UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINERAL INVESTIGATION OF THE HELLS HOLE ROADLESS AREA, GREENLEE COUNTY, ARIZONA, AND GRANT COUNTY, NEW MEXICO

By
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MLA 137-82
1982

This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

STUDIES RELATED TO WILDERNESS

The U.S. Bureau of Mines and the U.S. Geological Survey jointly conduct mineral surveys of lands which in the U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System.

This report is on the Hells Hole Roadless Area (3-138), Greenlee County, Arizona, and Grant County, New Mexico.

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MINERAL INVESTIGATION OF THE HELLS HOLE ROADLESS AREA, GREENLEE COUNTY, ARIZONA AND GRANT COUNTY, NEW MEXICO

By John P. Briggs, U.S. Bureau of Mines

INTRODUCTION

In 1979 the U.S. Bureau of Mines made a field investigation of the Hells Hole Roadless Area (fig. 1), as part of a joint effort with the U.S. Geological Survey to make a mineral survey of the area. The area is a 34,330 acre tract of land straddling the Arizona-New Mexico border.

Surface and underground workings were sampled. Assay results for 96 of the 139 samples collected are reported in table 2. Complete sample assay data is available for public inspection at the Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, Colorado.

Graton (1910), Russell (1947), Gillerman (1964), and Griggs (1966) previously studied the geology, the mineral resources, and the history of mining activity in the area.

Location, size, and geographic setting

The roadless area covers approximately 15,470 acres of the Apache-Sitgreaves National Forest, Greenlee County, Arizona, and 18,860 acres of the Gila National Forest, Grant County, New Mexico. The area is bounded on the north by Arizona-New Mexico Highway 78, on the west and south by the Forest Service boundary, and on the east by unimproved roads. Duncan, Arizona, is 25 mi to the southwest via Arizona Highway 75 and a gravel road in Bitter Creek drainage. The Clifton-Morenci area is about 25 mi to the northwest via State Highway 78 and U.S. Highway 666. Mule Creek, New Mexico, lies 3 mi east of the northeast corner of the area via State Highway 78.

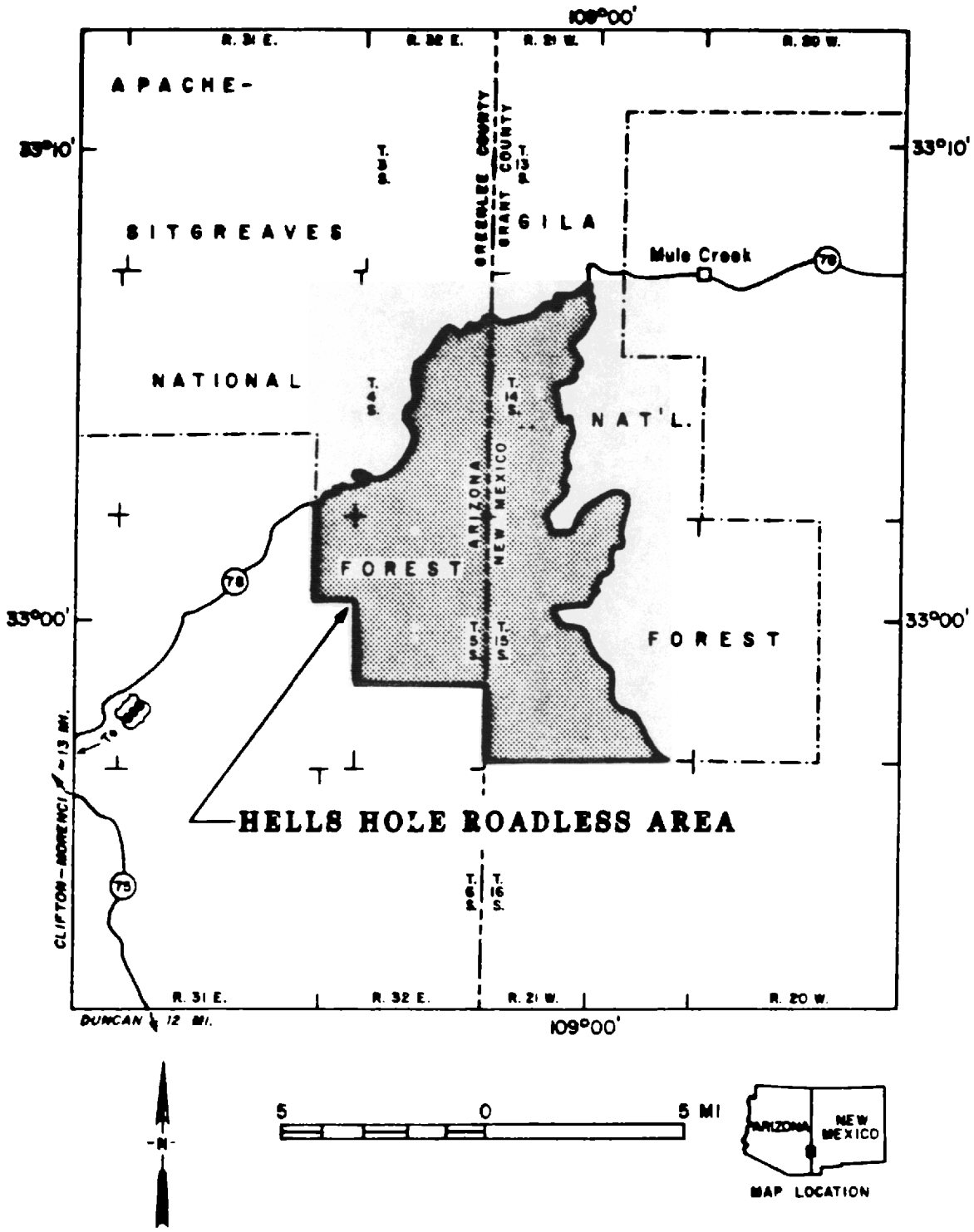


Figure 1.-Index map of the Hells Hole Roadless Area, Greenlee County, Arizona, and Grant County, New Mexico.

Mining activity

Mining activity in the region dates back to 1860 (Russell, 1947, p. 4). The first period of production occurred from 1880 to 1897 (Graton, 1910, p. 327). Subsequent periods of major production coincided with the increased demand for base metals during World Wars I and II, and the Korean conflict, and were followed by periods of little or no activity. Exploration and claim staking were the main activity in 1979. Fraser-Martin Mines has located a block of unpatented claims in the southeast corner of the area. This block encompasses the old Yellowjacket(?) Mine on the west flank of Yellowjacket Peak, which was probably worked for secondary copper minerals, and the Telluride Mine on Sawmill Creek which was developed during the mid-1920's on a gold- and silver-bearing quartz vein.

The northern portion of the Steeple Rock mining district which adjoins the southern boundary of the roadless area, was worked during the teens and late 1930's primarily for its gold-, silver-, and copper-bearing fissure veins at half a dozen localities. Large blocks of unpatented mining claims located by Exxon and Fraser-Martin Mines cover much of this part of the district.

Exxon Minerals conducted a base and precious metals exploration program in 1979, centered in a tract of land west of the Arizona border and south of the western half of the area. On the New Mexico side, Fraser-Martin Mines, Inc., through its agents, conducted base and precious metals exploration in 1979, over a tract of land lying between the Summit Mountains on the southwest, and upper Sawmill Creek on the northeast. In 1979, this company controlled a block of 290 unpatented mining claims which overlaps the southeastern quarter of the roadless area (pl. 1). Their exploration work included geologic mapping, geochemical and geophysical surveys, and drilling. There was no evidence of drilling in the roadless area.

In 1979, Summit Minerals Inc., Duncan, Arizona, started mining base- and precious-metal ores from the Center and Summit Mines in the central part of the Steeple Rock mining district, about six miles south of the area. Gold and silver associated with base metal sulfides was being recovered from the Center Mine, and a quartz vein system containing gold and silver was being mined at the Summit Mine. Run-of-the-mine ore was being shipped to the ASARCO smelter at El Paso, Texas, at the rate of eight 100-ton car loads per week. Summit Minerals, Inc., was also in the process of rehabilitating the Laura and Banks Mines in the same vicinity in 1979.

MINING DISTRICTS AND MINERALIZED AREAS

The southern portion of the Hells Hole Roadless area adjoins the Steeple Rock (Mayflower, Twin Peaks) mining district. Approximately 850 unpatented mining claims have been located within and around the roadless area. There are no patented mining claims in the area.

Mining and prospecting have occurred in four mineralized locales within and near the area (pl. 1): the Coal Creek uranium prospect is located in the northern portion of the area; the Telluride Mine area overlaps the eastern boundary of the area along the upper reaches of Sawmill Creek; the Yellowjacket Mine lies on the west flank of Yellowjacket Peak; and the northern portion of the Steeple Rock mining district abuts the southern portion of the area. The extent of activity in each of these locales is summarized in table 1.

On Coal Creek, radioactive minerals are localized in a chalcedony cemented fault zone. This isolated occurrence was probably derived from Tertiary volcanics with mobilization and deposition related to ground-water movement. The occurrence is very small and very low grade (less than 0.01 percent U_3O_8).

Data from samples (nos. 108-110) taken from workings on a fissure vein along Sawmill Creek, at the Telluride Mine, indicate that the exposed deposit is small and low grade. Exposures are too poor to determine if the vein extends into the roadless area. Along the upper reaches of Sawmill Creek on the eastern border of the roadless area and in Apache Box Canyon south of the roadless area, gold and silver mineralization is associated with quartz veins.

Secondary copper minerals are present in a narrow shear zone at the workings on Yellowjacket Peak, but, although of interest, do not constitute a significant resource.

Gold, copper, and silver mineralization is closely associated with the East Camp and Steeple Rock faults in the Steeple Rock district. Mineral deposits are localized along shear zones and are associated with quartz veins, argillic alteration, and silicified breccia zones coincident with the faults. Past production in the northern portion of the Steeple Rock district was 1,000 short tons yielding 1,115 oz gold, 3,640 oz silver, and 1,965 lb copper.

SUMMARY

Gold, silver, copper, and uranium occur in the Hells Hole Roadless Area, and adjacent to its eastern border. Uranium is exposed in a prospect on Coal Creek; gold and silver were detected at the Telluride Mine along Sawmill Creek, and copper oxides are present on Yellowjacket Peak. These appear to be isolated occurrences.

REFERENCES

Gillerman, Elliot, 1964, Mineral deposits of western Grant County: New Mexico Bureau of Mine and Mineral Resources Bulletin 83, 213 p.

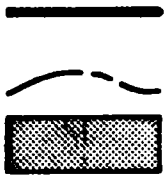
Graton, L. C., 1910, Steeple Rock district in The ore deposits of New Mexico: U.S. Geological Survey Professional Paper 68, pp. 327-328.

Griggs, R. L., and Wagner, H. C., 1966, Geology and ore deposits of the Steeple Rock mining district, Grant County, New Mexico: U.S. Geological Survey Bulletin 1222-E, 29 p.

Maxwell, C. H., 1978, Map showing appraisal of mineral resource potential of RARE II proposed roadless areas in National forests, New Mexico (exclusive of coal, oil, gas, and construction materials), scale 1:500,000, U.S. Geological Survey Open file report 78-859, 1 plate.

Russell, P. L., 1947, Steeple Rock lead-zinc district, Grant County, New Mexico: U.S. Bureau of Mines Report of Investigations 4073, 13 p.

EXPLANATION OF SYMBOLS FOR MINE AND PROSPECT MAP



APPROXIMATE BOUNDARY OF THE HELLS HOLE ROADLESS AREA

APPROXIMATE EXTENT OF MINING DISTRICTS OR MINERALIZED AREAS

UNPATENTED MINING CLAIMS

●187 LOCALITY OF PANNED CONCENTRATE SAMPLE--Showing sample number

○190 LOCALITY OF SAMPLED OUTCROP--Showing sample number

SURFACE OPENINGS--Showing sample locality number

×106 Prospect pit--Symbol may represent more than one working

194 Shaft

104 Adit or fault cave

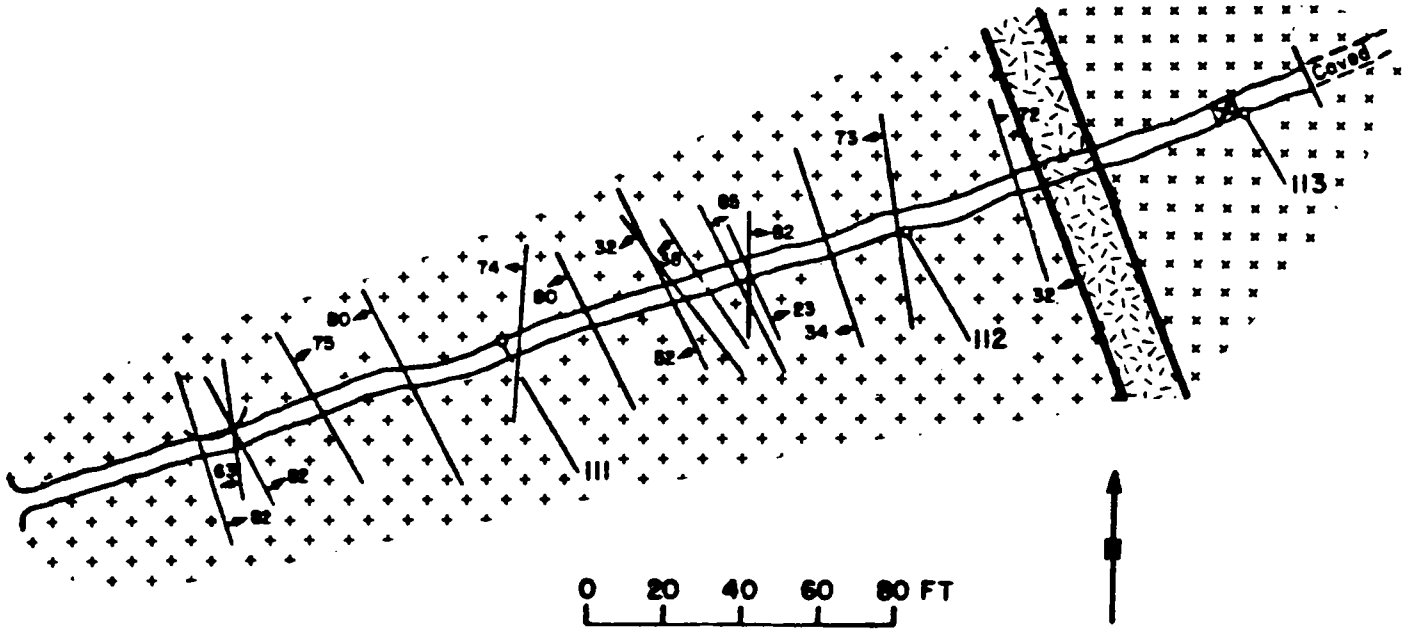


Figure 2. - Yellowjacket Peak adit

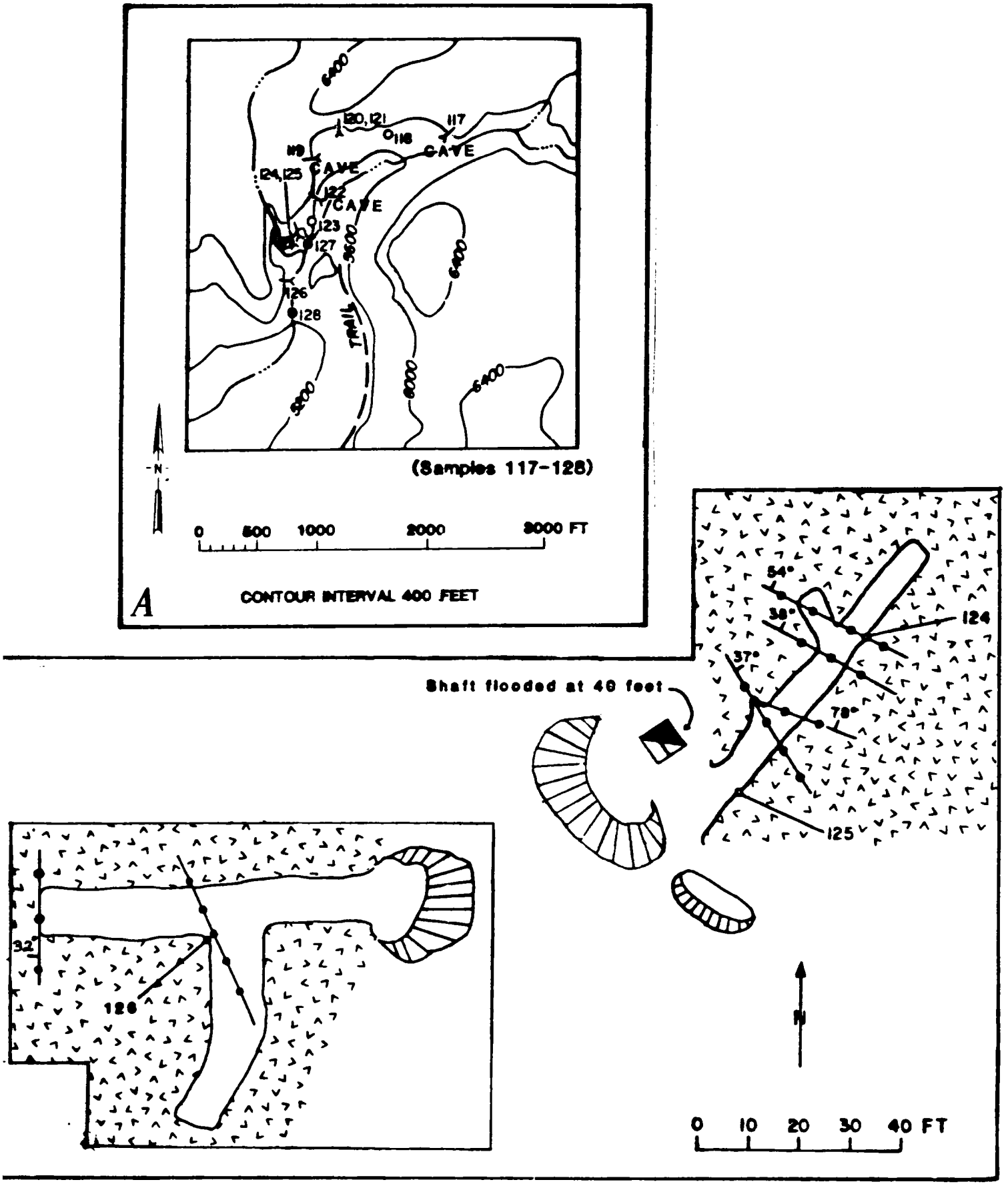


Figure 3 - A. Apache Box Canyon area. B. Maps of workings in the Apache Box Canyon area.

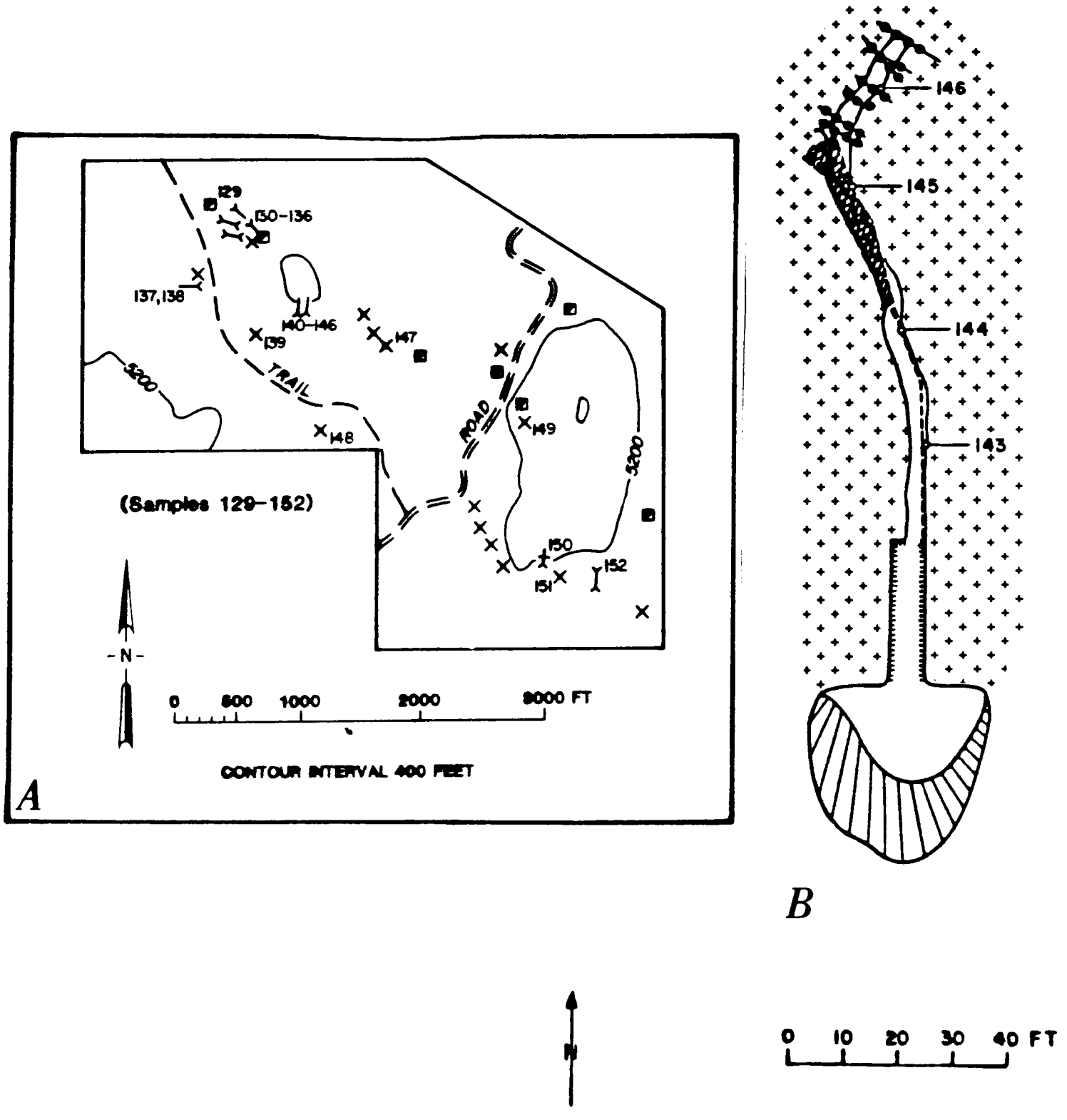


Figure 4 - A. Copper Basin Mine area. B. Map of adit in Copper Basin Mine area.

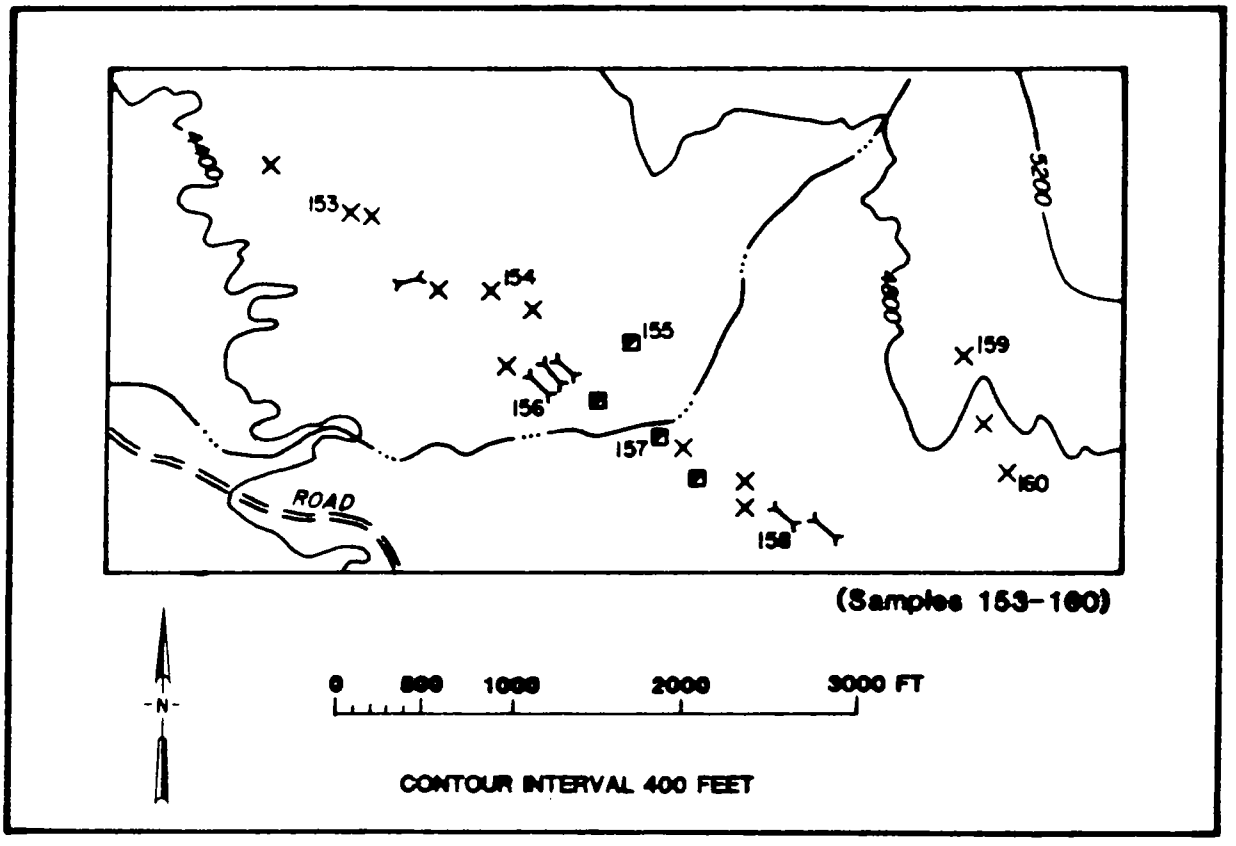
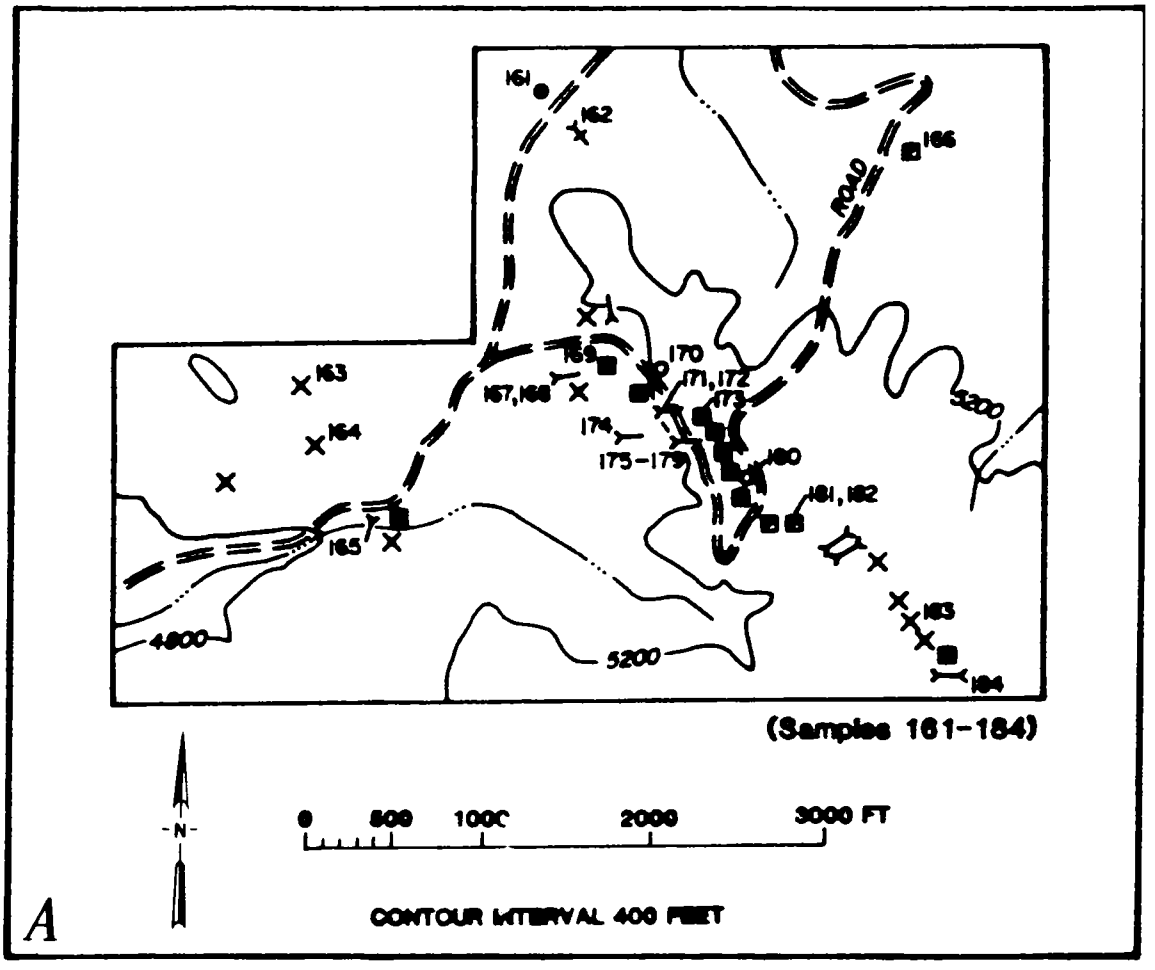


Figure 5. - Commerce-Mayflower Mine area



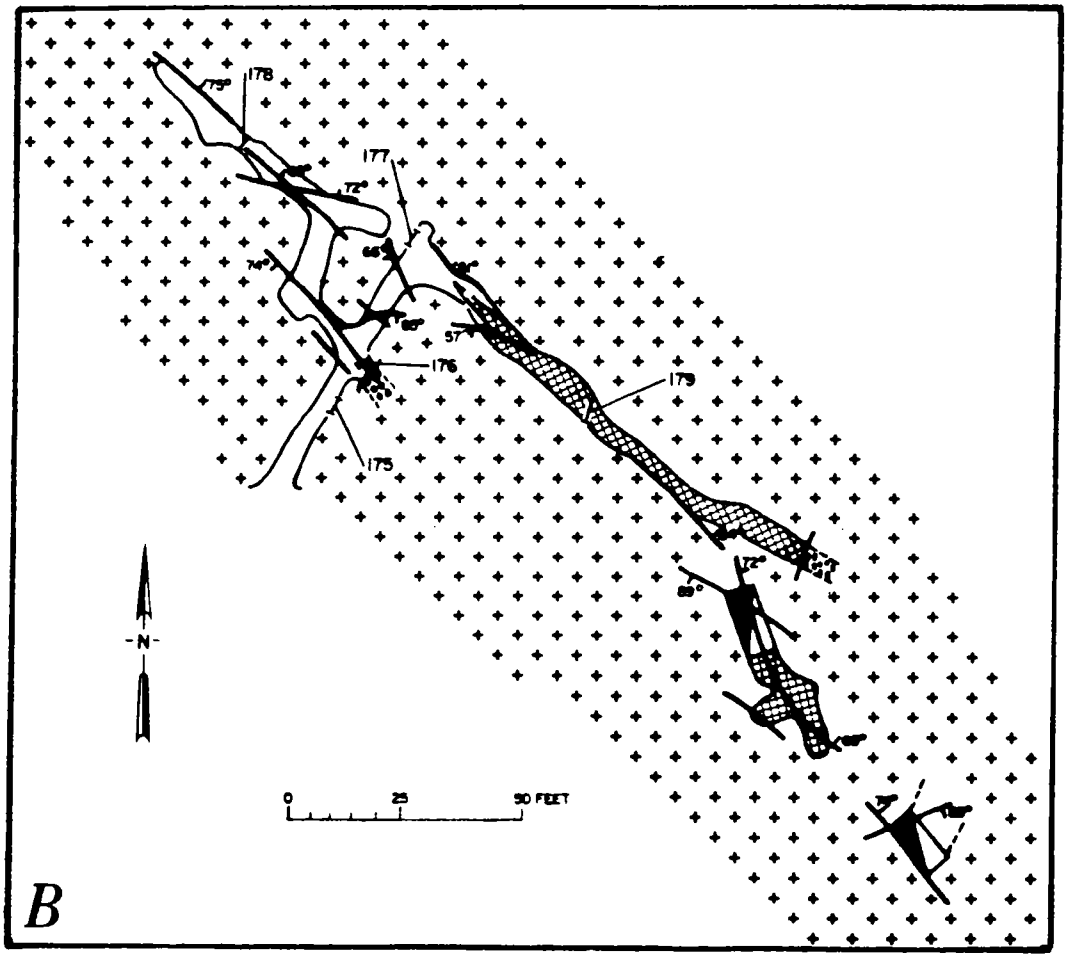


Figure 6 - A. Fraser-Martin Mines area. B. Map of adit in Fraser-Martin Mines area.

EXPLANATION FOR FIGURES 3-6

LOCALITY OF PANNED CONCENTRATE SAMPLE--Showing sample number

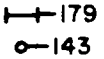
LOCALITY OF SAMPLED OUTCROP--Showing sample number

VEIN--Showing dip

FAULT--Showing dip

CONTACT--Showing dip


SHEAR ZONE--Dashed where approximate



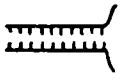
LOCALITY OF MINE MAP SAMPLE--Showing sample number


RUBBLE


RAISE


DUMP

SURFACE OPENINGS--Showing sample locality number


Open cut and portal

Adit or fault cave

Prospect pit

Caved adit

Shaft

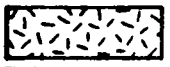
Trench

Diamond drill hole

ROCK TYPES


Andesite


Dacite


Transition zone

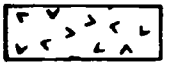

Brecciated rhyolite

Table 1.--Mineralized areas of the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County, New Mexico

Mineralized Area and location	Commodity and sample nos.	Production and development	Geology
Coal Creek uranium prospect. Also known as Beam Mining Company claims and as Pajaro Azul (Blue Bird) prospect. Sec. 7, T. 14 S., R. 21 W. (NM).	Uranium; 100, 101.	One prospect pit.	Mineralization localized along chalcedony cemented fault zone in rhyolite breccia. Geiger counter readings as much as 0.008 mr/hr above background.
Telluride Mine area. Sec. 10 and 15, T. 15 S., R. 21 W. (NM).	Silver and gold; 106-110.	Prospect pits and one shaft flooded at 6 ft. Production unknown.	Workings localized on narrow, elongate, argillic alteration zone surrounding quartz vein. Limonite suggests presence of pyrite.
Yellowjacket Peak workings. Sec. 28 and 33, T. 15 S., R. 21 W. (NM).	Copper and turquoise; 111-113.	Shaft, raise 100 ft, haulage level 320 ft long. Production unknown. Much of workings inaccessible.	Secondary copper mineralization localized along narrow shear zone. Abundant chrysocolla on dump. Leased as "turquoise" mine (E. F. Martin, Jr., oral commun.). Currently inactive. Possible potential for gemstone material.

Table 1.--Mineralized areas of the Hells Hol adless Area and vicinity, Greenlee County, Arizona, and Grant County, New Mexico--Continued

Mineralized Area and location	Commodity and sample nos.	Production and development	Geology
Northern Portion of Steeple Rock (Mayflower, Twin Peaks) mining district. T. 16 S., R. 21 W. (NM) T. 6 S., R. 32 E. (AZ).	Silver, gold, and minor copper.	Numerous adits, shafts, trenches, and prospect pits. Estimated excavation: 11,000 tons. Production (1880-1960): 1,000 tons yielding 1,115 oz gold, 3,640 oz silver, and 1,965 lbs copper.	Secondary copper minerals localized along fault and joint planes. Base-metal sulfides at depth associated with fault breccias; silver and gold associated with sulfides in quartz veins (Griggs and Wagner, 1966, p. 21).
THE FOLLOWING AREAS ARE IN THE NORTHERN PORTION OF THE STEEPLE ROCK DISTRICT			
Twin Peaks Mine. Sec. 8, T. 16 S., R. 21 W. (NM).	Silver, gold, and copper; 115, 116.	Four shafts (one caved) 17-900 ft deep, mill site, and prospect pits.	Shafts sunk along alteration zone along fault.
Apache Box Canyon area (fig. 3). Sec. 2, 3, 10, and 11, T. 16 S., R. 21 W. (NM).	Silver and gold; 117-128.	Three adits 40-60 ft long, one shaft flooded at 40 ft, and four fault (?) caves.	Zero to 0.62 oz/ton gold and 0.0 to 8.7 oz/ton silver; associated primarily with quartz veins in rhyolite and rhyolite breccia.

Table 1.--Mineralized areas of the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County, New Mexico--Continued

Mineralized Area and location	Commodity and sample nos.	Production and development	Geology
THE FOLLOWING AREAS ARE IN THE NORTHERN PORTION OF THE STEEPLE ROCK DISTRICT--Continued			
Copper Basin Mine area (fig. 4). Sec. 7, 8, 17, and 18, T. 16 S., R. 21 W. (NM) Sec. 10, T. 6 S., R. 32 E. (AZ).	Copper and silver; 129-152.	Prospect pits (15), six adits (one caved) 15-100 ft long, seven shafts 12-30 ft deep, and six trenches 15-55 ft long.	Secondary copper minerals localized along fault and joint planes. Few quartz veins and stockwork in rhyolite. Silver values 0.1-1.3 oz/ton. Copper values less than 0.01 to 3.2 pct.
Commerce-Mayflower Mine area (fig. 5). Sec. 9, 10, 15, and 16, T. 6 S., R. 32 E. (AZ).	Copper and silver; 153-160.	Four shafts 10-140 ft deep. Prospect pits (14) and six trenches 30-100 ft long.	Secondary copper minerals on fault and joint surfaces. Native copper (one occurrence). Base-metal sulfides associated with silicified fault breccia (one occurrence). Assays indicate up to 8.3 oz/ton silver and 15.4 pct copper.
Fraser-Martin Mines (fig. 6). Sec. 8, 9, 16, 17, and 18, T. 16 S., R. 21 W. (NM).	Silver and copper; 161-184.	Shafts (13); four probably greater than 100 ft deep (one caved). Remaining shafts 8-30 ft. Seven adits 6-60 ft long (one caved, and two drifts totaling 200 ft. Prospect pits (11) and three trenches 15-120 ft long.	Workings localized along quartz veins, faults, and associated silicic and argillic alteration. Base-metal sulfides. Silver and gold associated with quartz veins.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico

[Gold and silver determined by fire assay; values reported in oz/ton. Copper, determined by atomic absorption; values reported in percent. Lead and zinc determined by atomic absorption; values greater than 0.01 pct are reported in description column. Duplicate entries represent duplicate analyses. Uranium, in samples 100 - 103, determined by radiometric methods and reported in description column. Spectrographic analyses available for public inspection at Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, Colorado. Tr, trace; L, detected but less than 0.01; -, not detected; ND, not determined.]

Sample		Resource						
No.	Type	Gold	Silver	Copper	Lead	Zinc	Uranium	Description
100	3.0-ft chip.....	ND	ND	ND	ND	ND	0.007	Across 2-in. fault trending N. 70° E., 78° N. in prospect pit. Rhyolite breccia cemented with chalcedony.
101	.....Do.....	ND	ND	ND	ND	ND	.005	Left side of prospect pit. Rhyolite breccia cemented with chalcedony.
102	.....Do.....	ND	ND	ND	ND	ND	<.003	Outcrop. Flow-banded rhyolite.
103	2.0-ft chip.....	ND	ND	ND	ND	ND	<.003	Outcrop. Rhyolite breccia cemented with chalcedony.
104	.....Do.....	Tr	0.1	0.01	L	L	ND	Across back of adit at portal. E.-W.-trending andesite porphyry dike ridge.
105	4.3-ft chip.....	-	-	L	L	L	ND	Outcrop. E.-W.-trending dike-like body of silicified andesite.
106	Grab sample.....	-	-	L	L	L	ND	Prospect pit. Andesite porphyry displaying liesegang banding and argillic alteration.
107	Pan concentrate....	Tr	.3	.01	L	0.10	ND	Sawmill Creek.
108	Grab sample.....	0.01	.4	L	L	.08	ND	Dump. Telluride Mine shaft. Andesite porphyry displaying argillic alteration, limonite staining, and vugs lined with drusy quartz.
109	2.8-ft chip.....	Tr	-	L	L	.08	ND	Prospect pit. Quartz vein. Andesite porphyry displaying argillic alteration and limonitic staining.
110	3.0-ft chip.....	.03	.3	L	L	L	ND	Do.
111	5.3-ft chip.....	Tr	-	L	L	L	ND	Across 5 in. thick fault zone in left wall of main haulage level. Blue-green amygdaloidal andesite characterized by calcite vein fillings in joints and fractures.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
112	6.3-ft chip.....	Tr	0.1	0.05	L	L	ND	Same as above except 2 ft fault zone in right wall.
113	1.3-ft chip.....	Tr	-	L	L	L	ND	Across main fault zone in raise.
114	3.3-ft chip.....	-	Tr	L	L	L	ND	Prospect pit. Iron oxide-stained andesite.
115	Grab sample.....	Tr	-	L	L	L	ND	Dump. Twin Peaks Mine. Shafts sunk on 6-ft wide, N. 20°-35° W., subvertical fault zone displaying limonitic staining and pervasive argillic alteration Andesite porphyry country rock.
116	.....Do.....	0.03	.8	L	L	L	ND	Do.
117	4.0-ft chip.....	Tr	.1	.01	L	L	ND	Across N. 30° W., 75° S. shear zone in fault cave (?). Rhyolite cut by numerous quartz veinlets.
118	5.0-ft chip.....	-	-	L	L	L	ND	Outcrop. Argillic alteration zone in maroon andesite porphyry at contact with overlying rhyolite.
119	4.6-ft chip.....	-	Tr	L	L	L	ND	Across subvertical fault zone trending N. 35° W. in fault cave (?). Dark-gray porphyritic rock.
120	3.0-ft chip.....	-	-	L	L	L	ND	Across subvertical alteration zone in breccia at contact between dark-gray porphyritic rock and overlying rhyolite.
121	.....Do.....	Tr	.2	L	L	L	ND	Do.
122	6.0-ft chip.....	Tr	.2	L	L	0.01	ND	Across intersection of fault gouge and contact between rhyolite and dark-gray porphyritic rock. Fault cave (?).
123	1.0-ft chip.....	-	-	.10	L	L	ND	Outcrop. Argillic alteration zone in maroon andesite porphyry.
124	5.6-ft chip.....	.02	1.2	L	L	L	ND	Right rib of adit. Rhyolite breccia
124	.....Do.....	.02	.6	.01	ND	ND	ND	characterized by quartz veins, hematitic staining, and vugs lined with quartz crystals.
125	5.0-ft chip.....	-	.2	.01	L	L	ND	Do.
126	4.3-ft chip.....	.62	8.7	L	L	.02	ND	Across back of adit. Rhyolite breccia
126	.....Do.....	.35	3.5	L	ND	ND	ND	with hematitic staining, and vugs lined with quartz crystals.
127	Pan concentrate....	.11	.2	ND	ND	ND	ND	Apache Box Canyon.
128	.....Do.....	Tr	.2	ND	ND	ND	ND	Do.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
129	Grab sample.....	-	0.1	0.13	L	L	ND	Dump. Shaft. Malachite-stained, maroon, amygdaloidal andesite.
130	4.3-ft chip.....	-	-	.06	L	L	ND	Across 1.7-ft thick, subvertical, N. 60° W. fault zone at head of trench in andesite. Malachite stain on dump.
131	5.0-ft chip.....	Tr	.1	.03	L	L	ND	Across 1-ft thick, S. 55° E., 63° S. vein in back of adit at portal. Malachite, calcite, and quartz.
132	2.5-ft chip.....	-	.1	.06	L	L	ND	Across back of adit in andesite. Subvertical fault gouge 6 in. thick, N. 70° W., contains quartz, calcite, malachite and limonite.
133	3.0-ft chip.....	Tr	.1	L	L	L	ND	Do.
134	3.6-ft chip.....	-	Tr	.02	L	L	ND	Across intersection of two subvertical faults (S. 75° E. and S. 50° E.) at head of trench in andesite. Calcite and limonite.
135	3.0-ft chip.....	Tr	.1	.63	L	L	ND	Across back of adit at portal. Subvertical fault zone 2 ft thick, trending N. 45° W. in andesite, contains malachite, calcite, and quartz veinlets.
136	2.6-ft chip.....	Tr	.1	.90	L	L	ND	Across back of adit in andesite. Subvertical fault 0.4-in. thick, trending N. 60° W., filled with calcite and malachite veinlets.
137	6.3-ft chip.....	Tr	.8	1.10	L	L	ND	Across 4-in. thick fault trending N. 30° W., 75°S. exposed in face of crosscut in andesite. Calcite, malachite, and limonite.
138	3.3-ft chip.....	Tr	1.3	.60	L	L	ND	Do.
139	Grab sample.....	Tr	.3	.25	L	L	ND	Dumps. Caved shaft and adit on N. 72° W. shear zone in andesite. Calcite and chrysocolla.
140	4.3-ft chip.....	Tr	.1	.01	L	L	ND	Across 6 in. thick, N. 50° W., subvertical fault exposed in back of adit at portal in andesite. Limonite, quartz, and malachite.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
141	6.1-ft chip.....	Tr	0.2	0.10	L	L	ND	Across 6-in. thick, subvertical, N. 40° W. fault at head of trench in andesite. Malachite and limonite.
142	3.3-ft chip.....	.03	.3	.50	L	L	ND	Across 1.7-ft, N. 55° W., subvertical shear zone exposed in right wall of trench in andesite. Hematite, malachite, and quartz.
143	3.0-ft chip.....	Tr	.2	L	L	L	ND	Across 5± in. thick, subvertical N.-S. fault in back of adit in andesite. Quartz and limonite.
144	2.6-ft chip.....	Tr	.1	L	L	L	ND	Do.
145	.....Do.....	.01	.1	L	L	L	ND	Do.
146	4.0-ft chip.....	Tr	.2	L	L	L	ND	Across 5-in. thick N. 70° W., subvertical quartz vein in right wall of adit in andesite.
147	Grab sample.....	.02	.9	.58	0.01	L	ND	Dump. Shaft and prospect pits located on N. 25° W. striking quartz vein in andesite.
148	9.0-ft chip.....	Tr	.3	L	L	L	ND	Across N. 64° W., 84° S., contact between andesite and rhyolite intrusive. Quartz veins. Drusy amethystine quartz coating quartz crystals.
149	2.5-ft chip.....	Tr	.1	L	L	L	ND	Across N. 83° W., 60° S., subvertically sheared quartz vein, in andesite.
150	Grab sample.....	-	1.0	3.20	L	L	ND	Dump. Caved adit in calcite-cemented andesite breccia near contact with rhyolite.
151	8.0-ft chip.....	Tr	.4	1.10	L	L	ND	Across junction of two subvertical veins. Prospect pit in andesite. Calcite, quartz, malachite, and iron oxide.
152	3.8-ft chip.....	Tr	.1	.22	L	0.03	ND	Across 15-in. wide, subvertical, N.-S., fault at head of trench in andesite. Malachite and azurite.
153	4.0-ft chip.....	Tr	-	L	L	L	ND	Across N. 75° W., 78° N., malachite-stained fault zone, in prospect pit.
154	4.3-ft chip.....	Tr	.2	.17	L	L	ND	Across zone of subvertical, malachite-coated fractures, striking N. 65° W. in prospect pit.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
155	Grab sample.....	Tr	1.6	1.80	L	L	ND	Dump. Shaft located on subvertical, N. 45° W., trending zone of silicified andesite. Pyrite, chalcopyrite, covellite, malachite, and azurite.
156	Grab sample.....	0.01	8.3	14.10	0.01	0.01	ND	Dump. Trench in andesite. Malachite azurite, chrysocolla, covellite, and hematite.
156	.....Do.....	Tr	5.8	15.40	ND	ND	ND	
157	3.3-ft chip.....	Tr	0.2	0.68	.02	L	ND	Across N. 45° W., trending zone of malachite and specularite-filled fractures in andesite. Shaft sunk on zone.
158	4.0-ft chip.....	Tr	-	.35	L	L	ND	Across N. 45° W., 64° S., zone of fault gouge exposed in trench. Malachite and chrysocolla.
159	2.0-ft chip.....	-	.1	.22	L	L	ND	Across N. 20° E., 30° S., shear zone in prospect pit. Liesegang banded andesite.
160	3.3-ft chip.....	Tr	.5	3.20	L	L	ND	Across 1-in. thick vein in prospect pit. Native copper, malachite, chrysocolla, chalcocite, calcite, hematite, and epidote.
161	Grab sample.....	-	1.0	.01	L	ND	ND	Dump. Caved adit in intensely argillized,
161	.....Do.....	Tr	Tr	L	ND	ND	ND	limonite-stained andesite.
162	.....Do.....	-	.2	.33	L	L	ND	Mud-pit; drill site.
163	5.3-ft chip.....	-	.5	L	L	L	ND	Across brecciated, baked and (or)
		Tr	Tr	L	L	L	ND	silicified zone in andesite porphyry. Prospect pit. Malachite staining.
164	2.6-ft chip.....	Tr	.6	.70	L	L	ND	Across N. 26° E., 52° N., contact
164	.....Do.....	Tr	.5	.70	ND	ND	ND	between andesite and tuffaceous unit exposed in prospect pit. Malachite stain along contact.
165	6.6-ft chip.....	Tr	-	L	L	L	ND	Along right wall of adit driven in tuffaceous rock.
166	4.5-ft chip.....	-	.1	.01	L	L	ND	Across 2-ft wide, N.-S., vertical fault zone exposed in shaft sunk in andesite.
167	2.6-ft chip.....	.01	.4	L	.01	.01	ND	Across 2-ft wide N. 10° W., 80° W., brecciated zone in recess along left wall of adit driven in dark-gray, aphanitic, igneous rock (basalt?).

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
168	4.3-ft chip.....	Tr	0.1	L	L	L	ND	Across 8-in. thick N. 10° E., 68° E., zone of limonite-stained fault gouge in face of adit driven in dark-gray, aphanitic, igneous rock (basalt?).
169	Grab sample.....	Tr	.3	L	L	L	ND	Dump. Shaft. Andesite displaying argillic alteration and containing quartz veinlets.
170	32.0-ft chip.....	Tr	.3	0.01	0.02	0.02	ND	Outcrop. Across subvertical, N. 45° W., brecciated quartz vein.
171	5.6-ft chip.....	Tr	-	.09	.02	.01	ND	Along left wall of adit in brecciated quartz displaying hematitic staining.
172	3.8-ft chip.....	0.01	.4	.01	.01	.02	ND	Across contact between quartz vein and andesite in right wall of adit.
173	5.2-ft chip.....	Tr	.1	.01	L	L	ND	Across northwest wall of shaft sunk in N. 45° W. trending, hematite-stained, brecciated quartz vein.
174	4.0-ft chip.....	Tr	-	L	L	L	ND	Across 2.3-ft thick, N. 67° W., vertical shear zone in face of adit driven in dark-gray, aphanitic, igneous rock (basalt?). Hematite-stained quartz veins (3) in shear zone.
175	.....Do.....	Tr	.1	L	L	L	ND	Across N. 55° W., subvertical contact between andesite and brecciated quartz in right wall of adit.
176	4.3-ft chip.....	Tr	-	L	L	L	ND	Across 4-ft wide N. 30° W., subvertical fault zone exposed in back of drift. Hematite-stained andesite contains quartz veins.
177	4.6-ft chip.....	Tr	.2	L	L	L	ND	Across 2-ft wide N. 45° W., subvertical zone of hematite-stained fault gouge exposed in left wall adit in andesite.
178	3.7-ft chip.....	Tr	.1	L	L	L	ND	Across 2.5 ft-wide, N. 50° W., 70° N., fault zone exposed in back of main drift in andesite.
179	3.6-ft chip.....	.02	.6	L	L	.01	ND	Across back of main drift. Brecciated hematite-stained andesite.
180	5.3-ft chip.....	Tr	.2	.01	L	L	ND	Outcrop. Across N. 45° W., subvertical quartz vein with occasional boxwork structure in some places.

Table 2.--Analyses of samples from the Hells Hole Roadless Area and vicinity, Greenlee County, Arizona, and Grant County New Mexico--Continued

Sample No.	Sample Type	Resource Gold	Silver	Copper	Lead	Zinc	Uranium	Description
181	Grab sample.....	Tr	0.2	0.01	L	L	ND	Dump. Shaft. Andesite displaying argillic alteration. Quartz and pyrite.
182	Grab sample.....	Tr	-	L	L	L	ND	Do.
183	Grab sample.....	Tr	-	L	L	L	ND	Dump. Small shaft sunk on N. 45° W., quartz vein. Pyrite and hematitic staining.
184	3.0-ft chip.....	Tr	.3	.36	0.02	L	ND	Across eastern half of N. 45° W.-striking quartz vein exposed in prospect pit. Hematite stain.
185	4.3-ft chip.....	Tr	.1	.02	L	L	ND	Across 1.7-ft thick, N. 55° W., fault zone in left wall of 95-ft adit driven in andesite porphyry.
186	.....Do.....	Tr	-	L	L	L	ND	Across 2.0-ft thick, N. 45° W., fault zone in right wall of 95-ft adit driven in andesite porphyry.
187	Pan concentrate....	Tr	-	ND	ND	ND	ND	Apache Creek.
188	.....Do.....	Tr	-	ND	ND	ND	ND	Do.
189	3.8-ft chip.....	Tr	-	.25	L	L	ND	Across 2-in. thick, N. 50° W., 68° S., fault in prospect pit. Azurite, chrysocolla, and malachite in andesite porphyry.
190	3.0-ft chip.....	Tr	Tr	ND	ND	ND	ND	Outcrop. Subvertical quartz vein trending N. 10° E., in andesite.
191	6.0-ft chip.....	Tr	-	.04	.08	0.05	ND	Prospect pit. Subvertical silicified zone trending N. 45° W., in andesite.
192	6.5-ft chip.....	-	-	.02	.08	.20	ND	Prospect pit. Brecciated andesite cut by 3-4 calcite veins as much as 3 in. thick
193	Pan concentrate....	Tr	-	L	.03	.01	ND	Wampoo Wash.
194	4.6-ft chip.....	Tr	.5	.83	.10	1.45	ND	Across iron and azurite stained, N. 55° W., 55° S., zone of fault gouge in back of adit. Wampoo(?) Mine; two inclined shafts, raise, and adit.
195	Pan concentrate....	Tr	-	ND	ND	ND	ND	Wampoo Wash.

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 137-82
PLATE 1

Coal Creek uranium prospect

Telluride Mine workings

Yellowjacket Peak workings

Steeple Rock mining district (northern portion)

Area of figure 3 (samples 117-128)

Area of figure 4 (samples 129-152)

Area of figure 5 (samples 153-160)

Area of figure 6 (samples 161-184)

Base from U. S. Geological Survey
Big Lue Mountains, 1962; Mule Creek, 1965;
Steeple Rock, 1959; York Valley, 1960.

SCALE 1:62,500

CONTOUR INTERVALS 40 AND 80 FEET

Field work completed by John P. Briggs and S. Don Brown in 1979.

MAP LOCATION

MINE AND PROSPECT MAP OF THE HELLS HOLE ROADLESS AREA, GREENLEE COUNTY, ARIZONA, AND GRANT COUNTY, NEW MEXICO

BY

JOHN P. BRIGGS, U. S. BUREAU OF MINES

1982