
Ba (20)	>5000	>5000	1000	L	150	150	150
Be (1)	N	N	1	N	10	15	2
Bi (10)	N	N	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	N
Co (5)	N	N	5	N	30	20	15
Cr (10)	20	10	L	10	15	L	15
Cu (5)	15	50	15	L	15	20	30
La (20)	20	L	30	L	L	20	20
Mo (5)	10	10	L	N	70	200	15
Nb (20)	N	N	N	N	N	N	N
Ni (5)	L	L	L	N	70	50	50
Pb (10)	30	50	30	20	50	20	20
Sb (100)	N	100	N	N	N	N	N
Sc (5)	L	N	L	N	10	N	5
Sn (10)	N	N	N	N	N	N	N
Sr (100)	1000	700	N	150	150	N	150
V (10)	50	30	70	15	150	70	100
W (50)	N	N	N	N	N	N	N
Y (10)	15	15	15	L	100	50	50
Zn (200)	N	N	N	N	1000	1000	300
Zr (10)	70	15	150	30	10	30	100
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1044	1045	1046	1048	1060	1062	1063
ELEMENT							
Fe% (.05)	10	15	>20	>20	0.5	0.3	7
Mg (.02)	5	0.2	1	0.3	0.07	0.3	3
Ca% (.05)	15	0.7	2	0.7	0.5	0.3	5
Ti% (.002)	0.005	0.07	0.02	0.003	0.1	0.05	0.7
Mn (10)	200	500	2000	100	300	700	1000
Ag (.5)	N	N	N	N	N	N	N
As (200)	300	700	500	200	N	N	N
Au (10)	N	N	N	N	N	N	N
B (10)	N	50	N	N	30	30	N
Ba (20)	30	>5000	1000	700	200	L	1000
Be (1)	L	7	3	1	3	5	N
Bi (10)	N	N	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	N
Co (5)	N	5	150	50	5	N	20
Cr (10)	L	30	10	10	10	L	100
Cu (5)	20	50	70	700	L	L	50
La (20)	N	N	N	N	20	L	30
Mo (5)	10	50	N	N	N	N	N
Nb (20)	N	N	N	N	L	20	N
Ni (5)	20	300	500	150	5	5	70
Pb (10)	300	50	20	15	50	50	30
Sb (100)	100	N	N	N	N	N	N
Sc (5)	N	10	N	N	N	L	20
Sn (10)	N	N	N	N	N	N	N
Sr (100)	N	150	N	N	200	100	500
V (10)	70	200	50	500	20	L	200
W (50)	N	N	N	N	N	N	N
Y (10)	10	20	30	15	10	20	20
Zn (200)	2000	700	2000	200	N	N	N
Zr (10)	N	30	N	N	100	30	200
Th (100)	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1201A	1201B	1202	1203	1204	1205	1206	1207
ELEMENT								
Fe% (.05)	5	0.1	>20	10	0.2	1	2	2
Mg% (.02)	0.5	L	0.2	0.2	1.5	0.15	2	1
Ca% (.05)	10	1	0.3	0.7	7	0.3	7	2
Ti% (.002)	0.03	0.007	L	0.002	0.07	0.07	0.3	0.2
Mn (10)	>5000	200	>5000	3000	150	30	150	1000
Ag (.5)	N	N	N	L	700	10	15	1
As (200)	200	N	500	N	200	N	N	N
Au (10)	N	N	N	N	30	N	N	N
B (10)	50	10	20	30	L	15	200	20
Ba (20)	>5000	500	1500	>5000	100	100	300	300
Be (1)	2	L	3	10	L	1	3	2
Bi (10)	N	N	N	N	N	N	N	N
Cd (20)	L	N	N	20	30	N	N	N
Co (5)	10	N	300	300	N	10	10	15
Cr (10)	20	N	L	L	N	15	50	50
Cu (5)	100	10	20	100	10000	150	70	15
La (20)	20	N	N	N	N	N	50	50
Mo (5)	N	70	N	N	N	30	30	N
Nb (20)	N	N	N	N	N	N	N	N
Ni (5)	300	10	700	700	20	15	30	50
Pb (10)	150	N	20	20	2000	50	100	20
Sb (100)	L	N	N	N	3000	N	100	N
Sc (5)	10	N	N	N	N	N	10	10
Sn (10)	N	N	N	N	N	N	N	N
Sr (100)	200	N	N	N	100	N	100	200
V (10)	700	10	10	200	30	15	50	50
W (50)	N	N	N	N	N	N	N	N
Y (10)	30	N	20	70	N	N	15	20
Zn (200)	1500	N	1500	2000	2000	N	N	N
Zr (10)	20	10	N	N	10	70	100	100
Th (100)	N	N	N	N	N	N	N	N

APPENDIX 2. Sample analyses (continued).

Sample no.	1208	1209	1210	1211	1212	1213A	1213B	1225
ELEMENT								
Fe% (.05)	3	2	0.15	1	10	0.15	1	0.5
Mg% (.02)	1	5	10	1	0.2	7	10	0.2
Ca% (.05)	1.5	7	20	2	0.05	15	20	2
Ti% (.002)	0.3	0.2	0.01	0.1	0.3	0.005	0.1	0.03
Mn (10)	1000	700	150	100	150	150	300	700
Ag (.5)	0.7	2	2	200	10	2	1	3
As (200)	N	N	N	700	N	N	N	L
Au (10)	N	N	N	N	N	N	N	N
B (10)	30	50	L	>2000	70	N	50	L
Ba (20)	300	200	N	>5000	500	20	200	30
Be (1)	3	2	L	L	1	N	1	L
Bi (10)	N	N	N	15	N	N	N	N
Cd (20)	N	N	N	70	N	N	N	N
Co (5)	20	15	N	5	15	N	N	N
Cr (10)	70	50	N	10	50	N	20	10
Cu (5)	30	20	10	2000	70	30	20	10
La (20)	30	50	N	N	30	N	20	N
Mo (5)	N	N	N	N	N	N	N	10
Nb (20)	N	N	N	N	N	N	N	N
Ni (5)	70	50	50	30	70	20	30	20
Pb (10)	30	70	50	15000	70	100	70	300
Sb (100)	N	N	N	3000	N	N	N	N
Sc (5)	10	7	N	N	5	N	L	N
Sn (10)	N	N	N	N	N	N	N	N
Sr (100)	100	150	100	300	N	150	300	N
V (10)	100	50	L	30	20	L	15	L
W (50)	N	N	N	N	N	N	N	N
Y (10)	30	20	10	10	15	N	20	10
Zn (200)	N	N	N	1500	N	N	N	N
Zr (10)	150	70	L	50	200	N	50	N
Th (100)	N	N	N	N	N	N	N	N

[1]Analysis by Branch Exploration Geochemistry, U.S. Geological Survey, Denver, CO.
Fe, Mg, Ca, and Ti reported in %, all other elements reported in ppm. Lower limits of determination are in parentheses. > = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

APPENDIX 3. Fire assay results.[1]

Sample no.	Au oz/T	Au ppm	Ag oz/T	Ag ppm
1031a middle	0.454	15.565	0.05	1.714
1031b middle	0.054	1.851	0.02	0.686
1031 north	0.040	1.371	0.03	1.028
1031 south	0.036	1.234	0.00	0.000
Diamond Queen	0.040	1.371	0.00	0.000
Yellow Fluorite	0.026	0.891	0.00	0.000

[1]The samples were run in duplicate, and the numbers reported are the average of the two runs. The original numbers are reported in oz/T then converted to ppm using the conversion factor of 34.285 ppm equals 1 oz/T.