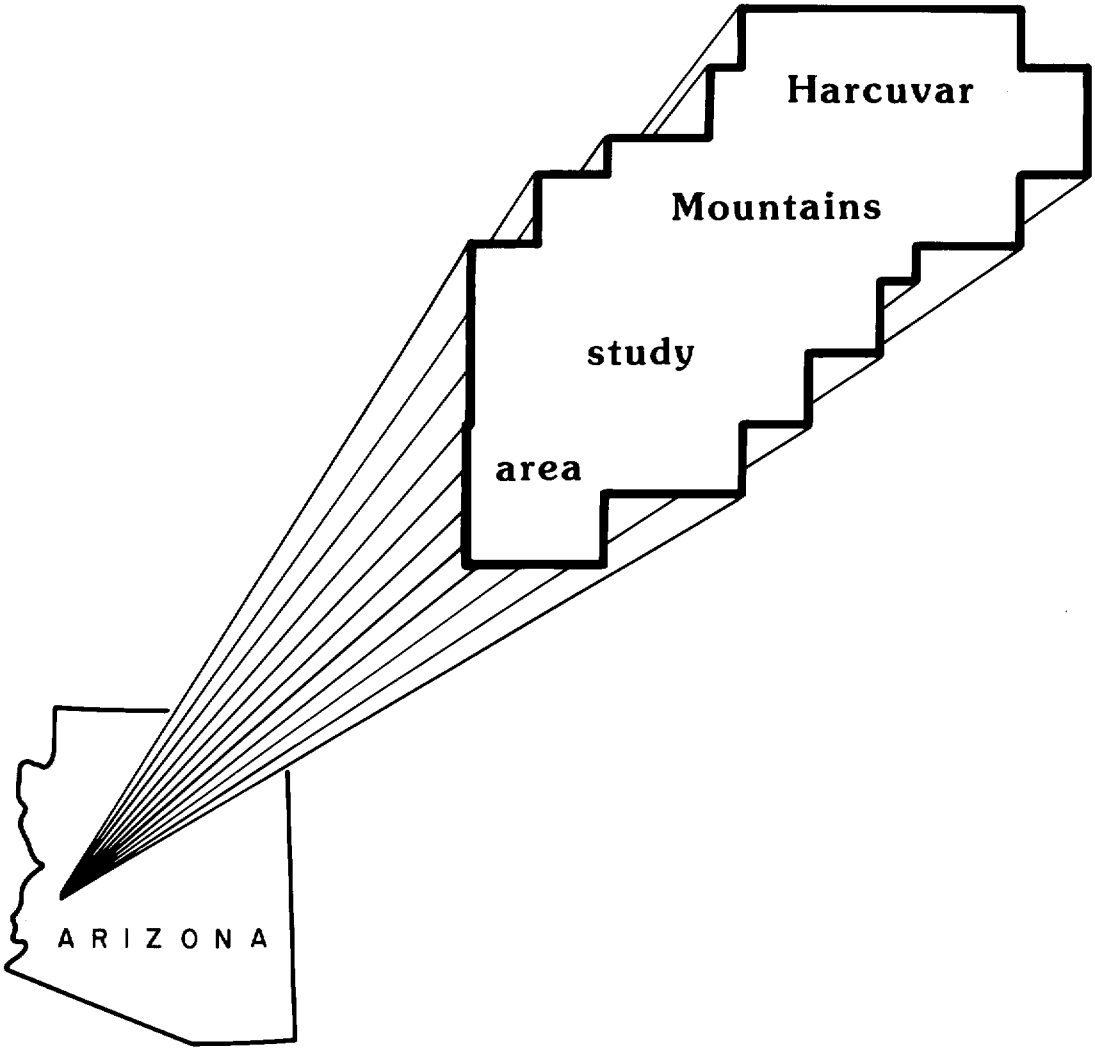
MLA 29-88

Mineral Land Assessment
Open File Report/1988

Mineral Resources of a Part of the Harcuvar Mountains Wilderness Study Area (AZ-020-075), La Paz County, Arizona



BUREAU OF MINES
UNITED STATES DEPARTMENT OF THE INTERIOR

MINERAL RESOURCES OF A PART OF THE HARCUVAR MOUNTAINS WILDERNESS STUDY AREA (AZ-020-075), LA PAZ COUNTY, ARIZONA

by

Steven E. Tuftin

MLA 29-88
1988

Intermountain Field Operations Center
Denver, Colorado

UNITED STATES DEPARTMENT OF THE INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
TS Ary, Director

PREFACE

The Federal Land Policy and Management Act of 1976 (Public Law 94-579) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of a part of the Harcuvar Mountains Wilderness Study Area (AZ-020-075), La Paz County, Arizona.

This open-file report summarizes the results of a Bureau of Mines wilderness study. The report is preliminary and has not been edited or reviewed for conformity with the Bureau of Mines editorial standards. This study was conducted by personnel from the Branch of Mineral Land Assessment (MLA), Intermountain Field Operations Center, P.O. Box 25086, Denver Federal Center, Denver, CO 80225.

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

°	degree
ft	foot
in.	inch
mi	mile
ppm	part per million
%	percent
oz/st	troy ounce per short ton

MINERAL RESOURCES OF A PART OF THE HARCUVAR MOUNTAINS WILDERNESS STUDY AREA (AZ-020-075), LA PAZ COUNTY, ARIZONA

by

Steven E. Tuftin, U.S. Bureau of Mines

SUMMARY

In January 1987, the Bureau of Mines conducted a mineral investigation of 25,287 acres of the 74,778 acre Harcuvar Mountains Wilderness Study Area, in La Paz County, Arizona, on land administered by the Bureau of Land Management. The Bureau of Mines studied that part of the Wilderness Study Area deemed preliminarily suitable for inclusion in the National Wilderness Preservation System. The mineral investigation was requested by the Bureau of Land Management and authorized by the Federal Land Policy and Management Act of 1976 (Public Law 94-579).

The Harcuvar Mountains are composed of metamorphic and granitic rocks of Precambrian and Cretaceous age. Mineralized faults in granite gneiss in the central and eastern parts of the study area are exposed in several prospects and small mines. Prospects and a small adit included in the Webber Mine, in the central part of the study area, are on a northwest-striking fault in gneiss. An inferred subeconomic resource of 600 tons of 3.3% copper has been determined for the Webber adit, and an inferred subeconomic resource of 8,000 tons of 1.8% copper has been determined for the Webber Mine area. Workings along Happy Camp Canyon, inside the eastern border of the study area, are on three northwest-trending faults. A mine and prospect on the western fault are on a vuggy quartz vein with gold concentrations varying from 0.011-.073 oz/st. An inferred subeconomic resource of 300 tons of 0.045 oz gold/st and 1.15% copper, and an inferred subeconomic resource of 2,000 tons of 0.030 oz

gold/st and 1.15% copper has been determined for this structure. Several million tons of ore would be needed to make these resources economical.

The veins and mineralized faults in the vicinity of the workings in Webber Canyon and Happy Camp Canyon area are oxidized. There may be a zone of secondary copper enrichment at depth. The mineralized fault-zones and veins are generally less than 2 ft thick.

One mile west of the study area, a sample from the dump of a shaft in Tertiary-age sedimentary rock contains a gold concentration of 0.061 oz/st, and 0.26% copper. A sample from another prospect in the Tertiary strata has a much lower concentration of copper. This strata is in the upper plate of a detachment fault and does not occur in the study area.

INTRODUCTION

In January 1987, the Bureau of Mines, in a cooperative program with the U.S. Geological Survey (USGS), studied the mineral resoures of a part of the Harcuvar Mountains Wilderness Study Area (WSA), La Paz County, Arizona, on lands administered by the Bureau of Land Management (BLM), Phoenix District Office. The Harcuvar Mountains WSA comprises 74,778 acres; the Bureau studied the 25,287 acres deemed preliminarily suitable for inclusion in the National Wilderness Preservation System. "Study area" as used in this report, refers only to the smaller area. The Bureau surveys and studies mines, prospects, and mineralized areas to appraise reserves and identified subeconomic resources. The USGS assesses the potential for undiscovered mineral resources based on regional geological, geochemical, and geophysical surveys. This report presents the results of the Bureau of Mines study which was completed prior to the USGS investigation. The USGS will publish the results of its studies. A joint USGS-Bureau report, to be published by the USGS, will integrate and summarize the results of both surveys.

Geographic setting

The study area is about 11 mi long and 4 mi wide and includes a rugged segment of the northeast-trending Harcuvar Mountains in the Basin and Range physiographic province. Butler Valley lies to the northwest and McMullen Valley lies to the southeast of these mountains. In the study area, the peaks and ridges along the crest of the range are about 4,600-4,900 ft in elevation, rising about 2,800 ft above the valley floor. The highest point in the study area is 4,957 ft in the northeast corner near Smith Peak. The southwest corner of the study area lies about 9 mi north of Wenden, and about 1.5 mi east of Cunningham Pass (fig. 1). Access to the area is by secondary gravel and dirt roads off the paved Cunningham Pass road.

Previous studies

The regional geology of west-central Arizona is summarized by Reynolds (1980), who describes the Late Cretaceous-Tertiary metamorphic and igneous complexes that include the Harcuvar Mountains. Mesozoic structural features in the region are described by Reynolds and others (1986). A model for hydrothermal mineralization as related to detachment faults is discussed by Wilkins and others (1986). Structural controls of mineralization associated with Tertiary detachment faults are described by Spencer and Welty (1986). The Bullard detachment fault in the far eastern part of the Harcuvar Mountains is described by Reynolds and Spencer (1985). Metallic mineral districts in the region are summarized by Keith and others (1983).

Methods of investigation

Prior to field work, a literature search was conducted for minerals information pertinent to the study area. Bureau of Land Management records were checked for current mining claims and oil and gas leases. Two Bureau geologists conducted a five-day field examination of the study area.

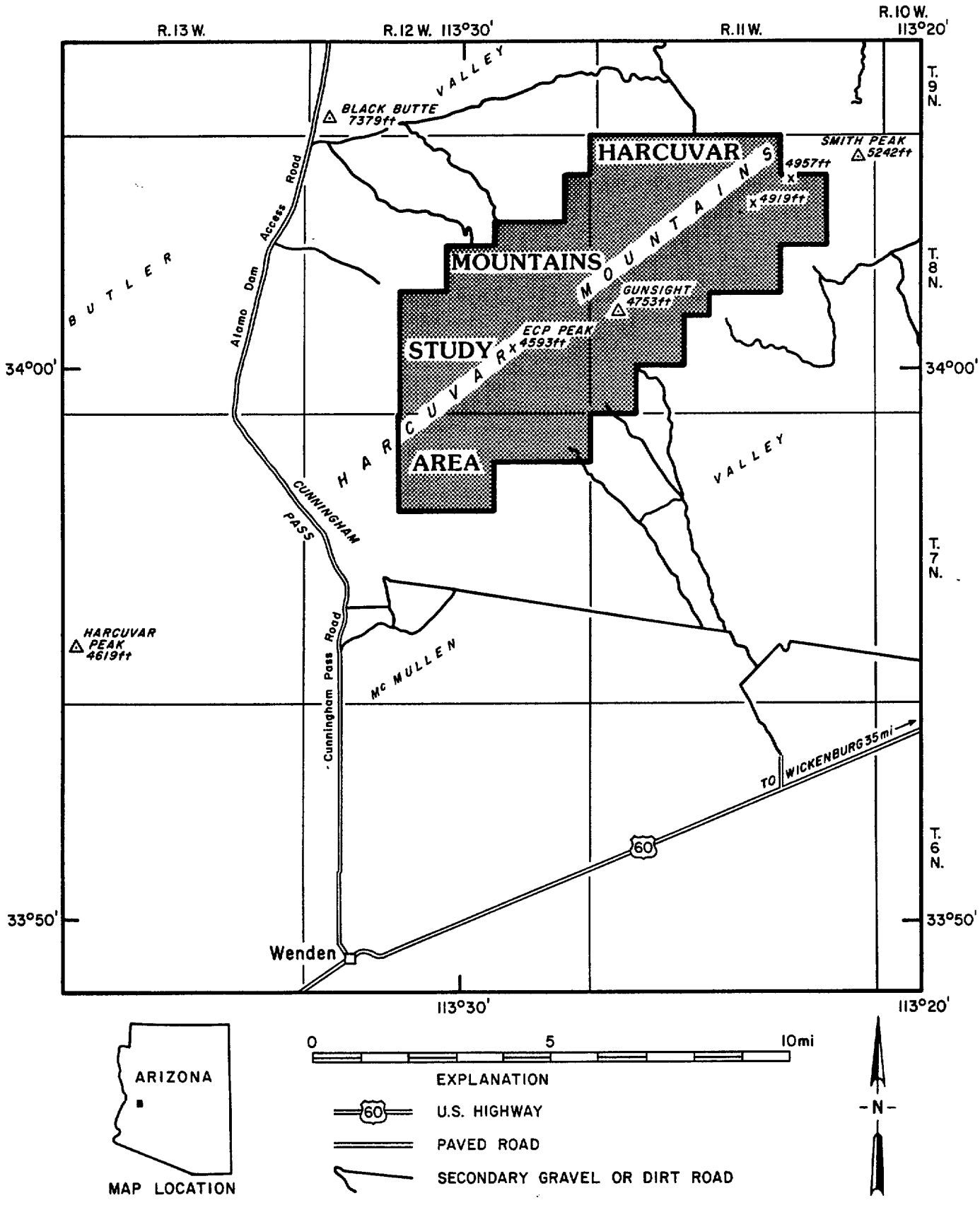

Figure 1.--Index map of the Harcuvar Mountains study area, La Paz County, Arizona.

Twenty-five chip and dump samples were collected from mines and prospects in and near the study area. Gold concentrations were determined by fire assay with an atomic absorption spectrometry finish; silver and copper concentrations were determined by atomic absorption spectrometry. Five of these samples were selected for multi-element analyses by inductively coupled plasma-atomic emission spectrometry (appendix). Sample analyses were conducted by Chemex Labs Inc., Sparks, Nevada.

Geologic setting

The Harcuvar Mountains are part of a metamorphic core complex composed of metamorphic and granitic rocks of Precambrian age and sheets of Cretaceous-age granite. Late Cretaceous and mid-Tertiary-age metamorphism and crustal extention have converted these rocks into amphibolite-grade gneisses, mylonites, and gneissic granites with a gently dipping foliation. These Precambrian and Cretaceous rocks are part of the lower plate of the Bullard detachment fault, a dislocation surface that has been mapped in the northeastern part of the Harcuvar Mountains. This fault parallels the northwest and southeast sides of the study area. Upper plate rocks flank both sides of the study area along the Bullard fault but they do not extend into the study area (Drewes and others, in prep.). (See Reynolds, 1980, p. 7-9, and 13, Reynolds and Spencer, 1985, p. 353-356, and Reynolds and Spencer, 1987, p. 10.)

MINING ACTIVITY

Several prospects and small mines occur in the central part and along the southeastern margin of the study area, however there is no record of mineral production from these workings. According to BLM records, approximately 840 acres are covered by lode claims in the Harcuvar Mountains study area (pl. 1) as of May 1986.

The Cunningham Pass mining district (pl. 1) is centered about 3 mi west of the study area in a broad northwest trending fault zone in Precambrian metamorphics (Keith, 1978, p. 29-33). Prospecting and mining in this district began in the middle 1880s, and numerous shafts and open cuts were worked for copper, gold, and silver. The total estimated and recorded production from the Cunningham Pass district through 1974 is approximately 9,000 tons of ore containing 773 tons of copper, 4,436 oz gold, 2,344 oz silver, and very minor lead (Keith, 1978, p. 32).

Several small workings (shafts and pits) about a mile northwest of the study area (pl. 1) are in Tertiary sedimentary rocks (Spencer and Welty, 1985, p. 30-31). There is no record of production from these workings.

OIL AND GAS

The potential for a petroleum reservoir in the Harcuvar Mountains study area is considered to be "low to zero" by Ryder (1983, p. C19-C20) because the underlying rocks in this region are mostly of igneous and metamorphic origin. Tertiary sedimentary rocks in the basins between the horst blocks are the only place hydrocarbons could occur, however these basins are shallow and they are unlikely to contain significant quantities of hydrocarbons.

About two-thirds of the study area is covered by oil and gas leases and lease applications (fig. 2).

APPRAISAL OF SITES EXAMINED

Mineralized fault zones were prospected in the central part of the study area at the head of Webber Canyon, and along the eastern margin of the study area along Happy Camp Canyon (pl. 1). These fault zones and associated quartz veins generally have elevated concentrations of copper. One of these fault-vein systems carrys consistently elevated concentrations of gold.

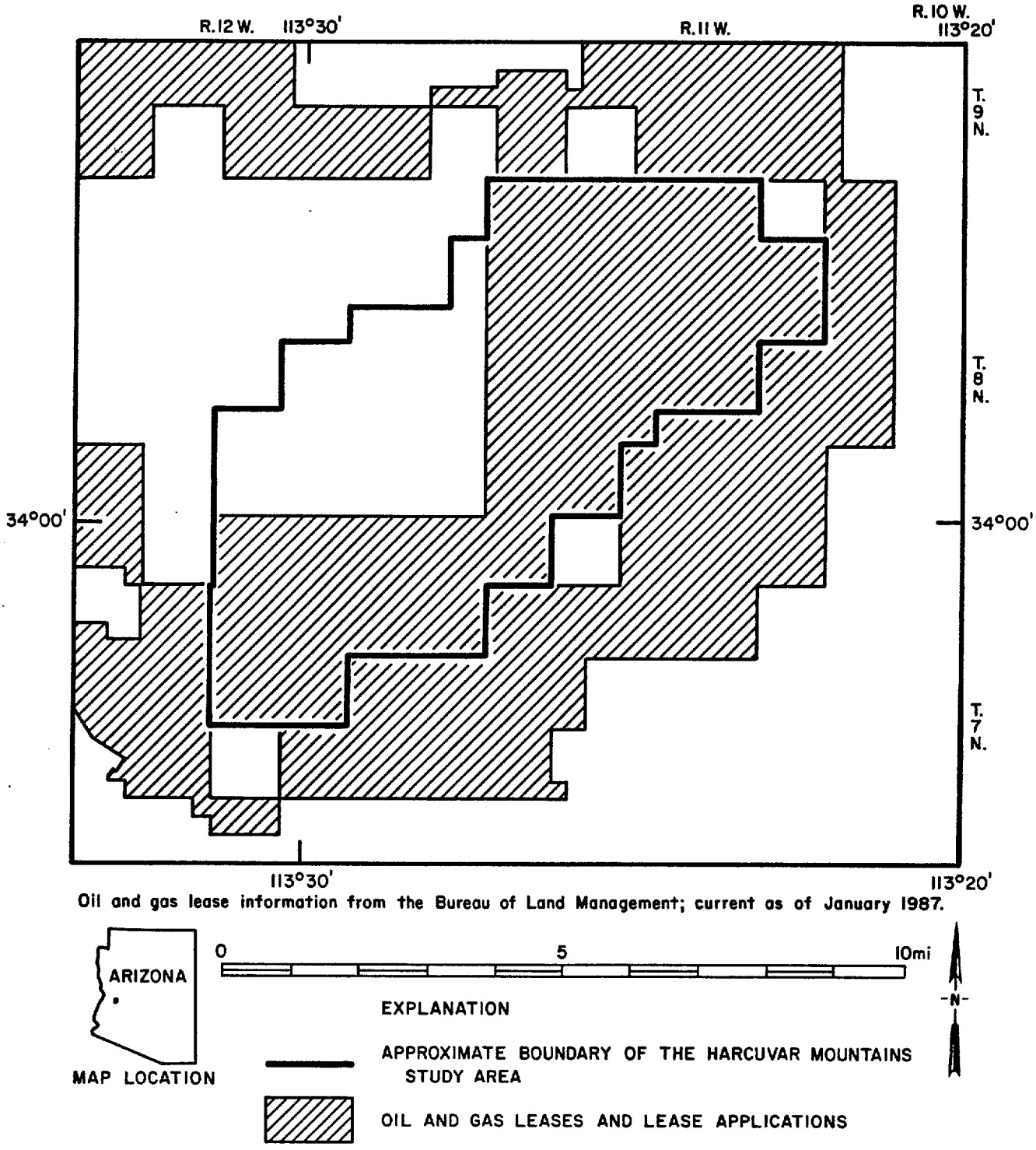

Figure 2.--Map showing oil and gas leases and lease applications within and near the Harcuvar Mountains study area, La Paz County, Arizona.

Northwest of the study area, two prospects in Tertiary sedimentary rocks were sampled. They both show elevated concentrations of copper; one shows a trace of gold. Mineralization in these strata is in upper plate rocks and is probably related to the Bullard detachment fault (Spencer and Welty, 1985, p. 30-31).

Webber Mine area

A small group of workings at the head of Webber Canyon, in the central part of the study area (pl. 1) follow a northwest-striking fault in granite gneiss (fig. 3A). The fault zone is characterized by breccia in gouge, silicified zones in gneiss, and limonite coated fracture surfaces in gneiss adjacent to the fault. Disseminated green copper minerals are typically associated with the fractures, fault gouge, and silicified zones. Workings along this fault include three prospect pits, a shaft, and a 60-ft-long adit.

Five samples were taken from the Webber Mine adit (fig. 3B). Samples from the fault gouge (nos. 4 and 7) and a sample from the hanging wall (no. 5) contain copper ranging from 1.64% to 5.27%. Footwall samples (nos. 3 and 6) contain much less copper (0.23% and 0.15% respectively). The maximum width of the fault gouge is 2 ft in the Webber adit.

Five samples were taken from three prospect pits in the Webber Mine area (fig. 3A). Sample number 8, taken in a 2.8-ft-wide gouge zone, contains 2.15% copper. Sample numbers 9-12, from the two upper prospect pits, contain less than 1% copper.

An inferred subeconomic resource of 600 tons of 3.3% copper has been determined for the Webber adit, and an inferred subeconomic resource of 8,000 tons of 1.8% copper has been determined for the entire fault zone of the Webber Mine area as shown in fig. 3A (to 50 ft depth between workings).

Deposits of this grade would require several million tons of ore to be economical.

The fault and related mineralization in the vicinity of these workings is in the oxidized zone. At depth, there may be a zone of secondary enrichment of copper and silver. Drilling and geophysical work are needed to determine the presence of a resource at depth, but the indicated small size of the deposit does not warrant the expense of such investigations.

Happy Camp Canyon area

Workings along Happy Camp Canyon, near the southeastern margin of the study area (pl. 1), are on three northwest-trending faults that dip vertically or steeply to the northeast (figs. 4, 5). The faults are characterized by veins and lenses of quartz, silicified zones in gneiss, breccia in gouge, and fracture zones in gneiss adjacent to the faults. The quartz is often vuggy, with inclusions of green copper minerals and limonite.

Workings on the western fault (inside the study area) include a 50-ft-long adit with a 97-ft-deep winze and a 30-ft-high raise to the surface, and a prospect pit about 100 ft uphill from the portal of the adit (fig. 4). A vein of vuggy quartz with inclusions of limonite and secondary copper-minerals follows most of the exposed strike length of this fault in the vicinity of these workings.

Four samples were taken in the adit. The winze in this adit was not accessible, however, sample numbers 13, 14 and 15 appear to be representative of the rock and quartz vein that the winze penetrates. Gold was present in all samples from the adit, ranging from 0.011 to 0.073 oz/st. Copper concentrations were less than 1% for all of the samples taken in the adit (fig. 4).

A sample collected from the quartz vein at the top of the raise has a gold concentration of 0.029 oz/st and 1.15% copper (fig. 4, sample 17). A select dump sample of quartz vein material from this raise (sample 18) has a gold concentration of 0.013 oz/st and less than 1% copper. A sample taken across this vein from the prospect pit above the raise (fig. 4, sample 19) has a gold concentration of 0.025 oz/st and 4% copper. An inferred subeconomic resource of 300 tons of 0.045 oz gold/st and 1.15% copper, and an inferred subeconomic resource of 2,000 tons of 0.030 oz gold/st and 1.15% copper has been determined for this structure assuming vein continuity to the bottom of the winze. Several million tons of ore would be needed to make this deposit economical. Geophysical work would be needed to trace the extent of the vein.

Close to the study area boundary, two faults are exposed in two prospect pits (fig. 5). In the upper prospect, a sample was taken across a 2-ft-wide zone of fault gouge with lenses of coarsely crystalline fluorite. No notable concentrations of copper or gold were detected from this sample (fig. 5, no. 20). Sample number 21 was taken across a fault exposed in a prospect about 180 ft further down the hill. The sample, taken across a 1-ft-wide quartz vein with inclusions of malachite and chrysocolla, and 0.5 ft of gouge, contained 0.017 oz gold/st, and 1.1% copper. About 250 ft further down the hill, an adit was driven in granite gneiss apparently to intersect this mineralized fault. Three samples were taken of the wall rock, however, assay data show no notable metal concentrations (fig. 5, nos. 22-24). The face of the adit is only a few feet away from intersecting the projection of the fault.

The veins in the vicinity of these workings are in the oxidized zone; there may be a zone of secondary enrichment of copper at depth. Drilling and geophysical work are needed to determine the presence of ore bodies at depth, but the structures are too small to justify the expense of exploration.

Miscellaneous occurrences

Approximately 1 mi northwest of the study area, several prospects are in Tertiary sedimentary rocks; the mineralization may be related to the Bullard detachment fault. The fault separates the Tertiary strata from the study area. The geology and workings in this district are summarized by Spencer and Welty (1985, p. 30-31). Two prospects were sampled approximately 1 mi outside the study area (pl. 1, nos. 1, 2). A grab was taken from the dump of a 15-ft-deep shaft in conglomerate overlying sandstone and siltstone. Traces of green copper minerals were observed disseminated in the conglomerate; barite was noted on the dump. This sample contained 0.26% copper and 0.061 oz gold/st (table 1, no. 1). A sandstone bed was sampled in another prospect about 1 mi southwest of the shaft (pl. 1, no. 2). This sample contained only traces of copper and silver (table 1). These prospects are in the upper plate of the Bullard detatchment fault. The upper plate is not present in the study area.

A silicified zone in gneiss was sampled in a small prospect about 1/2 mi southeast of the study area (pl. 1, no. 25). Only 0.014% copper was detected in the assay; silver and gold were not detected (table 1).

CONCLUSIONS

Mines and prospects on four faults are in the central and southeastern parts of the study area. These structures have similar orientations and could be related. In the central part of the study area, at the head of Webber Canyon, a small group of workings are on a northwest-striking fault in granite gneiss. An inferred subeconomic resource of 600 tons of 3.3% copper has been determined for the Webber adit, and an inferred subeconomic resource of 8,000 tons of 1.8% copper has been determined for the Webber Mine area.

Workings along Happy Camp Canyon, inside the eastern part of the study area are on three northwest-trending faults. On the western fault, a 50-ft-long adit that includes a 97-ft-deep winze and a 30-ft-high raise, and a prospect pit are on a vuggy quartz vein with gold concentrations varying from 0.011-.073 oz/st. Copper in this vein is generally below 1%. An inferred subeconomic resource of 300 tons of 0.045 oz gold/st and 1.15% copper, and an inferred subeconomic resource of 2,000 tons of 0.030 oz gold/st and 1.15% copper has been determined for this structure. In a prospect near the study area boundary, a sample taken across a quartz vein and fault gouge has a gold concentration of 0.017 oz/st, and 1.1% copper. An adit was apparently driven to intersect this vein, but work was stopped before the vein was reached.

The veins and mineralized faults in the vicinity of the workings in Webber Canyon and Happy Camp Canyon area are in the oxidized zone. There may be a zone of secondary enrichment of copper at depth. Drilling and geophysical work are needed to determine the presence of ore bodies at depth, however the small apparent size of the structures does not justify the expense of exploration.

Oil and gas potential in the study area has been rated low because underlying rocks in this region are mostly of igneous and metamorphic origin.

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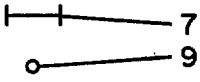
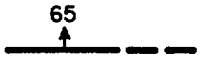
EXPLANATION OF SYMBOLS FOR FIGURES 3-5

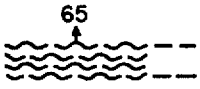
APPROXIMATE BOUNDARY OF THE HARCUVAR MOUNTAINS STUDY AREA



SAMPLE LOCALITY--Showing sample number



FAULT--Showing strike and dip; dashed where projected



FAULT ZONE--Showing strike and dip; dashed where approximate

VEIN--Showing strike and dip

VEIN--Showing strike and vertical dip; dashed where approximate

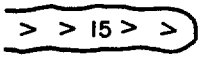
OPENCUT

SHAFT

PIT

BOTTOM OF RAISE

TOP OF WINZE



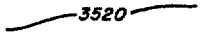
INCLINED WORKINGS--Showing degree of inclination; chevrons pointing down

STEP DOWN--Showing drop in feet; hachures on down side

DUMP

DUMP IN LOGITUDINAL SECTION

UNDERGROUND WORKING SHOWN DASHED ON SURFACE MAP



TOPOGRAPHIC CONTOUR--Showing elevation in feet above sea level

GRANITE GNEISS

Table 1.--Data for samples from miscellaneous prospects in and near the Harcuvar Mountains study area, La Paz County, Arizona.

[---, assayed for but not detected; xx, not applicable; lower detection limits: Au, 0.002 oz/st; Ag, 0.01 oz/st; Cu, 1 ppm.]

Sample No.	Type	Length (ft)	Au (oz/st)	Ag (oz/st)	Cu (ppm)	Remarks
1	dump	xx	0.061	---	2,600	Sandstone and conglomerate.
2	chip	4.5	---	0.01	71	Sandstone.
25	do.	4.0	---	---	140	Silicified zone in gneiss, strikes N., dips 80° E.

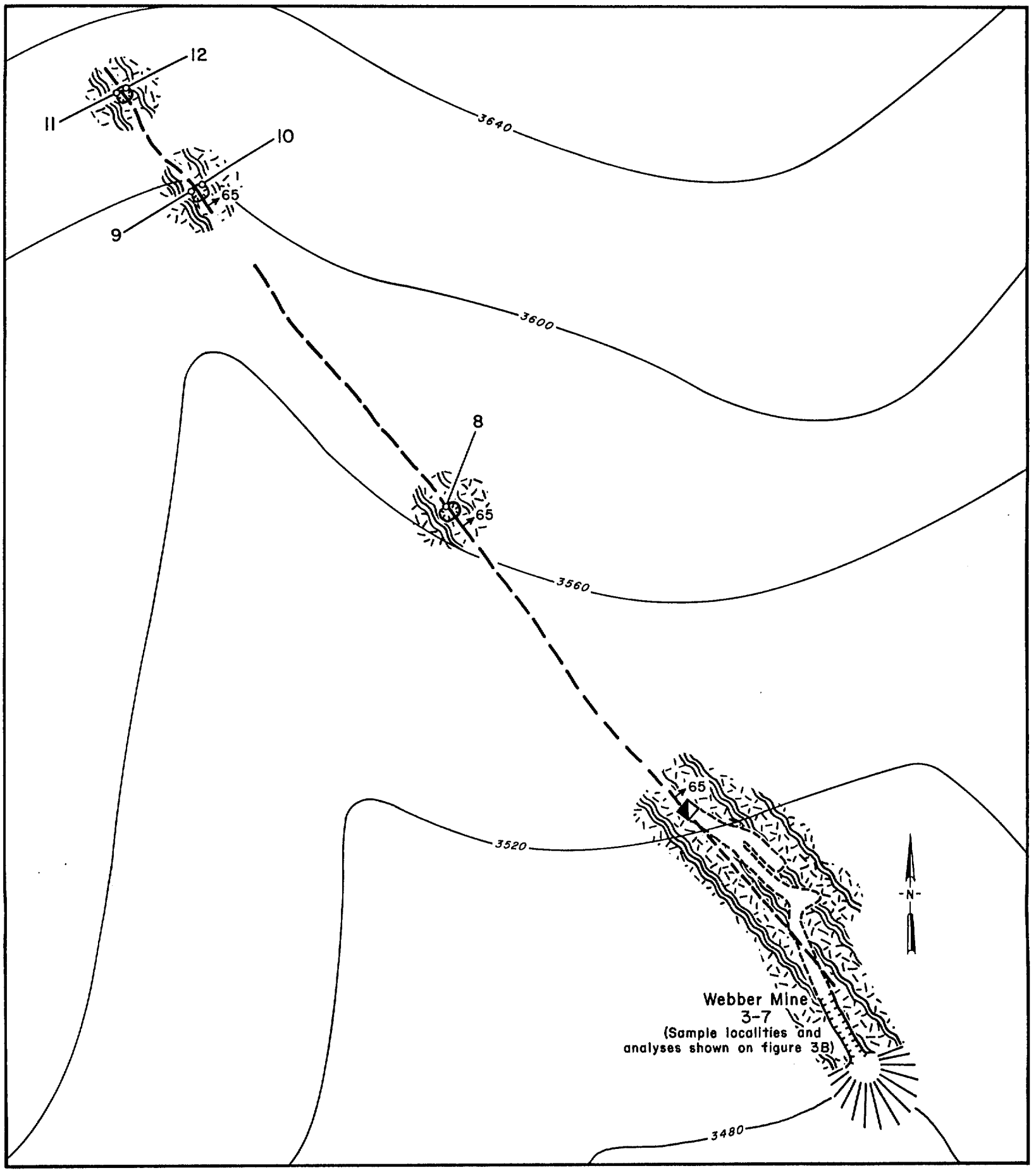
Appendix--Results and lower detection limits of multi-element analyses for selected samples from the Harcuvar Mountains study area, La Paz County, Arizona.

[---, assayed for but not detected; >, greater than.]

Element		Sample number				
		1	4	16	19	21
Al	%	1.15	0.44	0.61	0.27	0.79
Ag	ppm	.2	14.6	.2	2.2	.2
As	ppm	20	10	---	10	10
Ba	ppm	190	20	10	30	40
Be	ppm	---	---	---	---	---
Bi	ppm	2	---	---	---	---
Ca	%	5.03	.12	.15	.09	1.23
Cd	ppm	.5	3.5	---	---	---
Co	ppm	12	10	17	19	13
Cr	ppm	111	54	85	97	99
Cu	ppm	2,440	>10,000	6,490	>10,000	>10,000
Fe	%	4.59	1.51	3.56	5.72	4.64
Ga	ppm	20	---	---	---	---
Hg	ppm	---	---	---	---	---
K	%	.10	.03	.13	.04	.06
La	ppm	20	---	10	---	---
Mg	%	1.06	.05	.07	.03	.34
Mn	ppm	1,480	24	73	34	202
Mo	ppm	---	6	17	28	3
Na	%	.01	.02	.02	---	.01
Ni	ppm	47	7	4	6	11
P	ppm	1,290	---	110	---	---
Pb	ppm	190	464	14	28	14
Sb	ppm	---	---	---	---	---
Se	ppm	---	30	---	---	---
Sr	ppm	59	13	62	49	22
Ti	%	.07	---	---	---	.03
Tl	ppm	10	---	---	---	---
U	ppm	---	---	---	10	---
V	ppm	109	13	35	41	54
W	ppm	---	---	---	---	---
Zn	ppm	671	557	22	40	51

Detection limits for multi-element analyses.

Element	Symbol	Unit	Lower detection limit
Aluminum	Al	%	0.01
Silver	Ag	ppm	.2
Arsenic	As	ppm	5
Barium	Ba	ppm	10
Beryllium	Be	ppm	.5
Bismuth	Bi	ppm	2
Calcium	Ca	%	.01
Cadmium	Cd	ppm	.5
Cobalt	Co	ppm	1
Chromium	Cr	ppm	1
Copper	Cu	ppm	1
Iron	Fe	%	.01
Gallium	Ga	ppm	10
Mercury	Hg	ppm	1
Potassium	K	%	.01
Lanthanum	La	ppm	10
Magnesium	Mg	%	.01
Manganese	Mn	ppm	1
Molybdenum	Mo	ppm	1
Sodium	Na	%	.01
Nickel	Ni	ppm	1
Phosphorus	P	ppm	10
Lead	Pb	ppm	2
Antimony	Sb	ppm	5
Selenium	Se	ppm	10
Strontium	Sr	ppm	1
Titanium	Ti	%	.01
Thallium	Tl	ppm	10
Uranium	U	ppm	10
Vanadium	V	ppm	1
Tungsten	W	ppm	5
Zinc	Zn	ppm	1



[--, assayed for but not detected; lower detection limits: Au, 0.002 oz/st; Ag, 0.01 oz/st; Cu, 1 ppm.]

Sample No.	Chip length (ft)	Au (oz/st)	Ag (oz/st)	Cu (ppm (unless %))	Remarks
8	2.8	--	0.04	2.15%	Soft white gouge with silicified seams that are impregnated with green copper minerals.
9	3.5	--	.01	6,550	Sericitically altered gneiss and clay on footwall, adjacent to fault.
10	5.0	--	.02	2,950	Soft fault gouge with breccia; disseminated green copper minerals stain gouge.
11	2.5	--	.02	7,600	Fractured, sericitically altered granite gneiss, white clay matrix, from footwall.
12	2.0	--	.01	155	Soft white gouge, minor limonite stain.

Figure 3A.--The Webber Mine area, showing sample localities 8-12. Table shows data for samples 8-12.

United States Department of the Interior
BUREAU OF MINES
P. O. BOX 25086
BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225
Intermountain Field Operations Center

July 20, 1988

Mr. Leroy E. Kissinger, Director
Arizona Department of Mining and Mineral Resources
Mining Building, State Fairgrounds
Phoenix, Arizona 85007

Dear Mr. Kissinger:

Enclosed is a copy of each of the following U.S. Bureau of Mines Open-File Reports:

MLA 29-88 MINERAL RESOURCES OF A PART OF THE HARCUVAR MOUNTAINS WILDERNESS STUDY AREA (AZ-020-0&%), LA PAZ COUNTY, ARIZONA

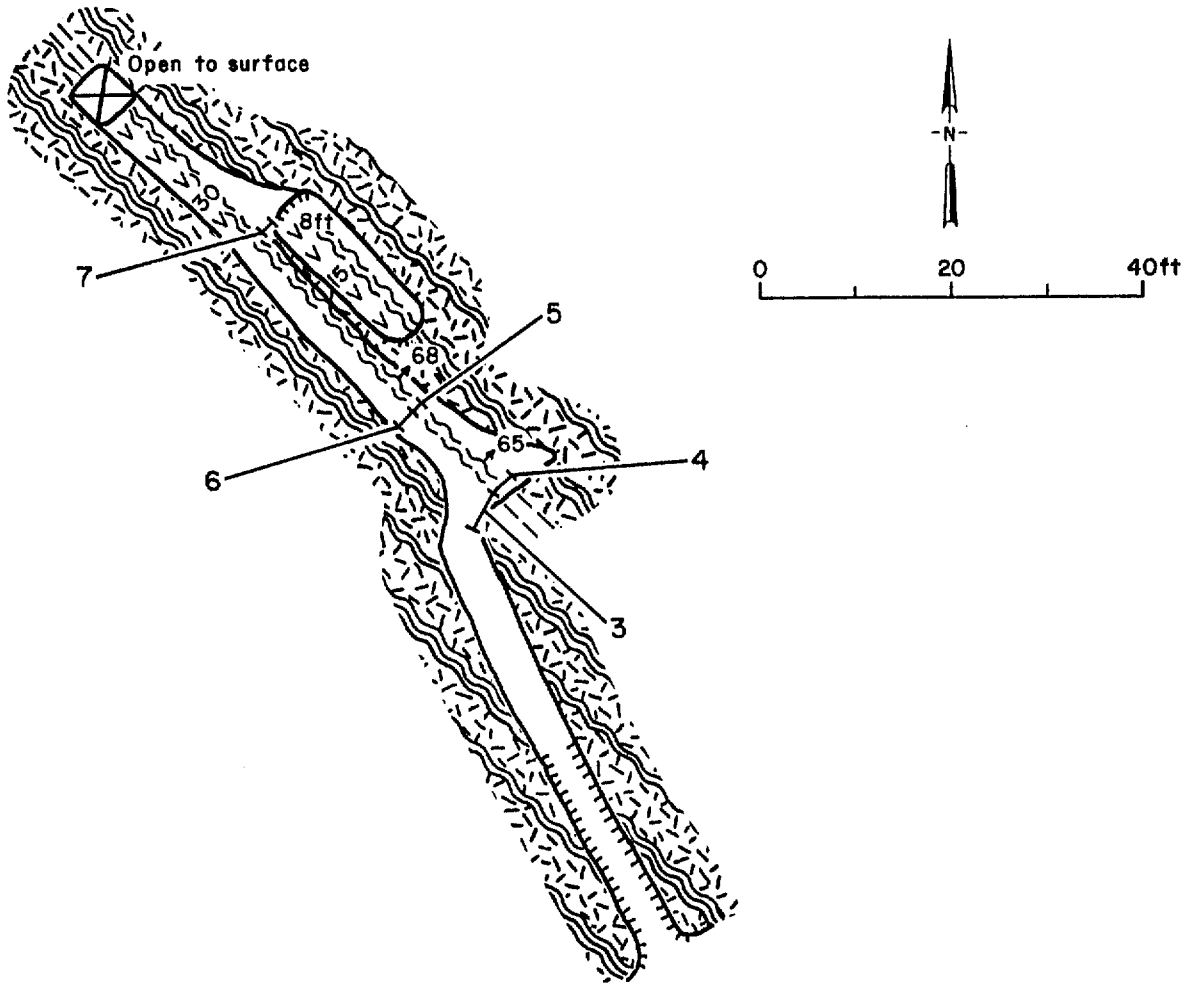
Sincerely,

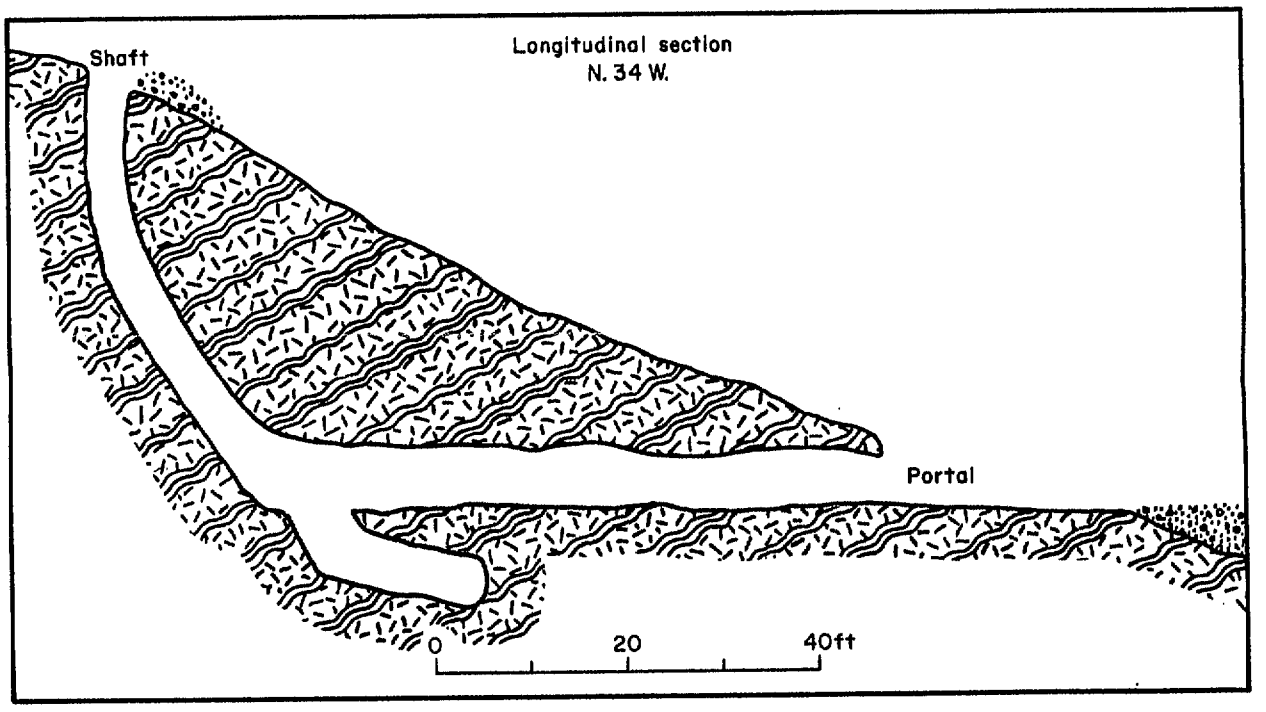
Uldis Jansons

Uldis Jansons, Chief
RE Branch

Enclosure(s)
(listed above)

cc: Project File

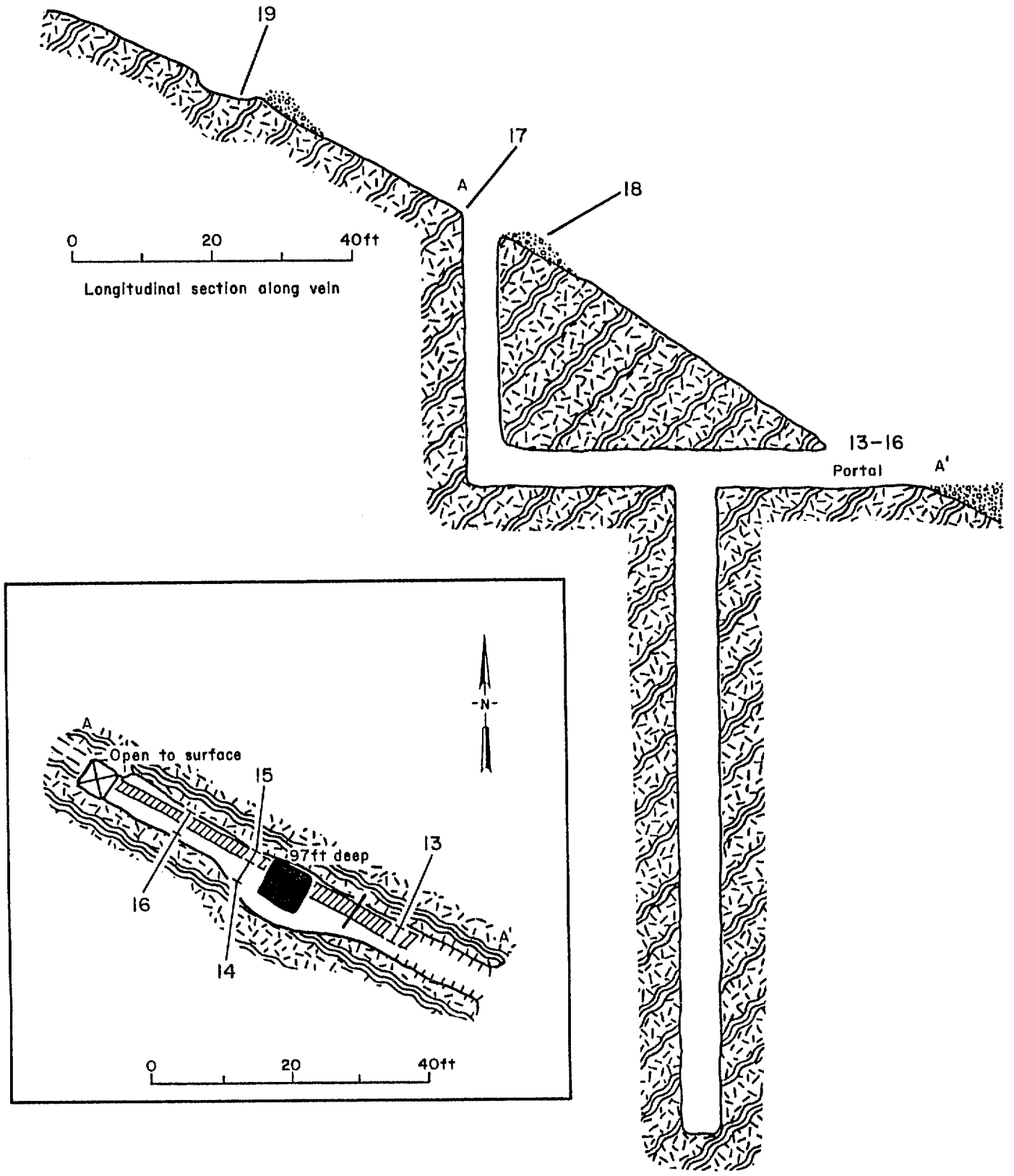




[--, assayed for but not detected; lower detection limits: Au, 0.002 oz/st; Ag, 0.01 oz/st; Cu, 1 ppm.]

Sample No.	Chip length (ft)	Au (oz/st)	Ag (oz/st)	Cu (ppm (unless %))	Remarks
3	4.0	--	--	2,300	Footwall; fractured gneiss; limonite and trace of chrysocolla coat fracture surfaces.
4	2.0	0.002	0.47	5.27%	Soft white fault gouge, green streaks of disseminated copper minerals.
5	1.5	.003	.42	2.97%	Hanging wall; sericitically altered gneiss and 4-in. silicified zone with disseminated copper silicates.
6	2.0	--	--	1,500	Footwall; fractured gneiss, limonite and trace of chrysocolla coat fracture surfaces.
7	1.5	--	.13	1.64%	Sericitically altered gneiss and gouge; 2-in. limonite seam, chrysocolla coats fracture surfaces.

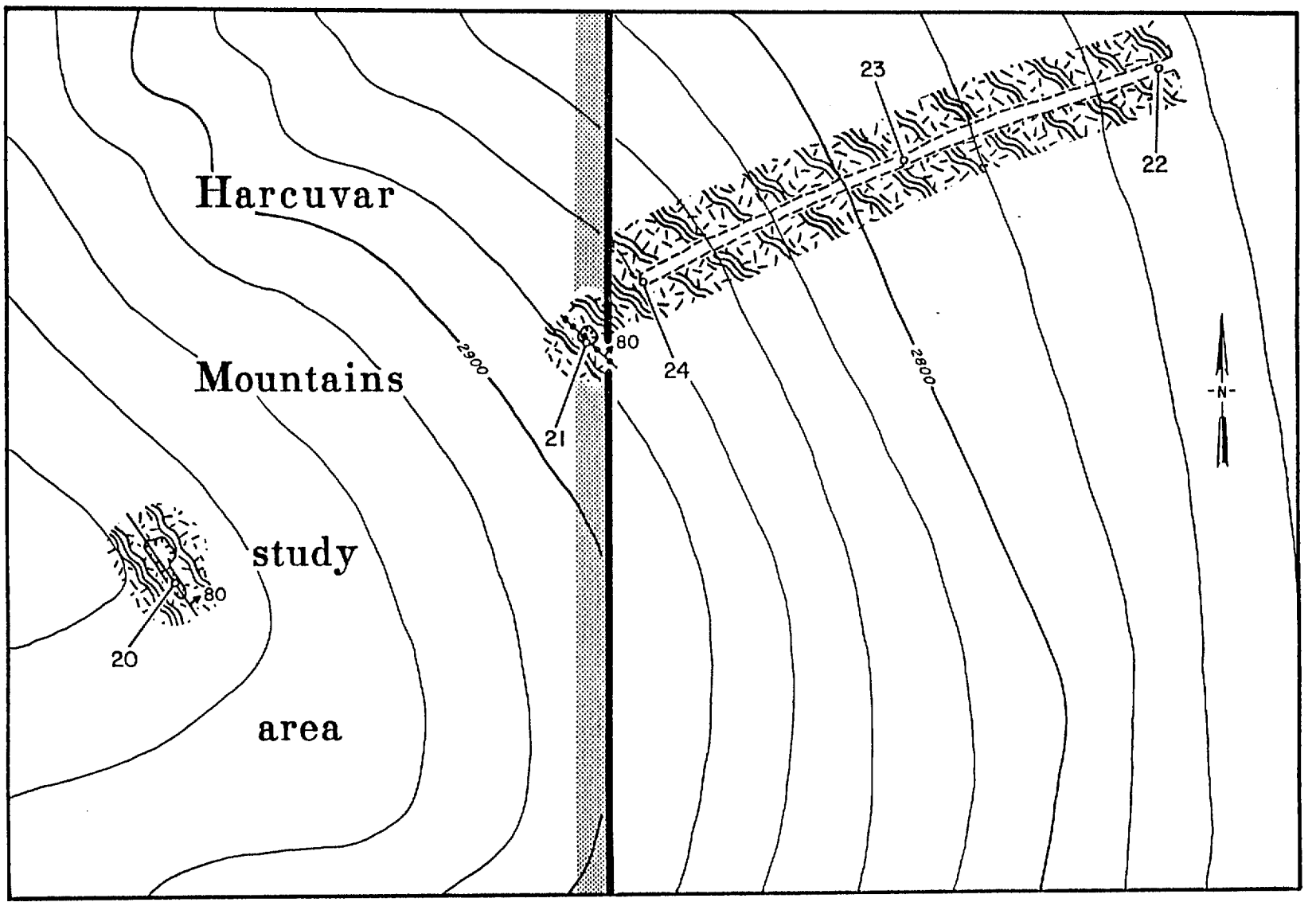
Figure 3B.--Plan map and logitudinal section of the Webber adit, showing sample localities 3-7. Table shows sample data.



[--, assayed for but not detected; lower detection limits: Au, 0.002 oz/st; Ag, 0.01 oz/st; Cu, 1 ppm.]

Sample No.	Type	Length (ft)	Au (oz/st)	Ag (oz/st)	Cu (ppm (unless %))	Remarks
13	chip	2.8	0.059	0.01	4,750	Vuggy quartz vein, inclusions of iron and manganese oxides, tiny spots of green copper minerals.
14	do.	3.3	.015	.01	1,700	Brecciated, sericitically altered gneiss; limonite and manganese oxides coat fracture surfaces.
15	do.	2.0	.073	.01	1,750	1.4-ft vuggy quartz vein, limonite inclusions; 0.6-ft white fault gouge.
16	do.	4.0	.011	--	6,600	Sericitically altered granite gneiss; 1.4-ft zone of limonite-stained gouge and breccia.
17	do.	1.2	.029	.04	1.15%	Vuggy quartz vein, inclusions of green copper minerals.
18	dump	select	.013	.04	6,150	Vein quartz, vuggy, with inclusions of limonite and green copper minerals.
19	chip	1.2	.025	.06	4.00%	Vuggy quartz vein, abundant inclusions of green copper minerals, some flecks of pyrite, chalcopyrite, and chalcocite.

Figure 4.--Plan map and logitudinal section of the western adit and prospects in Happy Camp Canyon, showing sample localities 13-19. Table shows sample data.



[--, assayed for but not detected; lower detection limits: Au, 0.002 oz/st; Ag, 0.01 oz/st; Cu, 1 ppm.]

Sample No.	Chip length (ft)	Au (oz/st)	Ag (oz/st)	Cu (ppm (unless %))	Remarks
20	2.0	0.005	--	780	Gouge, streaks and lenses of purple fluorite crystals.
21	1.5	.017	--	1.10%	Quartz vein, 1 ft wide, inclusions of malachite and chrysocolla; 0.5-ft gouge.
22	3.5	--	--	35	Granite gneiss.
23	3.0	--	--	120	Do.
24	3.5	--	--	33	Do.

Figure 5.--The eastern adit and prospects in Happy Camp Canyon, showing sample localities 20-24. Table shows sample data.

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

OPEN FILE REPORT
MLA 29-88
PLATE 1

Webber Mine
3-12
Area of figures 3A and 3B

20-24
Area of figure 5

13-19
See figure 4

Cunningham Pass district

Field work completed in 1987 by Steven E. Tuftin; assisted by Robert H. Wood II.

EXPLANATION

- APPROXIMATE BOUNDARY OF THE HARCUVAR MOUNTAINS STUDY AREA
- UNPATENTED MINING CLAIMS
- SURFACE OPENINGS--Showing sample number(s)
  - 1 Shaft
  - 2 Prospect pit
  - 13-19 Adit

Base from the U.S. Geological Survey, 1:24,000
E.C.P. Peak and Smith Peak, 1967; and Buckskin Mtns East SE, Harcuvar NE, and Harquahala Mtn NW, advance sheets

SCALE 1:50,000
0 ½ 1 2 3 4mi
CONTOUR INTERVALS 20 AND 40ft

MN

ARIZONA
MAP LOCATION

MINE AND PROSPECT MAP OF THE HARCUVAR MOUNTAINS STUDY AREA, LA PAZ COUNTY, ARIZONA

BY

STEVEN E. TUFTIN, U.S. BUREAU OF MINES

1988