CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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FEBRUARY 1947

UNITED STATES
DEPARTMENT OF THE INTERIOR
J. A. KRUG, SECRETARY

BUREAU OF MINES
R. R. SAYERS, DIRECTOR

REPORT OF INVESTIGATIONS

APEX COPPER PROPERTY

COCONINO COUNTY, ARIZ.

BY

STANTON L. TAINTER

R. I. 4013,
February 1947.

REPORT OF INVESTIGATIONS

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

APEX COPPER PROPERTY, COCONINO COUNTY, ARIZONA[1]

By Stanton L. Tainter[2]

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INTRODUCTION

When the disruption of gold mining stopped the usual source of siliceous flux needed by copper smelters, sandstone copper deposits in northern Arizona offered possibilities as a source of the flux during the war emergency. The Federal Geological Survey, while making a comprehensive survey of sandstone copper deposits, investigated the Warm Springs mining district in north-central Coconino County in August 1943. A month later, J. H. Hedges, chief of the Tucson Division, Mining Branch, Bureau of Mines, examined the operations in connection with an application for an access road.

Both investigations concluded that the district, as an emergency source of copper-bearing siliceous flux, had considerable merit, provided high prices for copper continued in effect.

Early in 1944, V. M. Ryan and S. B. Atherley requested assistance from the Bureau in exploring various deposits on their property.

The Bureau[3] drilled 152 holes, aggregating 3,756 feet, on the Petoskey and Mackin groups of claims. This report is based upon churn drilling done under contract from October 7 to November 25, 1944.

1/ The Bureau of Mines will welcome reprinting of this paper provided the following footnote acknowledgment is used: "Reprinted from Bureau of Mines Report of Investigations 4013."

2/ Mining engineer, Bureau of Mines.

3/ Stanton L. Tainter, project engineer.

ACKNOWLEDGMENTS

In its program of exploration of mineral deposits, the Bureau of Mines has as its primary object the more effective utilization of our mineral resources to the end that they make the greatest possible contribution to national security and economy. It is the policy of the Bureau to publish the facts developed by each exploratory project as soon as practical after its conclusion. The Mining Branch, Lowell B. Moon, chief, conducts preliminary examinations, performs the actual exploratory work, and prepares the final report. The Metallurgical Branch, R. G. Knickerbocker, chief, analyzes samples and performs beneficiation tests.

With respect to the investigations reported in this paper, the functions of the Mining, and Metallurgical Branches were carried out under the direction of J. H. Hedges, district engineer for Arizona, and S. R. Zimmerly, regional engineer, respectively. The Federal Geological Survey mapped the geology, recommended drilling sites, and logged the drill holes.

LOCATION AND ACCESSIBILITY

The property is approximately 2 miles west of Jacob Lake Post Office in the Warm Springs or Jacob Lake mining district, Coconino County, Arizona. (Fig. 1.) The claims are accessible by a gravelled access road from Jacob Lake, which is 167 miles north of Flagstaff, Ariz., and 159 miles south of Marysvale, Utah, over paved highway U. S. 89. Marysvale is the terminus of a branch line from Salt Lake City of the Denver & Rio Grande Western Railroad, and Flagstaff is on the Atchison, Topeka, & Santa Fe Railway.

PHYSICAL FEATURES AND CLIMATE

The claims are on the Kaibab Plateau near the western margin of the uplift at an altitude of 7,900 feet. The topography of the area is characterized by series of ridges and canyons. The Mackin and Petoskey groups of claims are separated by Warm Springs Canyon, a deep gulch draining westward. Jacob Lake is immediately southeast of the Mackin group, and Lambs Lake is on the Petoskey group.

Water is a problem on the Kaibab Plateau, for there are no flowing streams, and the small basins fed by melting snow form intermittent lakes, which dry up during the summer months. A number of seeps and springs are found along the western edge of the plateau, of which Big Springs, 7 miles south of Ryan, is perhaps the largest.

The plateau supports marketable timber. Pinon and juniper grow at an altitude below that of Jacob Lake. Ponderosa pine grows in the vicinity of Jacob Lake, and Engelmann spruce, Douglas, white, and Alpine firs grow at higher altitudes. The greater part of the timbered area is within the Kaibab National Forest.

Snowfall prohibits open-cut operations from January to May. During 1944, snow remained on the ground after November 12. No trouble has been

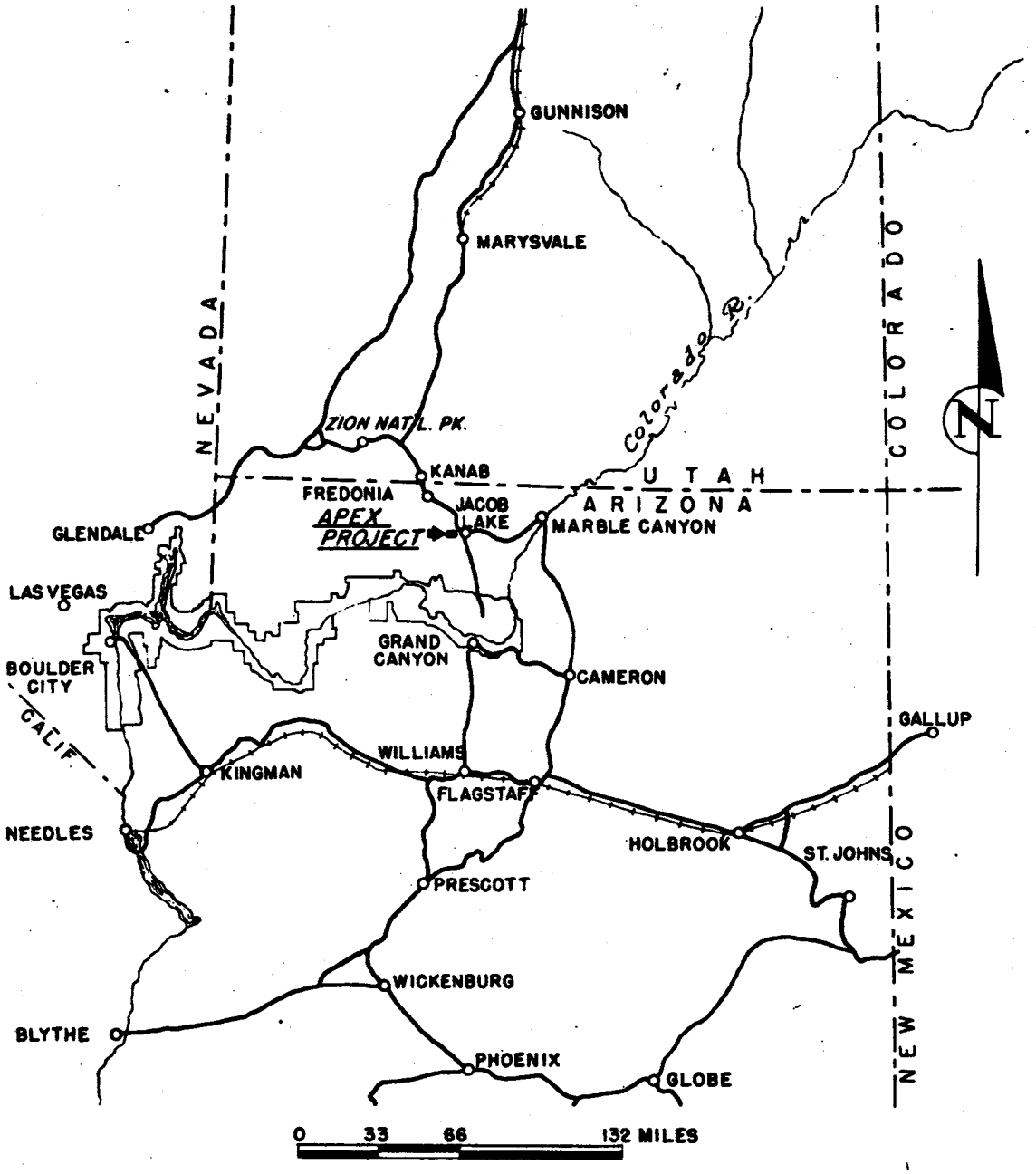


Figure 1.- Location map, Apex copper project, Coconino County, Arizona.

experienced from surface waters flooding the open-cuts during two seasons of operations.

Climatic data recorded by the Federal Weather Bureau over a six-year period at Bright Angel, 41 miles south of Jacob Lake, is shown in the following table. The winters at Jacob Lake are a little warmer than at Bright Angel.

Month	Temperature, °F.					Precipitation, inches	Snowfall, inches
	Average	Average maximum	Average minimum	Highest	Lowest		
Jan.	20.4	34.4	6.4	56	-23	2.69	24.4
Feb.	29.4	42.6	11.8	55	-20	3.34	22.2
Mar.	29.8	44.0	15.7	57	-14	2.02	16.6
Apr.	38.2	51.4	25.0	69	-4	2.93	14.1
May.....	46.0	61.1	30.8	76	12	1.26	4.4
June.....	54.6	72.9	36.4	88	23	1.10	T
July.....	60.1	75.8	44.4	87	26	2.27	.0
Aug.	57.7	72.8	42.6	84	27	2.47	.0
Sept.	51.5	66.5	36.6	80	18	2.93	.0
Oct.	42.3	57.3	27.3	71	10	1.86	5.2
Nov.	31.1	45.0	17.3	61	-10	1.83	12.7
Dec.	20.0	37.4	7.3	53	-12	2.15	19.7
Annual.....	40.1	55.1	25.1	88	-23	26.85	119.3

HISTORY

The first development work was done south of Warm Springs Canyon by the Petoskey Mining Co. Between 1900 and 1902, the company acquired five patented claims, built a steam pumping plant in Warm Springs Canyon near a spring 3 miles from the millsite, and finished construction of a leaching plant. Copper was to be dissolved from the ore with dilute sulfuric acid and precipitated upon scrap iron. Before the process was tried, fire destroyed the plant and operations ceased.

In 1901, the Coconino Copper Co. located a group of claims, predecessor to the Mackin group, north of Warm Springs Canyon. A small tonnage of ore was treated in a reverberatory furnace at Ryan, 7 miles west of the property. The smelter failed because of the high silica content of the ore. A plant was then erected to use the Neill and Burfeind process. This was probably the first attempt to leach copper by using sulfur dioxide as a leaching reagent. About 1902, a patent was issued on the process, which consisted of exposing the ore to the action of sulfur dioxide, removing the dissolved copper in solution from the ore, and driving off the excess sulfurous acid by heating the solution and precipitating the copper as sulfite. The process was discontinued because of the instability of the copper compounds. Later, the plant was leased to the Esmeralda Precipitation Co. of Chicago, which experimented unsuccessfully with the ore.

The Buckskin Mountain Copper Co., in 1907, attempted experimental leaching. Eight additional claims were patented, and in 1916 a few tons of selected ore was shipped. This was followed by a period of considerable

stock promotion, but there was little mining activity in the district until 1928. The Kaibab Copper Co. was organized 1919. Later that year, the company was reorganized as the Kaibab Smelting Co., and in 1921 it was merged with other companies to form Allied Mines & Recovery Co.

About 1928, the Saint Anthony Copper Co. was organized to mine the ore by steam-shovel methods. Considerable trenching and test-pitting was done on the Mackin group. A railroad was built to Ryan to a newly constructed 100-ton blast furnace. Fire destroyed the plant about 1929, and operations were suspended. About 1,000 tons of 8-percent copper ore was shipped to the smelter at Garfield. Later, the Los Angeles Exploration & Metal Co., Ltd., obtained title to the St. Anthony Co.'s holdings.

In 1939, the United States Metals Corp. acquired control of the properties. The mines were reopened under a leasing system, but production was small and sporadic until 1943, when Harry W. Patterson and Arthur W. Simmons, operating as the Apex Mining Co., leased the property. Open-cut mining was started in July on the Mackin deposit, and later that year operations were shifted to the Petoskey claim group. Mining was halted by heavy snowfall in December. Production amounted to 5,192 tons of 4.98-percent copper ore during the season.

In the spring of 1944, V. M. Ryan and S. B. Atherley subleased the Petoskey and Mackin groups and mined 9,246 tons of 7.13-percent copper ore from the Petoskey open cut, Copper Glance, and Kennedy claims to December of that year.

PROPERTY AND OWNERSHIP

Three claim groups comprise the property - the Petoskey group of 7 patented claims, the Mackin group of 12 patented and 11 unpatented claims, and the Phantom group of 5 claims, of which one is patented (fig. 2). The Phantom group, about 4 miles north of the Petoskey group, was not investigated by the Bureau.

Thirty of the claims are owned and five are held under lease and option by the United States Metals Corp., 510 West 6th Street, Los Angeles, Calif. Roy S. Gangestad is president and Vincent G. Dodds is vice president of the corporation.

GEOLOGY AND ORE OCCURRENCE

Kaibab limestone of Permian age covers the plateau, and only areas cut into by deep erosion expose the underlying Coconino sandstone and Supai formations. Kaibab limestone in the district consists of calcareous sandstone, cherty limestone, and chert.

The ore bodies are ribbonlike, irregular runs lying nearly flat and following the stratification. They appear to have formed at the intersection of favorable beds and vertical fissures. They vary in width from 10 to 50

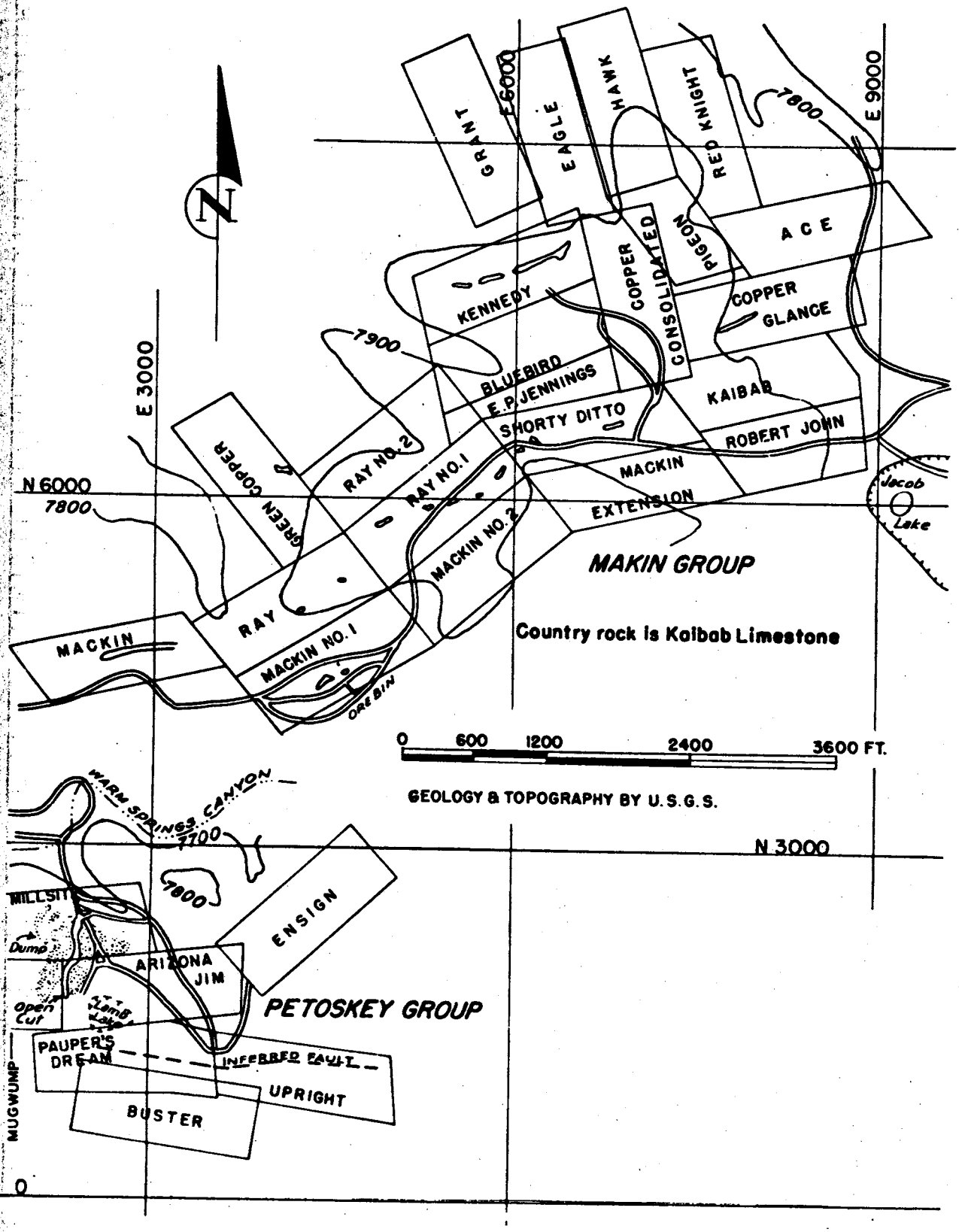


Figure 2.- Geologic plan, Apex copper project.

C.D. HOLE	SAMPLE NO.	FROM	TO	FEET	%Cu
1	6110	3.3	6.8	3.5	5.06
"	6111	6.8	13.3	6.5	4.90
"	6112	13.3	18.3	5.0	8.14
"	6113	18.3	20.3	2.0	6.94
"	6114	20.3	24.8	4.5	3.96
	6115	24.8	27.8	3.0	1.10
2	6116	1.0	5.0	4.0	2.5
"	6117	5.0	11.5	6.5	0.68
"	6118	11.5	15.0	3.0	0.40
3	6119	1.5	5.0	3.5	1.09
"	6120	5.0	8.0	3.0	2.25
"	6121	8.0	10.5	2.5	0.38
4	6122	17.3	17.6	3.2	0.91
6	6123	11.5	15.0	3.5	0.70
"	6124	15.0	19.0	4.0	1.41
"	6125	19.0	22.5	3.5	0.31
"	6126	22.5	27.0	4.5	0.13
8	6127	15.0	18.5	3.5	12.65
"	6128	18.5	19.5	1.0	13.34
"	6129	19.5	24.0	4.5	8.05
"	6130	24.0	27.0	3.0	4.00
"	6131	27.0	30.0	3.0	2.00
"	6132	30.0	33.0	3.0	0.50
9	6133	8.5	10.0	1.5	2.76
"	6134	10.0	13.0	3.0	9.70
"	6135	13.0	16.0	3.0	3.27
"	6136	16.0	19.0	3.0	1.58
13	6137	12.0	16.0	4.0	0.92
"	6138	16.0	19.0	3.0	8.84
"	6139	19.0	21.0	2.0	10.98
"	6140	21.0	23.0	2.0	9.52
"	6141	23.0	26.0	3.0	9.86
"	6142	26.0	29.0	3.0	10.59
"	6143	29.0	33.0	4.0	10.60
"	6144	33.0	36.0	3.0	7.61
"	6145	36.0	38.0	2.0	3.76
14	6146	10.0	12.0	2.0	1.69
"	6147	12.0	15.5	3.5	3.91
"	6148	15.5	18.5	3.0	6.03
"	6149	18.5	23.5	5.0	2.30
"	6150	23.5	28.5	5.0	1.75
"	6801	28.5	32.0	3.5	1.55
15	6802	15.0	18.0	3.0	2.22
"	6803	18.0	23.0	5.0	1.29
"	6804	23.0	28.0	5.0	1.90
"	6805	28.0	32.0	4.0	2.20
"	6806	32.0	37.0	5.0	1.60
"	6807	37.0	42.0	5.0	1.20
22	6808	22.0	24.0	2.0	7.71
"	6809	24.0	26.0	2.0	7.35
"	6810	26.0	28.0	2.0	7.18
"	6811	28.0	31.0	3.0	2.17
"	6812	31.0	34.0	3.0	8.90
"	6813	34.0	37.0	3.0	8.46
"	6814	37.0	40.0	3.0	4.04
24	6815	23.0	25.0	2.0	0.87
"	6816	25.0	27.0	2.0	1.37
26	6817	22.5	25.0	2.5	0.89
"	6818	25.0	28.0	3.0	0.84
"	6819	28.0	31.0	3.0	1.32
"	6820	31.0	35.0	4.0	3.86
"	6821	35.0	37.5	2.5	4.71
"	6822	37.5	42.5	5.0	6.49
"	6823	42.5	48.0	5.5	3.39
152	6860	5.0	10.0	5.0	1.19
"	6861	10.0	15.0	5.0	0.49
"	6862	15.0	20.0	5.0	0.33

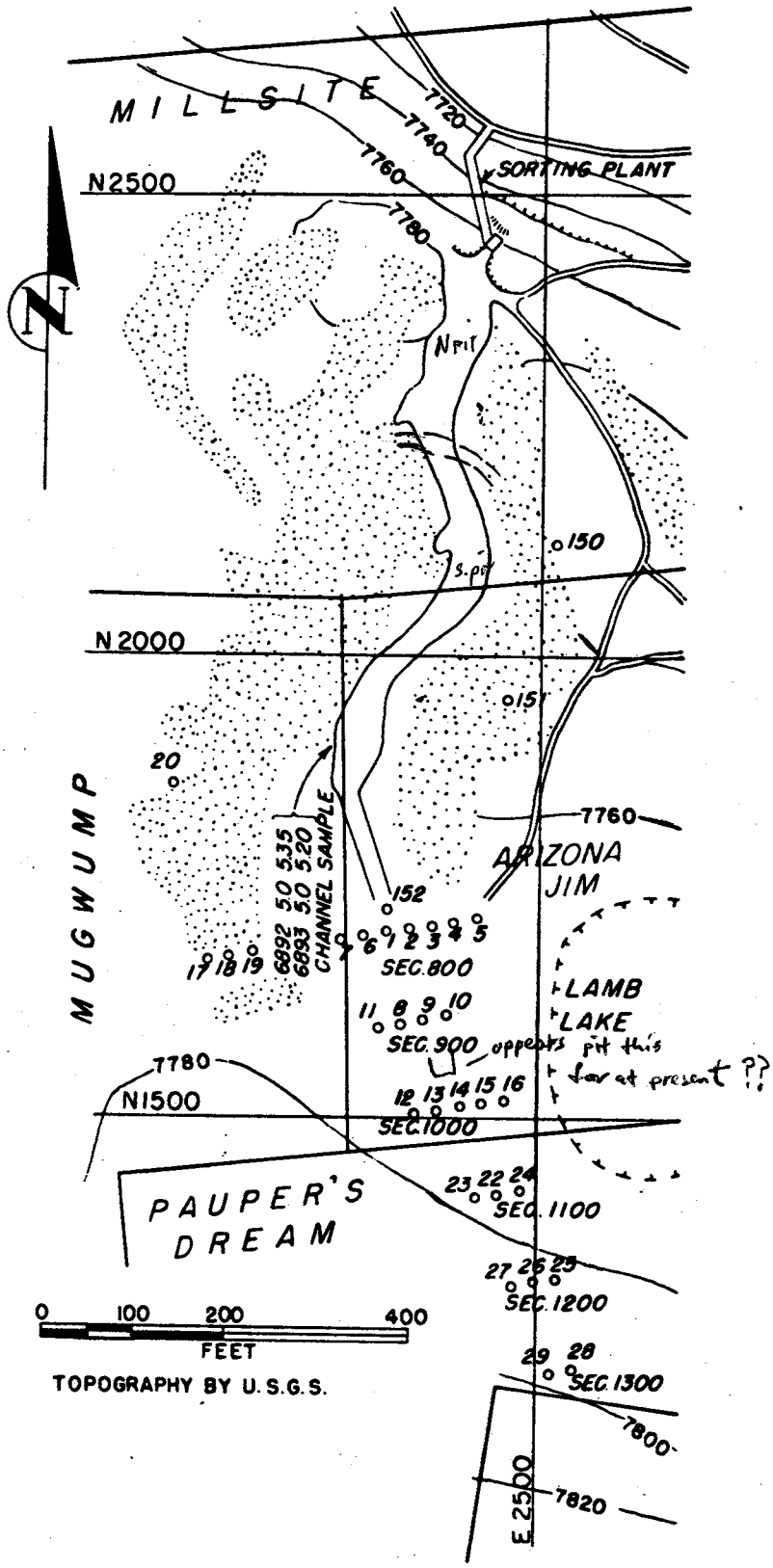


Figure 3.- Location of drill holes, Petoskey mine area.

feet. The only ore bodies wider than 20 feet are the Kennedy and Petoskey. The thickness ranges from a knife edge to 14 feet, although thickness in excess of 4 or 5 feet is uncommon. Mineralized beds occur to a depth of 30 feet below a sandstone capping, but the base of the runs is seldom over 15 feet below the capping. Where erosion has removed the capping, the tops of the runs sometimes crop out, but usually they are covered by a thin mantle of soil and forest debris. Limonite-stained cherty sandstone fragments are generally the only surface indications of copper mineralization.

Malachite and azurite are the principal ore minerals. Chalcopyrite and chalcocite occur locally. Gangue consists mainly of chert and sandstone. The average specific gravity of the ore is 2.6. The copper content varies greatly within the ore zone. The limits of mineralization are sharp in cherty sandstone replacements and are gradational in zones of brecciated chert. Gold and silver occur in small quantities. An increasing amount of silver has been noted in shipments from the Petoskey pit as it has advanced southward.

MINE WORKINGS

Past Operations

The claims have been prospected by numerous shallow test pits and trenches. R. B. Brinsmade wrote, in the Engineering and Mining Journal in 1907, that considerable drilling had been done in the district previous to the trenching and test pitting. The property was worked by open cuts in 1943-44 without additional development. There are three abandoned pits - Mackin No. 1, Copper Glance, and Kennedy.

Present Operations

Petroskey Group. - About 90 percent of the ore shipped from the claims during the summer of 1944 was produced from the Petoskey open cut (fig. 3). Mining operations were begun on the northern end of an ore run on the crest of the south slope of Warm Springs Canyon. The cut, 20 to 50 feet wide and about 20 feet deep, has been advanced southward 715 feet across relatively flat terrain. The sorting bin, sorting belt, and chutes were located near the mouth of the cut. About 75 tons of ore was shipped daily, which required the removal of about 3 tons of overburden for each ton of ore shipped.

Stripping of overburden was carried on immediately ahead of the ore face, which was mined in benches at right angles to the trend of the run. Several feet of soil was removed with a bulldozer. The sandstone capping was then drilled and blasted and cast aside with the bulldozer. The greatest depth of overburden stripped to December was 12 feet. The capping was removed from 6 to 12 feet beyond the side mining limits of the open cut. Exploration consisted of drilling jackhammer holes and noting the color of the cuttings. Compressor capacity was too limited to permit extensive prospecting by this method. In may cases the bottom and side limits of the ore were not properly delimited, and as a consequence it has been necessary to recast overburden several times.

The caterpillar-Diesel, model RD-8, tractor equipped with a 12-foot blade, employed in stripping, was also used for pushing broken ore from the benches to the shovel, making and maintaining roads free of snow, and clearing timber. Trees up to 12 inches in diameter were uprooted by pushing, and larger trees were removed in the same manner after digging around the roots.

Air for drilling was supplied at 100 pounds gage pressure by two portable Ingersoll-Rand (models 315A and 210A), 2-stage, air-cooled compressors. The 135-cubic-foot unit was connected by a 2-inch air line to a 2-1/2- by 4-1/2-foot air receiver, from which 3/4-inch air hoses led to the drills. The 210-cubic-foot unit was moved around as needed.

Drilling was done dry with 6 Ingersoll-Rand, model JB-5, blower-type jackhammers. One jackhammer was kept in reserve as a spare. The ore was broken by blasting bench holes. The usual round consisted of three rows of holes across the bench, spaced 2-1/2 feet apart in holes and rows. Holes were staggered in successive rows. The holes were drilled to grade and were 6 to 10 feet deep. Drilling advance per 8 hours was 75 feet in ore and 115 feet in waste.

Hexagon, 1-inch, hollow drill steel was purchased shanked and threaded in 2-foot changes from 2 to 10 feet. Ingersoll-Rand 4-point jackbits were used in 5 sizes. Starter bits were 2-1/8 inch, and the gage reduction was 1/8 inch. Side-hole bits were necessary for blowing the holes with a minimum of plugging. Bits were reground once before discarding. No blacksmithing was done at the mine.

Holes were loaded with Gold Medal No. 4 bag powder; 10-foot holes were loaded with 2 pounds, 8-foot holes with 1-3/4 pounds, and 6-foot holes with 1-1/4 pounds of powder. The holes were shot with No. 6 electric detonators in a stick of 7/8- by 8-inch, 30-percent gelatin dynamite placed on the bottom of the hole. Firing was done with a duPont No. 50 blasting machine. Fines from the pit were used for stemming. Boulder shots were loaded with 30-percent gelatin dynamite and detonated with No. 6 caps and fuse. The maximum thickness of the ore was 14 feet, and the face was worked on two benches. Occasionally "hard bottom" interfered with the shovel at the toe of the lower bench.

In December 1944, and Ingersoll-Rand model FM-2 wagon drill mounting equipped with an Ingersoll-Rand DA-35 drifter drill was used to drill a 12-foot bench. Jackbits were used. Starter size was 3-inch and decreased 1/8-inch per change on 1-1/8-inch round steel in 2-foot changes. Holes were spaced 5-1/2 feet apart in line and rows.

A Northwest, model 25, full-revolving, 3/4-yard shovel with an 18-foot boom loaded the trucks. The shovel was mounted on caterpillar crawls and was powered with an 85-horsepower gasoline engine. Gasoline consumption per 8 hours was 20 gallons. The front and bottom of the dipper were made of manganese steel. Dipper teeth were worn out in 2 weeks. The digging cable was 3/4-inch cast steel, 6 by 19, regular lay. The life of a cable was 8,000 tons.

The shovel faced the bench, and trucks were loaded behind the shovel. Loading time was 3 minutes for 3 tons. Waste boulders were set aside by the shovel, and occasional boulders were broken or chipped to recover included ore. Normally two trucks transported ore from the shovel to the sorting bin. During December, the time of a trucking cycle from the shovel to the sorting bin was 11 minutes.

Trucks from the pit dumped the ore onto a grizzly of inverted rails inclined at 32 degrees and spaced 5-1/2 inches apart. Oversize fell into a chute equipped with a down-cut steel arc gate. Undersize from the grizzly passed over a sloping wire screen of 1-inch openings. The minus 1-inch material passed to drop-board chutes. The plus 1-inch material, which comprised about 50 percent of the total ore, was fed to a 20-inch sorting belt. The flow was regulated by a gate-tender. The sorting belt, 79 feet long between the head and tail pulleys, was driven by a Chevrolet 4-cylinder engine at a speed of 30 to 50 feet a minute. Three men picked waste from the belt. It is estimated that 5 to 8 percent of the material was thrown out.

Three trucks hauled the ore from the sorting chutes to the shipping bin. The haul was 1-1/2 miles, and the maximum grade against the load was 13 percent where the road crossed Warm Springs Canyon. Each truck carrying about 4 tons of ore made an average of 5 trips, or a maximum of 7 trips per shift. Trucks were 3 cubic-yard end-dump, dual rear-wheel, 6- and 8-cylinder models. All were equipped with cab protectors.

The shipping bin, constructed of logs and lined with 2-inch plank, was built on a side-hill slope. Trucks from the mine dumped from an earth fill ramp, and the ore was discharged from the bin through four drop-board chutes 2-1/2 feet wide by 2 feet high. The bottom of the bin sloped at 35 degrees and discharged freely about 175 tons.

During November the crew consisted of 20 men - 1 foreman, 1 master mechanic, 1 shovel operator, 1 bulldozer operator, 1 powderman, 5 drillers, 1 mechanic, 5 truck drivers, 3 ore sorters, and 1 laborer.

Mackin Group. - The Copper Glance and Kennedy claims of the Mackin group were worked from August to December under a sublease from Ryan and Atherley. Through November 1944, 926 tons of ore was shipped, which yielded 4.22 percent copper. The ore formation was directly beneath the soil in runs that averaged 10 feet in width and 1 to 4 feet in thickness.

Ore and waste were dug with a full-revolving, Universal-Lorain, model 40, 3/4-yard gasoline shovel powered with an 85-horsepower engine and mounted on caterpillar crawls. The dipper was made of mild steel with a manganese-steel front and was equipped with four detachable teeth. Six sets of teeth were used during the season. Digging cables were 5/8 inch. Four gallons of gasoline was consumed per hour.

The overburden was stripped with the shovel, and the spoil was cast on both sides of the run. The exposed ore was drilled with one Thor-Cochise

model 75 jackhammer. Rows and holes were spaced equal to the depth of the holes. Detachable, 2-inch, side-hole, Timken bits were used on 7/8-inch, hollow, hexagon steel. Bits were discarded after drilling 50 feet. A Le Roi model 2P85V portable compressor supplied air at 110 pounds pressure. About 1-1/2 gallons of gasoline was used per hour.

Holes were loaded with 40 percent gelatin EZ load in 1-1/8- by 8-inch sticks. Powder consumed was 4 to 5 pounds per ton of ore shipped. The explosive charges were fired with No. 6 caps and fuse.

After blasting, the ore was sorted and piled with the shovel, and the waste was cast aside. While trucks were being loaded with the shovel, several men sorted out waste from the trucks between swings of the dipper. The ore was difficult to sort clean because the friable chert produced considerable fines.

A normal crew consisted of one shovel operator, one powderman, and two miners. One shift was worked 6-1/2 days a week. An average daily loss of about 1/2 man-shift was caused by absenteeism.

Hauling

The ore from both operations was trucked 159 miles to Marysvale, Utah, by separate contractors.

Ore from the Mackin group claims was moved in two 9-cubic-yard, 10-wheel trucks hauling 12 to 15 tons per trip.

Two 150-horsepower, 20-ton-capacity, 18-wheel, end-dump, Kenworth Diesel tractor-trucks capable of hauling 25 tons each transported the ore from the Petoskey group.

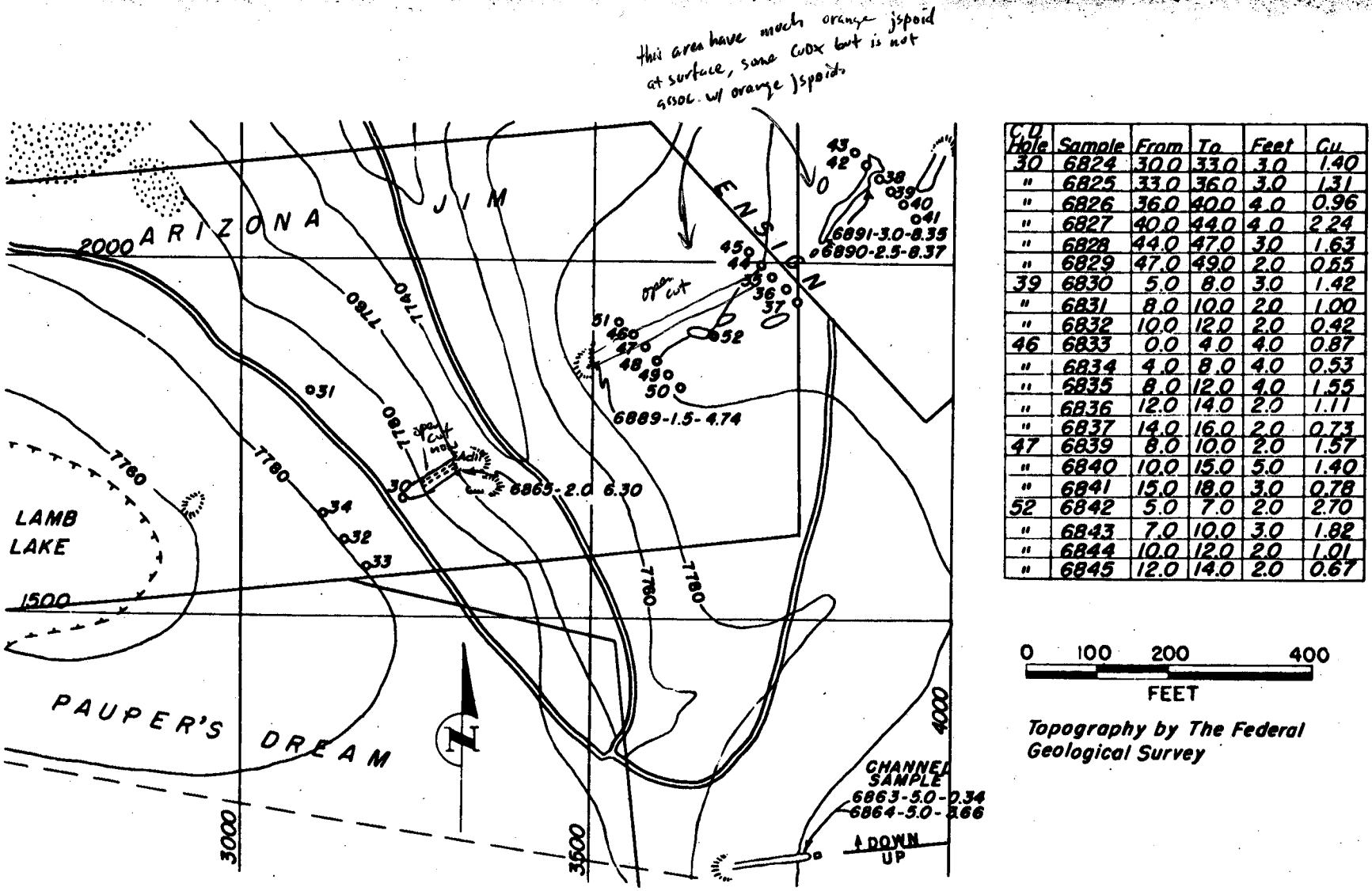
The ore was shipped by rail from Marysvale to the American Smelting & Refining Co. smelter at Garfield, Utah.

WORK DONE BY THE BUREAU OF MINES

Two abandoned Bureau of Public Roads camp buildings near Jacob Lake were repaired for use as an office and warehouse before drilling started.

During the period October 7, 1944, to November 25, 1944, 152 churn-drill holes totaling 3,756 feet were completed. Drilling was done under contract, and the drill used was a model 29-W Armstrong mounted on crawls and driven by a Ford 85-horsepower gasoline engine. All holes were 8 inches in diameter and cased with 10-inch standpipes to depths of 2 to 5 feet. The formation below the standpipe was firm enough to permit drilling without casing.

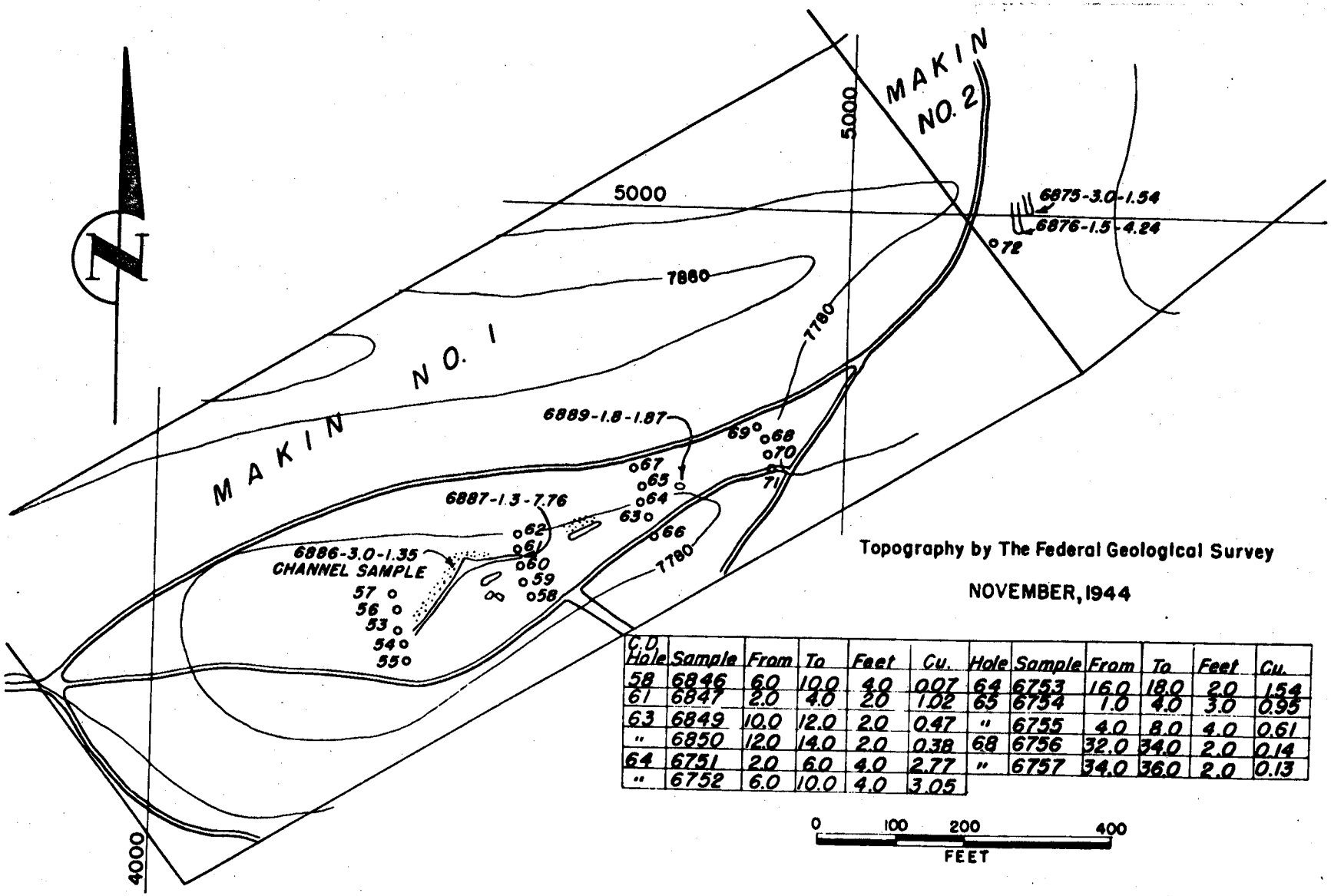
The holes were located in accordance with recommendations of the Federal Geological Survey (figs. 3 to 8). Drilling was started south of



CD Hole	Sample	From	To	Feet	Cu
30	6824	30.0	33.0	3.0	1.40
"	6825	33.0	36.0	3.0	1.31
"	6826	36.0	40.0	4.0	0.96
"	6827	40.0	44.0	4.0	2.24
"	6828	44.0	47.0	3.0	1.63
"	6829	47.0	49.0	2.0	0.65
39	6830	5.0	8.0	3.0	1.42
"	6831	8.0	10.0	2.0	1.00
"	6832	10.0	12.0	2.0	0.42
46	6833	0.0	4.0	4.0	0.87
"	6834	4.0	8.0	4.0	0.53
"	6835	8.0	12.0	4.0	1.55
"	6836	12.0	14.0	2.0	1.11
"	6837	14.0	16.0	2.0	0.73
47	6839	8.0	10.0	2.0	1.57
"	6840	10.0	15.0	5.0	1.40
"	6841	15.0	18.0	3.0	0.78
52	6842	5.0	7.0	2.0	2.70
"	6843	7.0	10.0	3.0	1.82
"	6844	10.0	12.0	2.0	1.01
"	6845	12.0	14.0	2.0	0.67

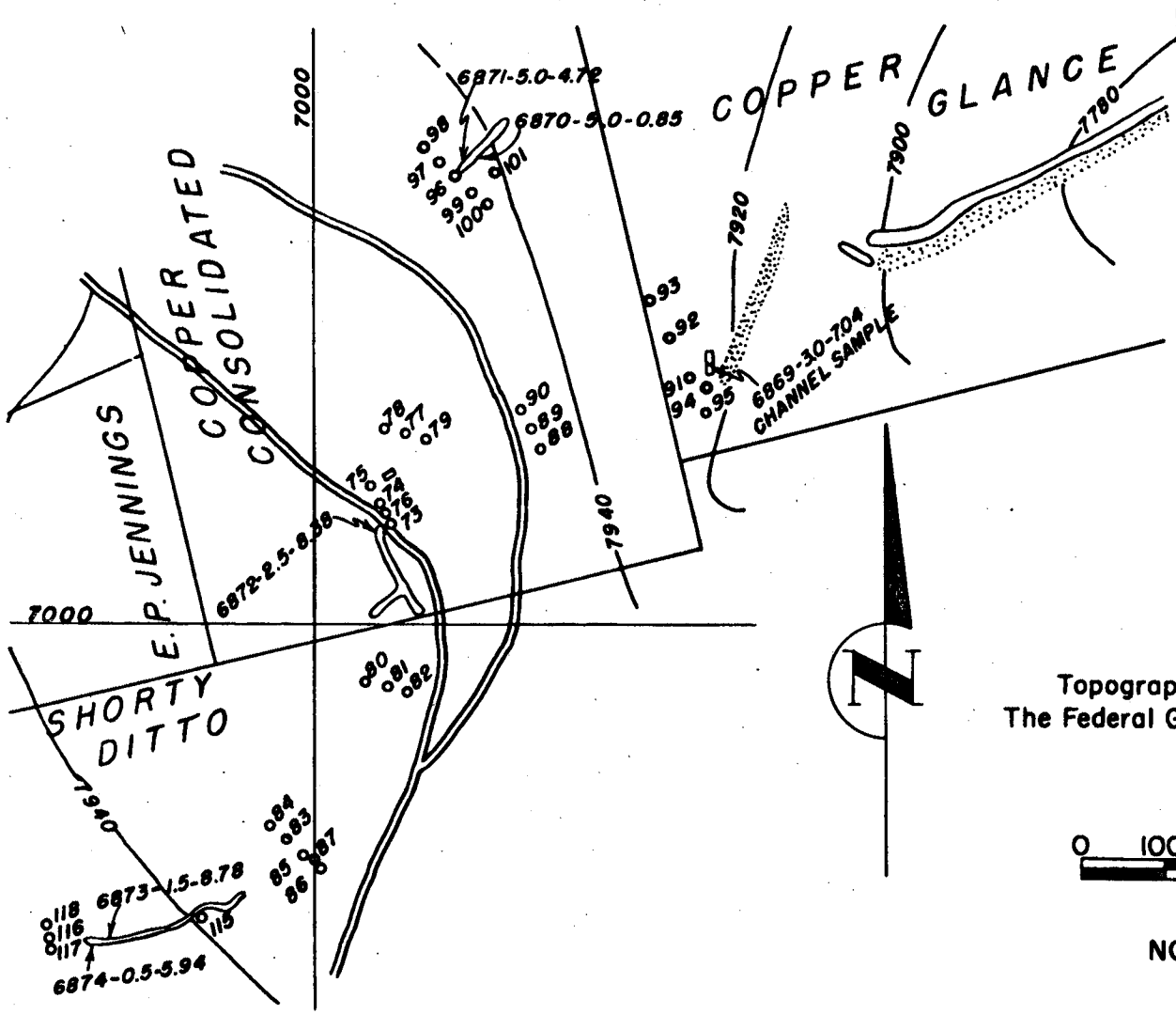
Topography by The Federal Geological Survey

Figure 4.- Locations of drill holes, Arizona Jim-Ensign claims.



C.D. Hole	Sample	From	To	Feet	Cu.	Hole	Sample	From	To	Feet	Cu.
58	6846	6.0	10.0	4.0	0.07	64	6753	16.0	18.0	2.0	1.54
61	6847	2.0	4.0	2.0	1.02	65	6754	1.0	4.0	3.0	0.95
63	6849	10.0	12.0	2.0	0.47	"	6755	4.0	8.0	4.0	0.61
"	6850	12.0	14.0	2.0	0.38	68	6756	32.0	34.0	2.0	0.14
64	6751	2.0	6.0	4.0	2.77	"	6757	34.0	36.0	2.0	0.13
"	6752	6.0	10.0	4.0	3.05						

Figure 5.- Locations of drill holes, Makin Nos. 1 and 2 claims.



C.D. Hole	Sample	From	To	Feet	Cu
74	6758	4.0	8.0	4.0	3.03
"	6759	8.0	10.0	2.0	0.94
76	6760	4.0	6.0	2.0	3.18
"	6761	6.0	8.0	"	3.92
"	6762	8.0	10.0	"	2.09
"	6763	10.0	13.0	3.0	1.43
81	6764	8.0	11.0	3.0	0.95
"	6765	11.0	13.0	2.0	1.03
"	6766	13.0	15.0	2.0	2.22
"	6767	15.0	17.0	"	1.12
"	6768	17.0	19.0	"	0.56
"	6769	19.0	21.0	"	0.25
"	6770	21.0	25.0	4.0	0.17
85	6771	8.0	10.0	2.0	0.29
"	6772	10.0	12.0	"	0.19
87	6773	4.0	6.0	"	1.81
"	6848	6.0	8.0	"	1.77
115	6793	11.0	13.0	"	0.61
	6794	13.0	15.0	"	0.43

Topography by
The Federal Geological Survey

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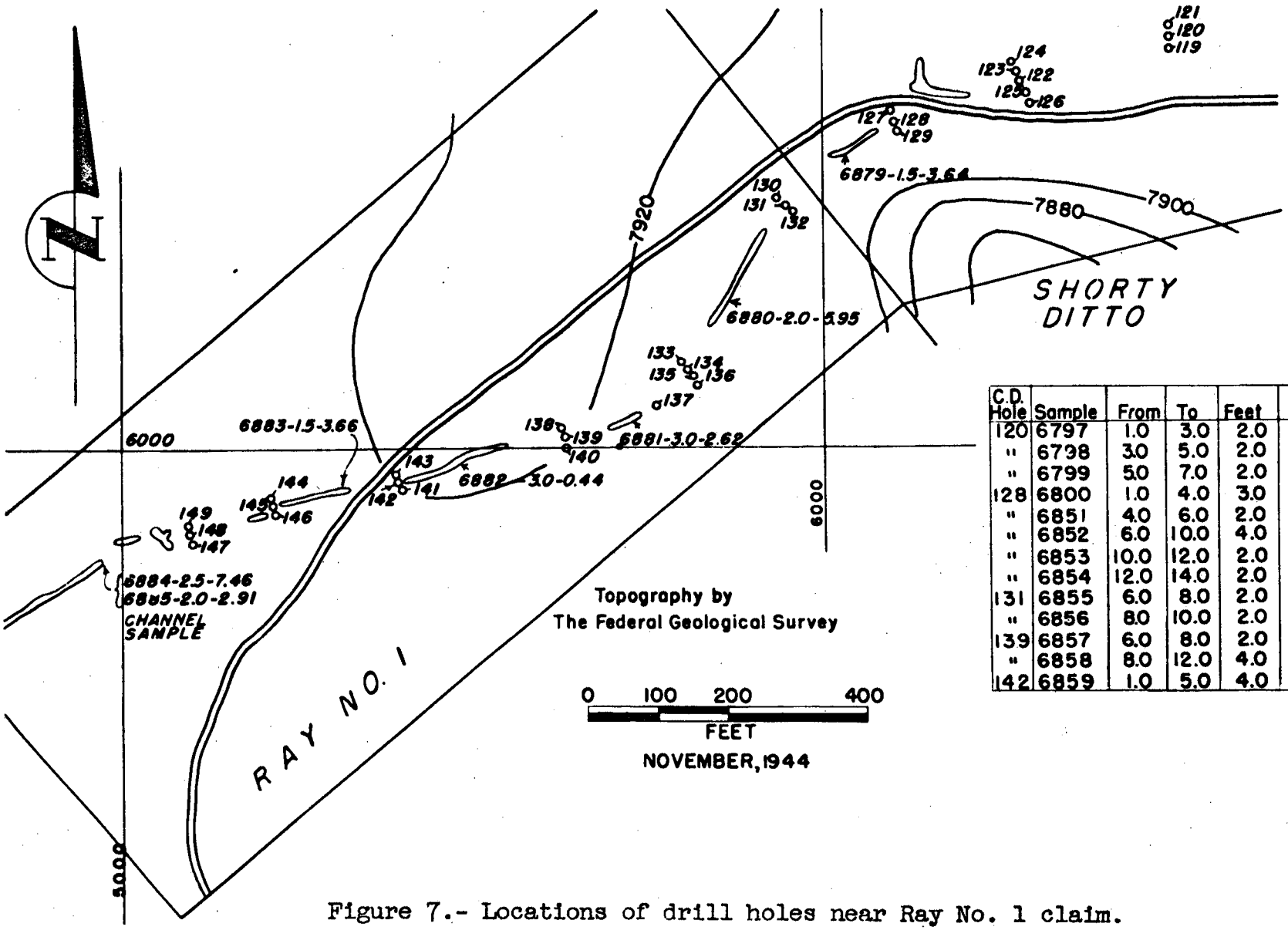
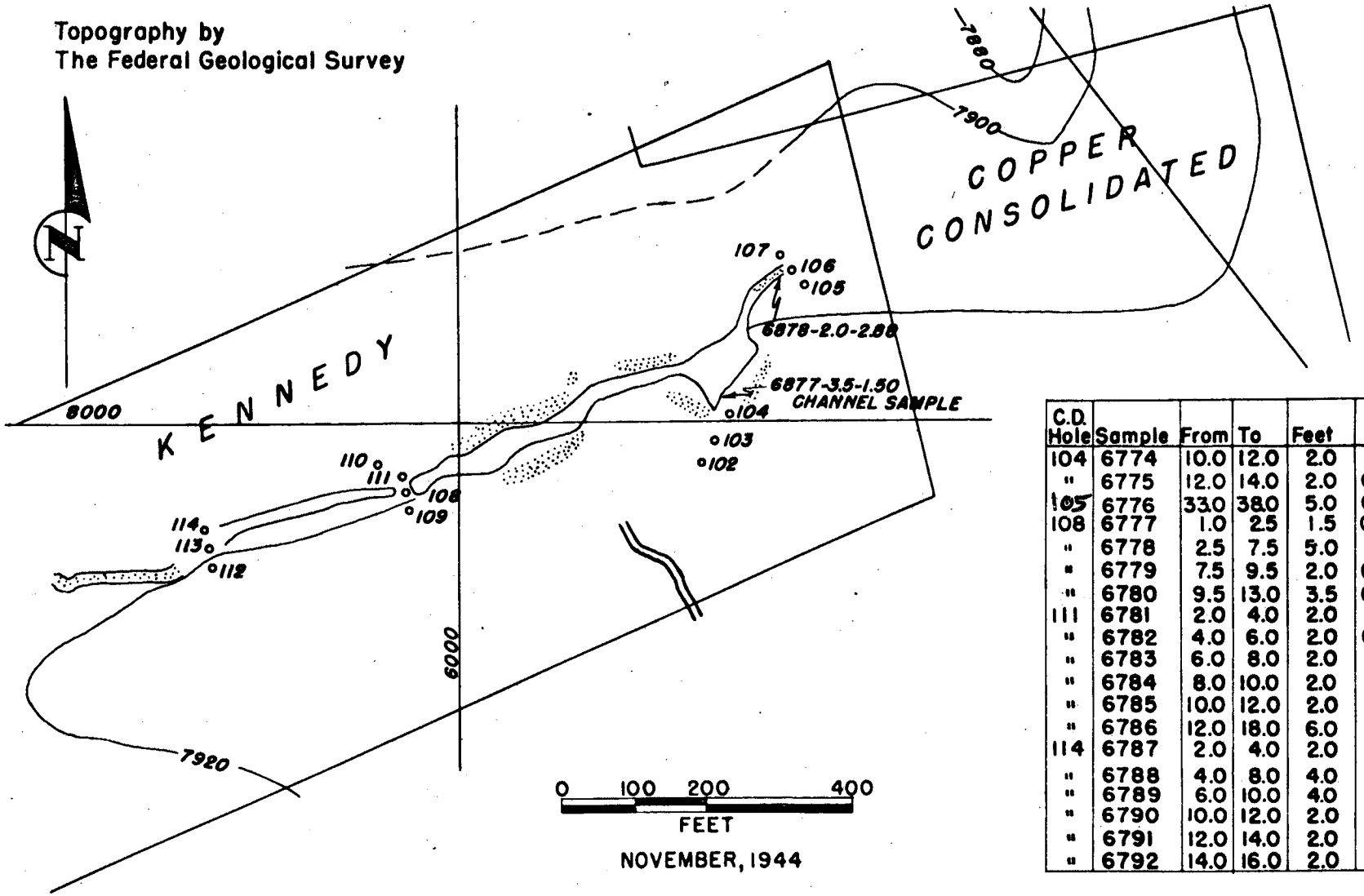
Figure 6.- Locations of drill holes near Copper Glance open cut.



C.D. Hole	Sample	From	To	Feet	Cu
120	6797	1.0	3.0	2.0	2.25
"	6798	3.0	5.0	2.0	0.74
"	6799	5.0	7.0	2.0	0.26
128	6800	1.0	4.0	3.0	1.35
"	6851	4.0	6.0	2.0	1.70
"	6852	6.0	10.0	4.0	2.81
"	6853	10.0	12.0	2.0	2.65
"	6854	12.0	14.0	2.0	1.49
131	6855	6.0	8.0	2.0	6.30
"	6856	8.0	10.0	2.0	1.48
139	6857	6.0	8.0	2.0	1.31
"	6858	8.0	12.0	4.0	0.46
142	6859	1.0	5.0	4.0	3.09

Figure 7.- Locations of drill holes near Ray No. 1 claim.



C.D. Hole	Sample	From	To	Feet	Cu
104	6774	10.0	12.0	2.0	1.05
"	6775	12.0	14.0	2.0	0.70
105	6776	33.0	38.0	5.0	0.10
108	6777	1.0	2.5	1.5	0.64
"	6778	2.5	7.5	5.0	1.37
"	6779	7.5	9.5	2.0	0.57
"	6780	9.5	13.0	3.5	0.25
111	6781	2.0	4.0	2.0	1.05
"	6782	4.0	6.0	2.0	0.32
"	6783	6.0	8.0	2.0	1.84
"	6784	8.0	10.0	2.0	1.21
"	6785	10.0	12.0	2.0	0.91
"	6786	12.0	18.0	6.0	0.57
114	6787	2.0	4.0	2.0	4.11
"	6788	4.0	8.0	4.0	6.13
"	6789	6.0	10.0	4.0	2.95
"	6790	10.0	12.0	2.0	1.61
"	6791	12.0	14.0	2.0	0.84
"	6792	14.0	16.0	2.0	0.54

Figure 8.- Locations of drill holes in Kennedy open-cut area.

the Petoskey open cut, on the Mugwump-Arizona Jim claims, and progressed southward onto the Pauper's Dream claim. Holes were drilled in rows at 100-foot intervals, and the holes were spaced 25 feet apart in the rows.

On the Mackin group, the Mackin No. 1, Ray No. 1, Shorty Ditto, Copper Consolidated, Copper Glance, and Kennedy claims were drilled. Holes were drilled in rows at intervals of approximately 200 feet and were spaced about 25 feet apart in the rows.

The Bureau took 153 churn-drill samples. Sections of the holes averaging 3 feet and not exceeding 5 feet were bailed, and if the cuttings showed copper mineralization, the sludge was dumped into a three-way sample splitter. Thirty-two channel samples aggregating 85.4 feet were cut from the surface workings on the deposits.

Roads and drilling sites were cleared by bulldozer. The Bureau built 5,360 feet of road 13 feet wide and repaired 830 linear feet of existing roads. In preparation for the new roads, areas totaling 1,440 square yards were cleared of trees up to 8 inches in diameter.

Condensed logs of holes, prepared by the Federal Geological Survey, are attached to this report.

CONDENSED LOGS OF CHURN DRILL HOLES

(Geology by Federal Geological Survey)

Hole No.	Collar		Footage		Percent copper	Description and remarks
	Coordinates	Elevation, ft.	From-	To-		
1	1699N - 2335E	7755.1	0	3.3		Soil.
			3.3	20.3	6.12	Cherty sandstone.
			20.3	24.8	3.96	Do.
			24.8	27.8	1.14	Do.
			27.8	50		Clay, cherty-limy sandstone.
2	1703N - 2360E	7754.7	0	1.		Soil.
			1.	5.	2.51	Cherty sandstone.
			5.	15.	.58	Do.
			15.	20.		Cherty-limy sandstone.
3	1707N - 2384E	7754.7	0	1.5		Soil
			1.5	8.	1.62	Cherty sandstone.
			8.	10.5	.38	Do.
			10.5	15.		Cherty-limy sandstone.
4	1711N - 2409E	7755.0	0	4.4		Soil.
			4.4	14.3		Cherty sandstone.
			14.3	17.6	.91	Do.
			17.6	20.7		Cherty-limy sandstone.
5	1715N - 2434E	7755.4	0	5.7		Soil.
			5.7	19.7		Cherty-limy sandstone.

Hole No.	Collar Coordinates	Collar Elevation, ft.	Footage From-	Footage To-	Percent copper	Description and remarks
6	1695N - 2310E	7755.4	0	3.		Soil.
			3.	11.5		Cherty sandstone.
			11.5	19.	1.08	Do.
			19.	27.	.21	Do.
			27.	31.		Cherty-limy sandstone.
7	1691N - 2285E	7757.4	0	1.8		Soil.
			1.8	30.		Cherty-limy sandstone.
8	1600N - 2351E	7760.4	0	2.5		Soil.
			2.5	15.		Cherty sandstone.
			15.	24.	10.42	Do.
			24.	27.	4.00	Do.
			27.	30.	2.00	Do.
			30.	33.	.50	Do.
			33.	35.		Cherty-limy sandstone.
9	1604N - 2376E	7758.8	0	4.0		Soil.
			4.	8.5		Cherty sandstone.
			8.5	10.	2.76	Do.
			10.	13.	9.76	Do.
			13.	16.	3.27	Do.
			16.	19.	1.58	Do.
			19.	30.		Cherty-limy sandstone.
10	1608N - 2401E	7757.0	0	3.		Soil.
			3.	30.		Cherty and limy sandstone.
11	1596N - 2327E	7762.1	0	3.		Soil.
			3.	30.		Cherty and limy sandstone.
12	1502E - 2368E	7770.1	0	12.		Soil and sandy clay.
			12.	32.		Cherty and limy sandstone.
13	1506E - 2392E	7767.0	0	4.		Soil.
			4.	12.		Sandy clay.
			12.	16.	.92	Cherty sandstone.
			16.	36.	9.70	Do.
			36.	38.	3.76	Do.
			38.	40.		Cherty-limy sandstone.
14	1510E - 2417E	7764.8	0	5.		Soil.
			5.	10.		Sandy clay.
			10.	12.	1.69	Cherty sandstone.
			12.	15.5	3.91	Do.
			15.5	18.5	6.03	Do.
			18.5	32.	1.90	Do.
			32.	35.5		Cherty-limy sandstone.

Hole No. 15 16 17 18 19 20 21 22 23 24 25

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
15	1514N - 2442E	7765.0	0	11.		Soil and sandy clay.
			11.	15.		Cherty sandstone.
			15.	42.	1.68	Do.
			42.	45.		Cherty-limy sandstone.
16	1518N - 2466E	7761.3	0	5.		Soil.
			5.	38.		Clay, cherty and limy sandstone.
17	1666N - 2138E	7768.6	0	5.		Soil.
			5.	35.		Clay, cherty and limy sandstone.
18	1670N - 2163E	7767.9	0	4.		Soil.
			4.	30.		Clay, cherty and limy sandstone.
19	1674N - 2187E	7766.7	0	3.		Soil.
			3.	26.		Clay, cherty and limy sandstone.
20	1856N - 2101E	7765.5	0	2.5		Soil.
			2.5	30.		Clay, cherty and limy sandstone.
21	2060N - 2151E	7762.4	0	8.		Soil and sandy clay.
			8.	24.		Clay, cherty and limy sandstone.
22	1415N - 2458E	7775.4	0	5.		Soil.
			5.	22.		Clay and cherty sandstone.
			22.	37.	6.86	Cherty sandstone.
			37.	40.	4.04	Do.
			40.	43.		Cherty-limy sandstone.
23	1411N - 2433E	7777.9	0	4.		Soil.
			4.	29.5		Clay and cherty sandstone.
			29.5	32.5		Trace copper in cherty sandstone.
			32.5	35.		Cherty-limy sandstone.
24	1419N - 2483E	7772.4	0	12.		Soil and clay.
			12.	23.		Clay and cherty sandstone.
			23.	27.	1.12	Cherty sandstone.
			27.	32.		Cherty-limy sandstone.
25	1325N - 2524E	7781.4	0	13.		Soil and sandy clay.
			13.	30.		Clay, cherty and limy sandstone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
26	1321N - 2499E	7783.5	0	2.5		Soil.
			2.5	22.5		Clay and cherty sandstone.
			22.5	31.	1.02	Cherty sandstone.
			31.	35.	3.86	Fractured cherty sandstone.
			35.	42.5	5.90	Do.
			42.5	48.	3.38	Do.
			48.	53.		Do.
						Soil in open fissure.
27	1316N - 2473E	7784.5	0	2.		Soil.
			2.	35.		Clay, cherty and limy sandstone.
28	1226N - 2540E	7792.8	0	2.		Soil.
			2.	40.		Clay, cherty and limy sandstone.
29	1222N - 2515E	7793.0	0	2.		Soil.
			2.	35.		Clay, cherty and limy sandstone.
30	1665N - 3231E	7788.1	0	2.		Soil.
			2.	30.		Cherty sandstone.
			30.	47.	1.52	Do.
			47.	49.	.55	Do.
			49.	50.5		Cherty-limy sandstone.
31	1814N - 3098E	7787.9	0	4.		Soil.
			4.	35.		Clay, cherty and limy sandstone.
32	1608N - 3150E	7781.5	0	4.		Soil.
			4.	30.		Clay, cherty and limy sandstone.
33	1568N - 3179E	7782.5	0	3.		Soil.
			3.	30.		Clay, cherty and limy sandstone.
34	1644N - 3118E	7781.3	0	5.		Soil.
			5.	30.		Clay, cherty and limy sandstone.
35	1980N - 3747E	7801.8	0	8.		Soil and clay.
			8.	20.		Cherty and limy sandstone.
36	1962N - 3764E	7802.9	0	2.		Soil.
			2.	22.		Clay, cherty and limy sandstone.

Hole No.	Collar Coordinates	Collar Elevation, ft.	Footage From-	Footage To-	Percent copper	Description and remarks
37	1944N - 3781E	7805.3	0	2.		Soil.
			2.	10.5		Clay, cherty and limy sandstone.
38	2118N - 3892E	7804.7	0	2.		Soil.
			2.	8.		Clay and cherty sandstone.
			8.	10.		Trace copper in cherty sandstone.
			10.	22.		Clay and limy-cherty sandstone.
			22.	25.		Fractured cherty-sandy limestone.
39	2100N-3909E	7806.5	0	5.		Soil and sandy clay.
			5.	10.	1.25	Cherty sandstone.
			10.	12.	.42	Do.
			12.	18.		Cherty-sandy limestone.
40	2082N - 3927E	7807.8	0	3.		Soil.
			3.	17.		Clay and cherty sandstone.
			17.	22.		Cherty-sandy limestone.
41	2064N - 3944E	7809.2	0	3.		Soil.
			3.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
42	2136N - 3875E	7802.2	0	2.		Soil.
			2.	17.		Clay and cherty sandstone.
			17.	20.		Cherty-sandy limestone.
43	2154N - 3858E	7801.9	0	3		Soil.
			3.	10.		Clay and cherty sandstone.
			10.	13.		Cherty-sandy limestone.
44	1998N - 3730E	7800.0	0	2.		Soil.
			2.	10.		Clay and cherty sandstone.
			10.	12.		Cherty-sandy limestone.
45	2016N - 3713E	7798.3	0	3.		Soil.
			3.	12.		Clay and cherty sandstone.
			12.	13.		Cherty-sandy limestone.
46	1879N - 3567E	7796.0	0	16.	.97	Cherty sandstone.
			16.	18.		Do.
			18.	30.		Cherty-sandy limestone. Fissure 23-29 feet.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
47	1897N -3550E	7792.8	0	2.		Soil.
			2.	8.		Clay and cherty sandstone.
			8.	18.	1.25	Cherty sandstone.
			18.	22.		Do.
			22.	24.		Cherty-sandy limestone.
48	1861N - 3585E	7799.1	0	3.		Soil.
						3.0 - 8.0 trace copper.
			3.	16.		Clay and cherty sandstone.
			16.	18.		Cherty-sandy limestone.
49	1843N - 3602E	7800.2	0	2.		Soil.
						18.0 - 21.0 trace copper.
			2.	21.		Clay and cherty sandstone.
			21.	24.		Cherty-sandy limestone.
50	1825N - 3619E	7800.2	0	2.		Soil.
			2.	12.		Clay and cherty sandstone.
			12.	15.		Cherty-sandy limestone.
51	1915N - 3533E	7792.8	0	2.5		Soil.
			2.5	15.		Clay and cherty sandstone.
			15.	18.		Cherty-sandy limestone.
52	1895N - 3665E	7801.8	0	5.		Soil and cherty sandstone.
			5.	12.	1.84	Cherty sandstone.
			12.	14.	.69	Do.
			14.	16.		Cherty-sandy limestone.
53	4373N - 4355E	7887.2	0	2.		Soil.
			2.	12.		Cherty sandstone.
			12.	14.		Cherty-sandy limestone.
54	4354N - 4363E	7887.4	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
55	4324N - 4367E	7886.8	0	3.		Soil.
			3.	10.		Clay and cherty sandstone.
			10.	12.6		Cherty-sandy limestone.
56	4403N - 4351E	7885.7	0	2.		Soil.
			2.	10.		Clay and cherty sandstone.
			10.	12.		Cherty-sandy limestone.
57	4422N - 4346E	7885.6	0	4.		Soil and clay.
			4.	15.		Cherty and sandstone.
			15.	19.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From	Footage: To	Percent copper	Description and remarks
58	4423N - 4547E	7885.1	0	.2.		Soil.
			2.	.6.		Cherty sandstone.
			6.	10.	.07	Do.
			10.	20.		Cherty-sandy limestone.
59	4447N - 4537E	7885.7	0	.2.		Soil.
			2.	16.		Cherty sandstone.
			16.	20.		Cherty-limy limestone.
60	4470N - 4530E	7884.8	0	.2.		Soil.
			2.	18.		Cherty sandstone.
			18.	21.		Cherty-sandy limestone.
61	4495N - 4527E	7881.1	0	2.		Soil.
			2.	4.	1.02	Cherty sandstone.
			4.	15.		Do.
			15.	20.		Cherty-sandy limestone.
62	4515N - 4525E	7879.5	0	2.		Soil.
			2.	23.		Cherty sandstone.
			23.	26.		Cherty-sandy limestone.
63	4544N - 4713E	7880.7	0	2.		Soil.
			2.	10.		Cherty sandstone.
			10.	14.	42	Do.
			14.	16.		Cherty-sandy limestone.
64	4568N - 4704E	7880.1	0	2.		Soil.
			2.	10.	2.91	Cherty sandstone.
			10	16		Cherty sandstone trace of copper.
			16.	18.	1.54	Cherty sandstone
			18.	38.		Cherty sandstone and clay.
			38.	42.		Cherty-sandy limestone.
65	4590N - 4704E	7878.4	0	1.		Soil.
			1.	8.	.76	Cherty sandstone.
			8.	13.		Cherty-sandy limestone.
66	4520N - 4721E	7880.7	0	2.		Soil.
			2.	15.		Cherty sandstone.
			15.	20.		Cherty-sandy limestone.
67	4616N - 4690E	7873.1	0	2.		Soil.
			2.	6.		Cherty sandstone.
			6.	10.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From	Footage: To	Percent copper	Description and remarks
68	4661N - 4881E	7878.3	0	3.		Soil.
			3.	32.		Clay and cherty sandstone.
			32.	36.	.14	Cherty sandstone.
			36.	40.		Clay and cherty sandstone.
			40.	42.		Cherty-sandy limestone.
69	4682N - 4870E	7877.3	0	2.		Soil.
			2.	10.		Clay andcherty sandstone.
			10.	18.		Cherty-sandy limestone.
70	4638N - 4883E	7879.0	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	27.		Cherty-sandy limestone.
71	4615N - 4895E	7879.0	0	2.5		Soil.
			2.5	19.		Clay and cherty sandstone.
			19.	24.		Cherty-sandy limestone.
72	4955N - 5208E	7832.8	0	13.		Soil and clay.
			13.	16.		Cherty sandstone.
			16.	40.5		Clay and cherty-limy sandstone.
73	7118N - 7089E	7944.5	0	2.5		Soil.
			2.5	16.		Cherty sandstone.
			16.	20.		Cherty-sandy limestone.
74	7140N - 7078E	7944.9	0	2.		Soil.
			2.	4.		Cherty sandstone.
			4.	8.	3.03	Do.
			8.	10.	.94	Do.
			10.	20.		Do.
			20.	24.		Cherty-sandy limestone.
75	7163N - 7067E	7945.1	0	3.		Soil.
			3.	6.		Cherty sandstone - trace copper.
			6.	16.		Cherty sandstone.
			16.	20.		Cherty-sandy limestone.
76	7129N - 7084E	7944.7	0	4.		Soil and sandstone.
			4.	10.	3.06	Cherty sandstone.
			10.	13.	1.43	Do.
			13.	17.		Do.
			17.	20.		Cherty-sandy limestone.
77	7226N - 7107E	7945.3	0	2.5		Soil.
			2.5	15.		Cherty sandstone,
			15.	20.		Cherty-sandy limestone.

Hole No. 78 79 80 81 82 83 84 85 86

Hole No.	Collar Coordinates	Collar Elevation, ft.	Footage From-	Footage To-	Percent copper	Description and remarks
78	7232N - 7083E	7945.3	0	2.		Soil.
			2.	15.		Sandy clay and cherty sandstone.
			15.	17.		Cherty-sandy limestone.
79	7221N - 7131E	7945.3	0	2.		Soil.
			2.	14.		Sandy clay and cherty sandstone.
			14.	16.		Cherty-sandy limestone.
80	6929N - 7061E	7946.2	0	2.5		Soil.
			2.5	20.		Cherty sandstone.
			20.	25.		Cherty-sandy limestone.
81	6923N - 7085E	7946.4	0	2.		Soil.
			2.	8.		Cherty sandstone.
			8.	17.	1.29	Do.
			17.	25.	.29	Do.
						Fissure 21-25 feet.
82	6917N - 7110E	7945.6	0	2.		Soil.
			2.	4.		Trace copper in cherty sandstone.
			4.	20.		Cherty sandstone.
			20.	23.		Cherty-sandy limestone.
83	6742N - 6965E	7945.7	0	2.		Soil.
			2.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
84	6758N - 6946E	7944.9	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	20.		Cherty-sandy limestone.
85	6726N - 6985E	7946.5	0	2.		Soil.
			2.	8.		Cherty sandstone.
			8.	12.	.24	Do.
			12.	16.		Do.
			16.	20.		Cherty-sandy limestone.
86	6711N - 7004E	7947.3	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	17.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
87	6719N - 6995E	7946.9	0.	2.		Soil.
			2.	4.		Cherty sandstone.
			4.	8.	1.79	Do.
			8.	10.		Do.
			10.	15.		Cherty-sandy limestone.
88	7208N - 7268E	7934.6	0	2.		Soil.
			2.	12.		Cherty sandstone.
			12.	16.		Cherty-sandy limestone.
89	7230N - 7256E	7935.7	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	17.		Cherty-sandy limestone.
90	7253N - 7245E	7936.5	0	2.		Soil.
			2.	15.		Cherty sandstone.
			15.	21.		Cherty-sandy limestone.
91	7297N - 7444E	7921.7	0	2.		Soil.
			2.	15.		Cherty sandstone.
			15.	20.		Cherty-sandy limestone.
92	7342N - 7421E	7924.4	0	2.		Soil.
			2.	15.		Cherty sandstone.
			15.	20.		Cherty-sandy limestone.
93	7386N - 7399E	7926.6	0	2.		Soil.
			2.	16.		Cherty sandstone.
			16.	19.		Cherty-sandy limestone.
94	7279N - 7464E	7918.5	0	2.5		Soil.
			2.5	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
95	7252N - 7466E	7918.0	0	2.		Soil.
			2.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
96	7532N - 7167E	7944.4	0	2.		Soil.
			2.	16.		Cherty sandstone.
			16.	25.		Cherty-sandy limestone.
97	7548N - 7148E	7944.7	0	2.		Soil.
			2.	20.		Cherty sandstone.
			20.	25.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
98	7563N - 7129E	7944.8	0	2.		Soil.
			2.	18.		Cherty sandstone.
			18.	20.		Cherty-sandy limestone.
99	7516N - 7187E	7944.1	0	2.		Soil.
			2.	15.		Cherty sandstone.
			15.	20.		Cherty-sandy limestone.
100	7500N - 7206E	7944.5	0	3.		Soil.
			3.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
101	7535N - 7215E	7944.3	0	2.		Soil.
			2.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
102	7946N - 6330E	7922.2	0	14.		Soil and sandy clay.
			14.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
103	7978N - 6349E	7921.0	0	6.		Soil and sandy clay.
			6.	25.		Cherty sandstone.
			25.	29.		Trace copper in cherty sandstone.
			29.	36.		Cherty-sandy limestone.
104	8010N - 6368E	7919.8	0	10.		Soil and sandy clay.
			10.	14.	.87	Cherty sandstone.
			14.	18.		Cherty-limy sandstone.
			18.	20.		Cherty-sandy limestone.
105	8182N - 6470E	7908.6	0	2.		Soil.
			2.	33.		Clay and cherty sandstone.
			33.	38.	.10	Clay, cherty-sandy limestone.
			38.	40.		Do.
106	8202N - 6454E	7906.0	0	2.		Soil.
			2.	30.		Sandy clay and cherty sandstone.
			30.	33.		Clay and cherty-sandy limestone.
107	8221N - 6439E	7905.0	0	2.		Soil.
			2.	25.		Sandy clay and cherty sandstone.
			25.	29.		Clay and cherty sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks	Hole No.
108	7908N - 5927E	7919.5	0	1.		Soil.	
			1.	9.5	1.05	Cherty sandstone.	118
			9.5	13.	.25	Do.	
			13.	25.		Cherty-sandy limestone.	
109	7883N - 5932E	7920.7	0	2.		Soil.	119
			2.	14.		Clay and cherty sandstone.	
			14.	25.		Cherty-sandy limestone.	
110	7943N - 5888E	7917.9	0	1.		Soil.	120
			1.	15.		Cherty sandstone.	
			15.	25.		Cherty-sandy limestone.	
111	7932N - 5923E	7917.2	0	2.		Fill.	
			2.	12.	1.07	Cherty sandstone.	
			12.	18.	.57	Do.	121
			18.	38.		Cherty-sandy limestone.	
			38.	66.		Red cherty clay.	
			66.	100.		Clay and cherty-sandy limestone.	122
112	7808N - 5662E	7919.6	0	2.		Soil.	
			2.	16.		Cherty sandstone.	
			16.	25.		Cherty-sandy limestone.	123
113	7832N - 5658E	7917.0	0	4.5		Fill.	
			4.5	14.		Cherty sandstone.	
			14.	25.		Cherty-sandy limestone.	124
114	7857N - 5653E	7916.5	0	2.		Fill.	
			2.	6.	5.12	Cherty sandstone.	
			6.	12.	2.50	Do.	
			12.	16.	.69	Do.	
			16.	28.		Cherty-sandy limestone.	125
115	6650N - 6862E	7941.4	0	2.		Soil.	
			2.	11.		Cherty sandstone.	
			11.	15.	.50	Do.	
			15.	17.		Do.	126
			17.	25.		Cherty-sandy limestone.	
116	6631N - 6682E	7931.8	0	2.		Soil.	
			2.	8.	.51	Cherty sandstone.	127
			8.	17.		Do.	
			17.	30.		Cherty-sandy limestone.	
117	6616N - 6683E	7931.6	0	2.		Soil.	128
			2.	18.		Cherty sandstone.	
			18.	20.		Cherty-sandy limestone.	

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
118	6646N - 6680E	7932.1	0	2.		Soil.
			2.	17.		Cherty sandstone.
			17.	20.		Cherty-sandy limestone.
119	6572N - 6491E	7922.5	0	4.		Soil.
			4.	20.		Cherty sandstone.
			20.	25.		Cherty-sandy limestone.
120	6587N - 6491E	7922.7	0	1.		Soil.
			1.	3.	2.25	Cherty sandstone.
			3.	7.	.50	Do.
			7.	13.		Do.
			13.	17.		Cherty-sandy limestone.
121	6602N - 6490E	7923.0	0	2.		Soil.
			2.	20.		Cherty sandstone.
			20	25		Cherty-sandy limestone.
122	6523N - 6281E	7917.0	0	4.		Soil.
			4.	35.		Clay and cherty sandstone.
			35.	40.		Clay and cherty-sandy limestone.
123	6536N - 6275E	7916.7	0	3.		Soil.
			3.	18.		Clay and cherty sandstone.
			18.	21.		Clay, cherty-sandy limestone.
124	6550N - 6269E	7916.5	0	3.		Soil.
			3.	14.		Clay and cherty sandstone.
			14.	16.		Clay and cherty-sandy limestone.
125	6509N - 6287E	7916.5	0	2.		Soil.
			2.	12.5		Clay and cherty sandstone.
			12.5	15.		Clay and cherty-limy sandstone.
126	6495N - 6293E	7916.2	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
127	6480N - 6097E	7915.9	0	2.		Soil.
			2.	18.		Cherty sandstone.
			18.	20.		Cherty-sandy limestone.
128	6466N - 6102E	7916.1	0	1.		Soil.
			1.	14.	2.07	Cherty sandstone.
			14.	22.		Cherty-clayey sandstone.
			22.	25.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
129	6452N - 6107E	7915.5	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	17.		Cherty-sandy limestone.
130	6359N - 5937E	7916.0	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
131	6350N - 5948E	7915.4	0	2.		Soil.
			2.	6.		Cherty sandstone.
			6.	8.	6.30	Do.
			8.	10.	1.48	Do.
			10.	14.		Do.
			14.	16.		Cherty-sandy limestone.
132	6340N - 5960E	7914.4	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	16.		Cherty-sandy limestone.
133	6129N - 5800E	7918.3	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
134	6116N - 5808E	7917.9	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	17.		Cherty-sandy limestone.
135	6104N - 5817E	7917.5	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	16.		Cherty-sandy limestone.
136	6093N - 5802E	7918.0	0	2.		Soil.
			2.	14.		Cherty sandstone.
			14.	17.		Cherty-sandy limestone.
137	6062N - 5764E	7918.8	0	2.		Soil.
			2.	16.		Cherty sandstone.
			16.	18.		Cherty-sandy limestone.
138	6032N - 5627E	7921.4	0	1.		Soil.
			1.	16.		Cherty sandstone.
			16.	20.		Cherty-sandy limestone.
139	6018N - 5613E	7921.3	0	2.		Soil.
			2.	6.		Clay and cherty sandstone.
			6.	8.	1.31	Cherty sandstone.
			8.	12.	.46	Do.
			12.	18.		Do.
			18.	20.		Cherty-sandy limestone.

Hole No.	Collar: Coordinates	Collar: Elevation, ft.	Footage: From-	Footage: To-	Percent copper	Description and remarks
140	6003N - 5635E	7921.0	0	2.		Soil.
			2.	18.		Clay and cherty sandstone.
			18.	20.		Cherty-sandy limestone.
141	5941N - 5403E	7920.5	0	2.		Soil.
			2.	20.		Cherty sandstone.
			20.	22.		Cherty-sandy limestone.
142	5956N - 5398E	7921.0	0	1.		Fill.
			1.—	5.	3.09	Cherty sandstone.
			5.	16.		Cherty and limy sandstone.
143	5970N - 5394E	7921.3	0	2.		Soil.
			2.	16.		Clay, cherty and limy sandstone.
144	5936N - 5211E	7918.0	0	2.		Soil.
			2.	16.		Clay and cherty sandstone.
			16.	18.		Cherty-sandy limestone.
145	5921N - 5213E	7918.7	0	2.		Soil.
			2.	16.		Cherty sandstone.
			16.	18.		Cherty-sandy limestone.
146	5907N - 5216E	7918.3	0	2.		Soil.
			2.	16.		Cherty sandstone.
			16.	18.		Cherty-sandy limestone.
147	5864N - 5097E	7915.7	0	1.		Fill.
			1.	14.		Cherty sandstone.
			14.	18.		Cherty-sandy limestone.
148	5879N - 5094E	7915.7	0	16.		Cherty sandstone.
			16.	18.		Cherty-sandy limestone.
149	5893N - 5091E	7915.7	0	2.		Fill.
			2.	16.		Cherty sandstone.
			16.	18.		Cherty-sandy limestone.
150	2122N - 2517E	7778.2	0	6.		Sandy clay.
			6.	20.		Clay and cherty sandstone.
			20.	25.		Cherty-limy sandstone.
151	1951N - 2463E	7768.8	0	12.		Sandy clay and cherty sandstone.
			12.	24.		Cherty-limy sandstone.
152	1724N - 2335E	7752.9	0	5.		Cherty sandstone.
			5.	10.	1.19	Do.
			10.	20.	.41	Do.
			20.	35.		Cherty-limy sandstone.
			35.	55.		Clay and cherty-limy sandstone.
			55.	100.		Cherty-limy sandstone.

call USBLM - phoenix - ask if have any min. claims
- any land orders affecting sections of interest.

Coconino County Cothse, Flagstaff 1/28/81

~~T-D-S~~

T38N R1E no map 29

is in book 601 - Map 28 - shows pat. mining claims

no assess. on these 7 pat claims

Millsite	1655	Not included or stated in 392/705 are
Mugwump	1655	claims other than MS 1655, ie. Buster and Ensign
Pauper's Dream	1655	
Upright	1655	Bk? Pg?
Arizona Jim	1655 - notes U.S.A.	392/705 7-1-71 - this order effect all these claims
Buster	3694 - notes U.S.A.	1965
Ensign	3706 - notes U.S.A.	1965

is in book 601 - Map 30 - shows only 1 parcel assessed, is
~~Copper Glance 3102~~ to Jacobs Lake Lode
- owned by Christensen, Lot B & Colleen H JT
948 N. ~~Stapley~~ Stapley Dr.
19.04 Ac Mesa, AZ 85203

other non-assessed parcels are shown on map with no other notations are:

Makin	3102	all under 39/425 10/28/52
Ray	3102	= 11 pat. claims
Mackin No. 1	3102	
Ray No. 1	3102	
Shorty Ditto	3102	
Kennedy	3102	
Copper Cor	3102	
Pegasi	~~3102~~ 3695	Grant 3707
Hawk	3695	Copper Glance 3102

This is all that showed up - no other pat. mining claims.

Note; according to RI, 4013
has 7 pat claims in Petrified area – all 7 are USFS
has 12 pat claims in Mackin area – 11 are known to USFS
has 1 pat claim in Phantom area – 0 show up in books

don't know anything about unaccounted for pat. claims,
assume all unpat. claims invalid

Should check w/ BLM in Phoenix to see what
going on and if area available for mineral location

BLM offices - Phoenix - ~~PS~~ 2/2/81
– (602) 261-3706 info
– checked on computer - no unpat. claims show up
– Sec 12 - surface resurveyed - minerals retained for all of these
– Sec 13 & 14 - ~~M 3694 - Empire~~

Check on Grand Canyon

minerals retained { 3706 - Empire
3674 - Buster }

Sec 12 & 13 { 3709
3695
3102
3707 } reserved by U.S. Patents for minerals, dated in 1952, Sept. 30

~~- Grand Canyon Game Preserve~~
- Lambs Lake Game Preserve - ~~south~~
– this affects Sec 13 & 14 - which closes area for ~~Sec 11 & 1~~,

Grand Cyn, Wash Game Preserve - close all Townships to mining

MINING CLAIM DEED

This indenture, made in the City of Los Angeles, State of California, on January 31, 1950, by United States Metals Corporation, a corporation created and existing under and by virtue of, the laws of the State of Nevada, (herein called the Seller), and R. E. Whiting and Nellie Whiting, husband and wife, (herein called the Buyers),

W I T N E S S E T H :

That the seller for and in consideration of the sum of One Dollar ($1.00) lawful money of the United States, and other valuable consideration, to it in hand, the receipt of which is hereby acknowledged, has bargained, sold, conveyed, remised, released and forever quitclaimed, and does by this act, bargain, sell, remise, release and forever quitclaim to buyers, their heirs and assigns, forever, all the right, title and interest, estates, claim and demand of seller in and to the surface rights only of the following described property, mining claims and mining rights in the County of Coconino, State of Arizona, and more particularly described as follows:

Mackin Lode mining claim,
U. S. Survey No. 3102

Mackin Lode No. 1 mining claim
U. S. Survey No. 3102

Ray Lode mining claim,
U. S. Survey No. 3102

Hawk Lode mining claim,
U. S. Survey No. 3695

Grant Lode mining claim,
U. S. Survey No. 3707

Kennedy Lode mining claim,
U. S. Survey No. 3102

Ray No. 1 Lode mining claim,
U. S. Survey No. 3102

Shorty Ditto Lode mining claim,
U. S. Survey No. 3102

Copper Glance Lode mining claim,
U. S. Survey No. 3102

Copper Con. Lode mining claim,
U. S. Survey No. 3102

Pigeon Lode mining claim,
U. S. Survey No. 3695

Ensign Lode mining claim,
U. S. Survey No. 3706

Jimbo Lode mining claim,
U. S. Survey No. 3709 and

Buster Lode mining claim,
U. S. Survey No. 3694.

Excepting and reserving to seller and its assigns all the oil, gas and minerals in, on or under the surface of said land, and all the rights of ownership therein, and the seller hereby further reserves to itself and its assigns, the right and license of exploring, mining, developing or operating for any or all of said products upon said lands, and of erecting thereon all necessary buildings, pipe-line, roads, machinery and equipment necessary in and about the business of mining, developing or operating for any of said products, and hereby reserves all of the rights of a full owner operating on his own land, according to all the privileges and customs of the field that may be developed about said tract of land.

That the above reservation shall extend for a period of fifty (50) years from and after the date of this deed; provided that, if upon the expiration of said fifty year period any of said claims are being operated, and ore is being produced in paying quantities, this reservation shall be automatically extended from year to year thereafter so long as ore is produced in paying quantities, otherwise all mineral rights

STATE OF CALIFORNIA)
) ss
COUNTY OF LOS ANGELES)

On January 31, 1950, before me, Stephan B. Robinson, a Notary Public in and for the County of Los Angeles, State of California, personally appeared Roger C. Peery, known to me to be the president of the corporation that executed the within instrument, and acknowledged to me that such corporation executed the same.

Notary Public in and for said
County and State

STATE OF ~~CALIFORNIA~~ ARIZONA)
) ss
COUNTY OF ~~LOS ANGELES~~ NAVAJO)

On January 31, 1950, before me, a Notary Public in and for the County of ~~Los Angeles~~ NAVAJO, State of ~~California~~ ARIZONA, personally appeared R. E. Whiting and Nellie Whiting, husband and wife, known to me to be the persons whose names are subscribed to the within instrument, and acknowledged that they executed the same.

Notary Public in and for said
County and State

My Commission expires August 27, 1952

hereby reserved by seller shall cease upon the expiration of said period.

Seller hereby warrants that it has a good and sufficient title and right to convey the interest herein referred to and agrees to defend the same against any person claiming a superior title.

Buyer assumes and agrees to pay all taxes and assessments against the real property herein conveyed. Seller agrees to pay any taxes levied against mineral rights.

IN WITNESS WHEREOF, the seller has signed this instrument, by its President, thereunto duly authorized and has caused its corporate seal to be hereunto affixed, attested to by its Secretary, and buyer has set its hand and seal the day and year first above written.

UNITED STATES METALS CORPORATION

By_____
President

ATTESTED:

By_____
Secretary

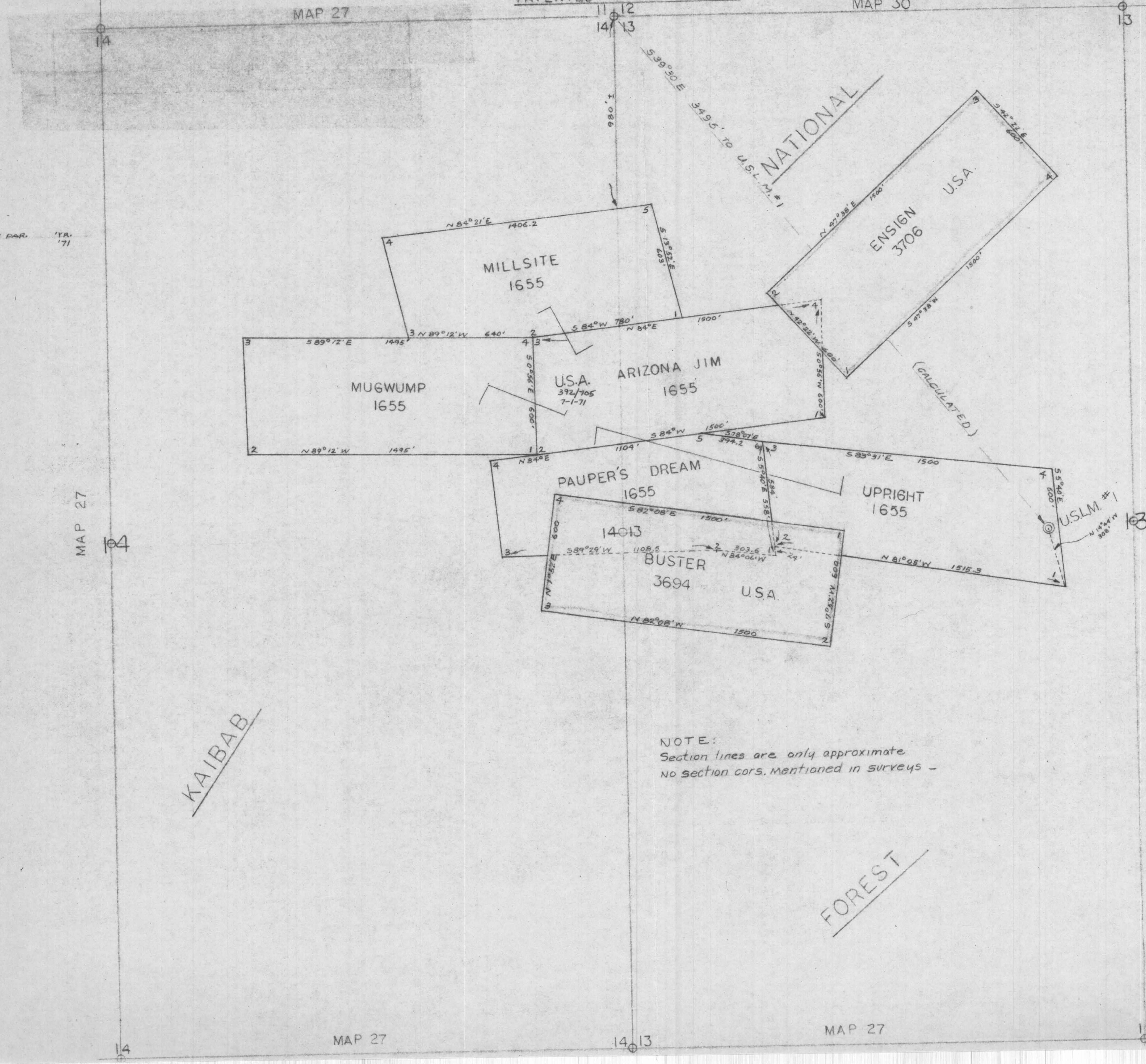
Ralph E. Whiting

Nellie P. Whiting

Buyer

POR W1/2 SEC.13, E1/2 SEC.14, T-38N R-1E
PATENTED MINING CLAIMS

BOOK 601
MAP 28



COCONINO COUNTY • ARIZONA

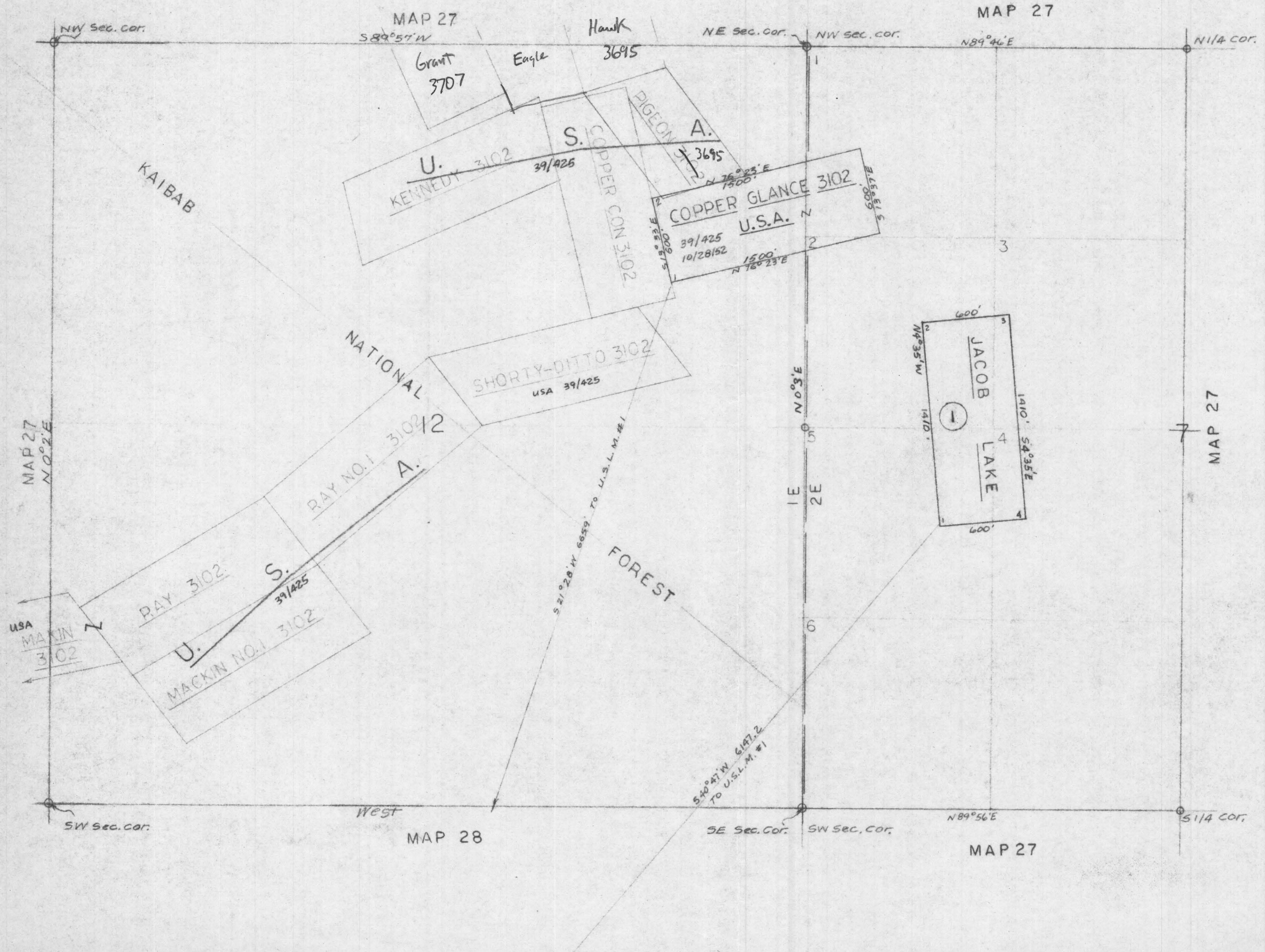
N

ASSESSOR

scale 1"=400'
9-14-71

BOOK 601
MAP 30

SEC. 12 T-38N R-1E
W1/2 SEC.7 T-38N R-2E


MAP 27
NW Sec. cor.
S89°57'W
Grant 3707
Eagle
Hawk 3695
NE Sec. Cor.
NW Sec. cor.
N89°46'E
N1/4 Cor.
MAP 27
U. S. A.
KENNEDY 3102
39/425
COPPER CON 3102
PIGEON
3695
N 76°23'E 1500'
COPPER GLANCE 3102
U.S.A.
39/425
10/28/52
1500' N 76°23'E
600' S 13°37'E
KAIBAB
NATIONAL
FOREST
SHORTY-DITTO 3102
USA 39/425
12
RAY NO. 1 3102
A.
S.
RAY 3102
MACKIN NO. 1 3102
U.
39/425
USA
MAKIN 3102
MAP 27
N 0°2'E
S 21°28'W 6859' TO U.S.L.M. #1
S 40°47'W 6147.2 TO U.S.L.M. #1
N 0°3'E
1E
2E
JACOB LAKE
600'
1410'
N 4°35'W
S 4°35'E
MAP 27
West
SW Sec. cor.
MAP 28
SE Sec. Cor.
SW Sec. Cor.
N89°56'E
S1/4 Cor.
MAP 27

COCONINO
COUNTY
•
ARIZONA

N

COUNTY OF COCONINO

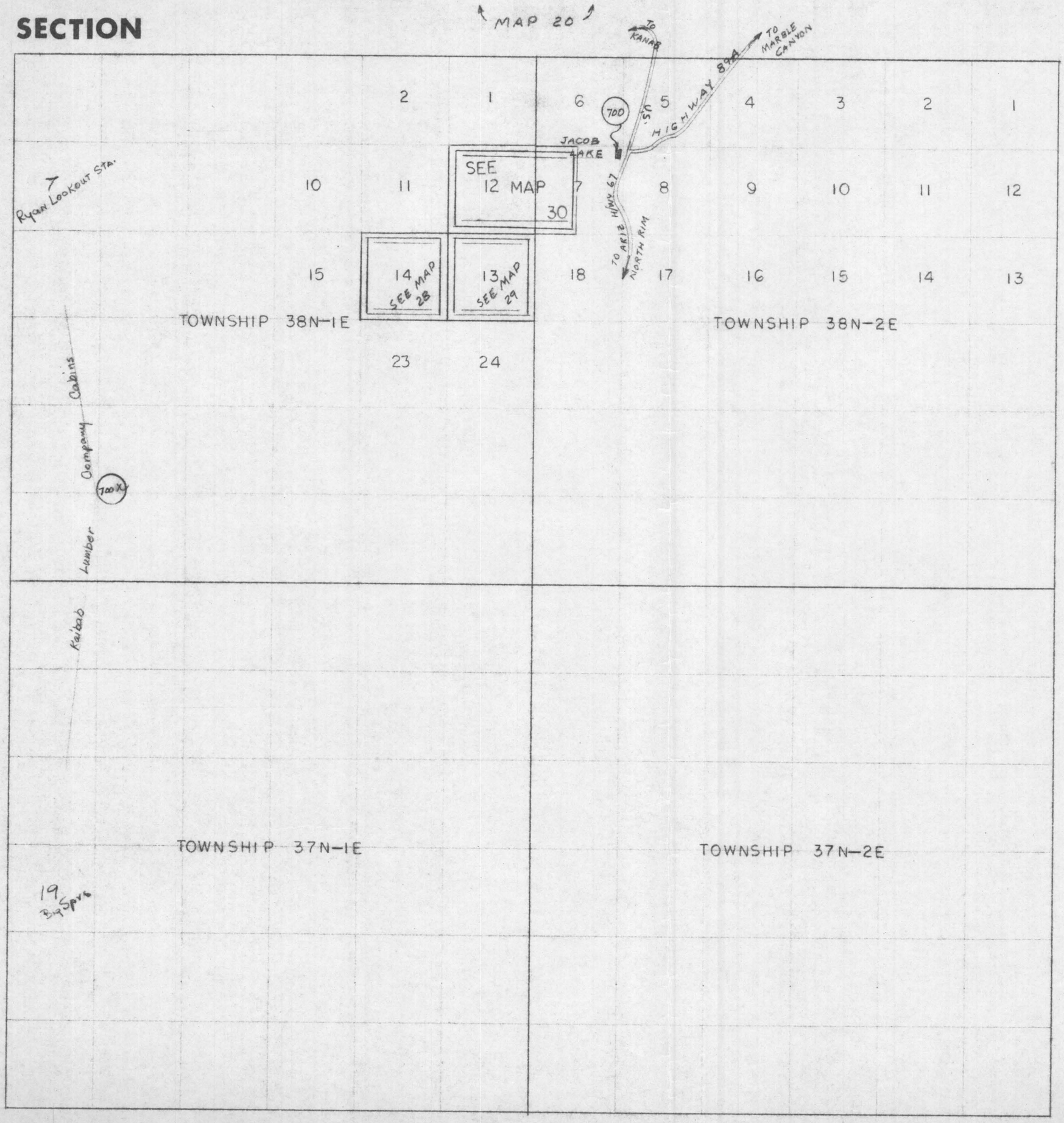
ASSESSOR

scale 1"=600'
4-17-70

TOWNSHIPS 38N 1E; 38N 2E;
37N 1E; 37N 2E

BOOK 601
MAP 27

TOWNSHIP RANGE SECTION



COCONINO COUNTY

ARIZONA

N

ASSESSOR
1963

scale 1"= 1 MILE

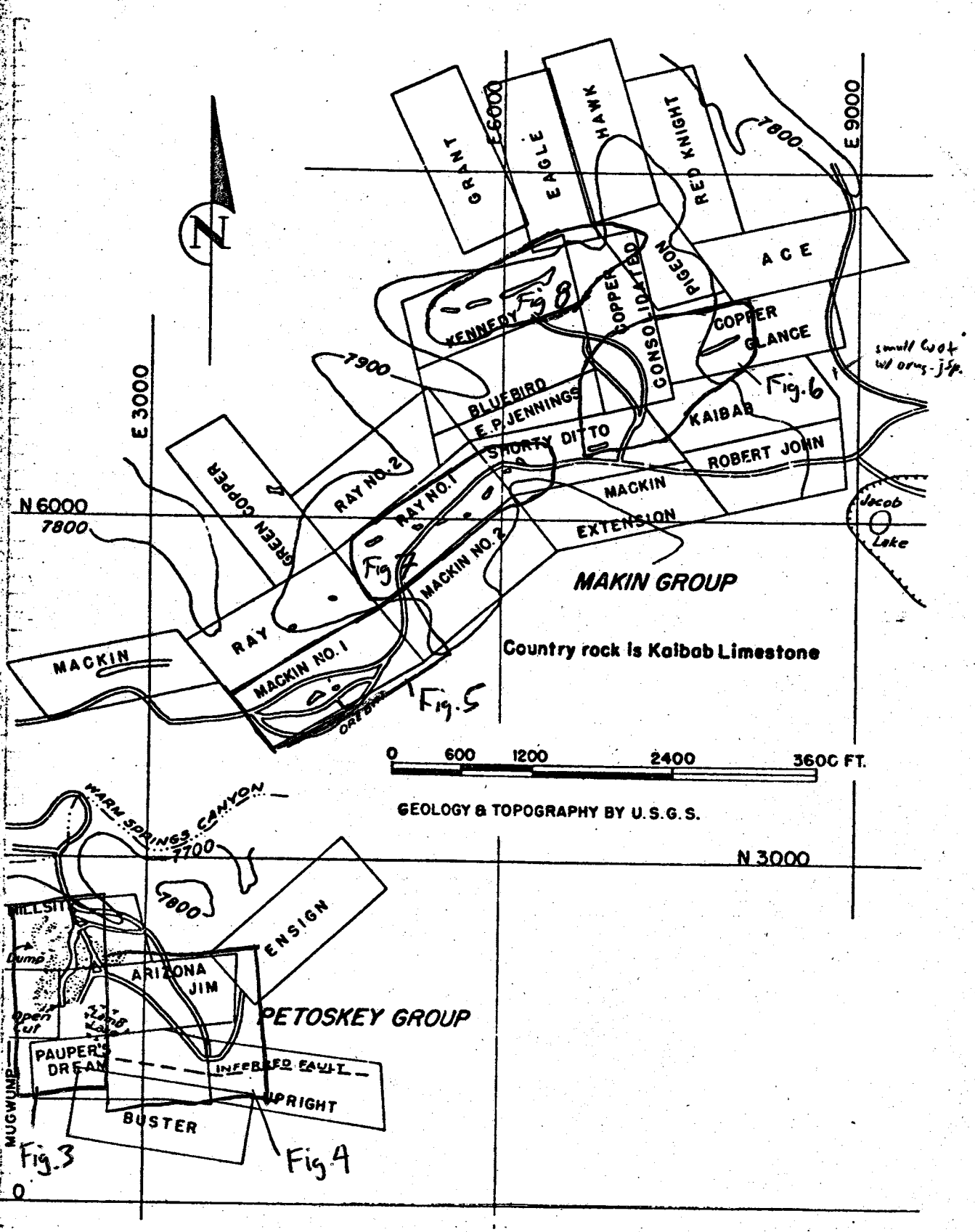
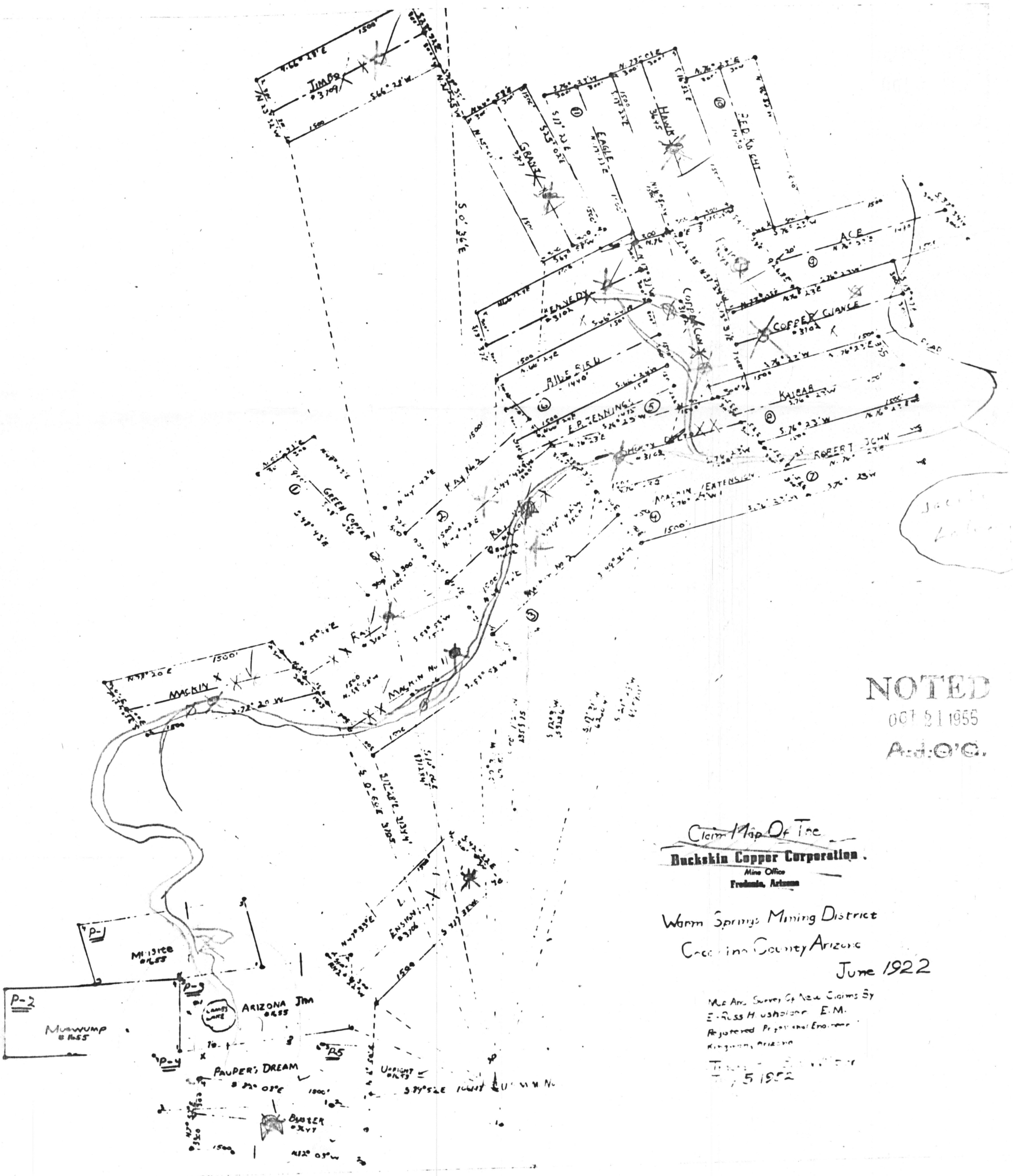


Figure 2.- Geologic plan, Apex copper project.

(3)



NOTED
OCT 21 1955
A.S.O'C.

Claim Map Of The
Buckskin Copper Corporation.
Mine Office
Fredonia, Arizona

Warm Springs Mining District
Coconino County Arizona
June 1922

Mine And Survey Of New Claims By
E. Russ Hushaber E.M.
Registered Professional Engineer
Kingman, Arizona

Filed ... 1955

With interest being focused on base metals as being more essential than ever for armament purposes, the very extensive surface deposit which we designate as the Kaibab group will prove very valuable. In any event let us turn to this group for our first examination:

Discovery of high grade copper ore at Jacobs Lake in the heart of what is now Kaibab National Forest was made by roving cowboys in the year 1900. After the first rush and preliminary opening of the area the claims covering the apparent entire extent of the enrichment were acquired by prominent copper men, including Ryan, Ray, and Kennedy. At that time the Kaibab Plateau was one of the most inaccessible areas on the continent, but, after holding the properties for a number of years, Ryan decided the high cost of transportation could be beaten, built a town just off the plateau at the mill site, and proceeded to import equipment for the erection of a smelter. Several hundred men were actively engaged on the property at this time, and Ryan's expenditures were reported to have been in excess of half a million dollars. Before a ton of ore could be treated at the new smelter the town of Ryan was destroyed by fire. Ryan commenced rebuilding, but before he had progressed very far, a second fire wiped out his efforts. After this period the property passed to John Mackin of Chicago. With the passage of some years Mackim felt that the excessively high cost of transporting machinery and equipment to the property had diminished somewhat, and proceeded to transport two smelters, a complete saw mill, generators, and all the necessary items for a very large mining and smelting operation. Seven miles of railroad was surveyed, graded, and the track graded for three miles. Electric locomotives were brought to the property. And again, before running a pound of ore, Mackin was forced to shut down. His efforts established the high rate of $30.00 per ton for hauling in and out of the property and inasmuch as his smelting operation called for the hauling of large quantities of flux material to offset the silica content of the ores, Mackin saw that his development could not succeed until roads were built through the Kaibab.

At this point Mackin, who had grown quite elderly, allowed a group of promoters to assume management of the property with the usual result. Nothing was done, and the valuable equipment was lost or stolen! Our inventories show that equipment of a value of nearly $400,000 was lost in this manner. United States Metals Corporation, upon acquiring the properties, instituted proceedings in an effort to regain at least a portion of this loss, but the matter had gone too long and a few thousand dollars was all they could retrieve.

We have gone into this history for this reason: Non-mining people frequently ask about this or that property, 'why has it not been worked before?' - and, in fact, that is the first question a mining man asks, himself. Until we can answer that very question ourselves we are very chary about proceeding on any deal on any property.

In the case of the Kaibab properties the value of the ore was and is certainly high. In the case of a surface flow deposit, with the ore easy of access, this is a matter established quickly. Two factors made the Kaibab an uncommercial factor; high cost of transportation, and the high silica content of the ores. The problem of transportation was not solved until just prior to the acquisition of the property by the United States Metals Corporation when a grade A through highway from Flagstaff to Salt Lake City was completed directly through the property.

Truck transport is now so low that the ore may actually be shipped to the A.S. & R. Smelter at Salt Lake City as has been proven by our experiemental shipment of some thirty cars of ore, trucked to Marysvale and shipped the balance of the way by rail. And as to the silica content the changes in mill and smelter processes has changed the ore from a penalty ore to a bonus ore. So we have the interesting facts established that our predecessors considered the property worthy of very tremendous aggregate expenditure even in the face of prohibitive transport costs and high recovery or treatment costs; factors which we do not face today.

Our fee holdings in the Kaibab comprise 25 claims of which 15 are patented. We control, on bond and lease, the 5 Petoskey claims adjacent to our own group on the South. This area, which we may point out is very extensive, controls or rather blankets the entire known mineralized district. The engineers, Sheldon and McAuliffe, give the property, on the basis of several thousand feet of trenching and pits, from 1,000,000 to 2,000,000 tons of evident ore, which, on their sampling, they average at 7½% copper content. Now 7½% copper means 150 pounds of copper to the ton of ore which, at the present price of 11½¢ per pound is the equivalent of $17.25 per ton of ore. Of course, a considerable value part of the ore will not run better than 2% to 4%- but that is high for a large surface copper deposit-and yet the ore that runs from 12%-17% will certainly raise the average of the whole. The deepest hole at present of the Kaibab claims of approximately 10 feet, and on the Petoskey, 30 feet, alliin ore. If the depth of the ore estimated by Sheldon and McAuliffe, who took an average depth of 5 feet in their reports, extends downwards to 50 feet, we would have a deposit containing between ten and twenty million tons of copper ore. Such a figure as fully developed ore would certainly look well on a balance sheet, having, as it would, a gross value of one hundred fifty to two hundred million. That, of course, remains to be determined, but indications of such tonnage are certainly there. In passing, the instructor in Geology at the University of Utah referred to the Kaibab property as being the 'largest undeveloped copper property in the United States'.

Let us now examine the Comanche Group, as to history, development, and possibilities.

The bonanza enrichment of Blind Spring Hill, which lies on the present road to Tonopah, about 35 miles north of Bishop, California, was first opened in the late 1860's. The values were silver, copper, lead and gold. The hill was quickly divided into old time small mining claims, and some thousand or more miners plunged into working the eighteen or twenty mines of the district. The strike of the veins was north and south across the broad uplift of the mountains, and shafts and pits were sunk at many points over the high rise. The camp produced millions in a hurry, even though the ore had to be shipped by wagon to the sea, and thence to Wales for smelting. The California State Reports give the production of the hill at six million dollars, but, in view of the fact that the bulk of production occurred before any semblance of reporting it is more likely that the total production of the hill reached seventeen to eighteen million.

All of this production was taken from holes and shafts usually no more than 20 to 200 feet in depth. The deepest working on the entire hill was no more than 650 feet from the surface. The reason for this very shallow working was the fact that horizontal faultings throughout the entire hill moved the

John Mackin and Mary M. Mackin, husband and wife	:	MINING DEED (Quitclaim)
	:	Dated: October 16, 19[illegible]
	:	Recorded: November 1[illegible], 19[illegible]
to	:	Book: 57 DEEDS
	:	Page: 572
The Los Angeles Exploration & Metals Co. Ltd., a Nevada corporation	:	Consideration: $10.00, etc.
	:	
	:	

CONVEYS: All of the right, title and interest of the Parties of the First Part in or to the following described real property situate in the County of Coconino, State of Arizona, more particularly bounded and described as follows, to-wit:

The Ensign Patented Lode Mining Claim, U.S. Sur. #3706;

The Buster Patented Lode Mining Claim, U.S. Sur. #3694;

The Mackin Patented Lode Mining Claim, U.S. Sur. #3102;

The Mackin No. 1 Patented Lode Mining Claim, U.S. Sur. #3102;

The Ray Patented Lode Mining Claim, U.S. Sur. #3102;

The Ray No. 1, Patented Lode Mining Claim, U.S. Sur. #3102;

The Shorty Ditto Patented Lode Mining Claim, U.S. Sur. #3102;

The Copper Glance Patented Lode Mining Claim, U.S. Sur. #3102;

The Copper Consolidated Patented Lode Mining Claim, U.S. Sur. #3102;

The Kennedy Patented Lode Mining Claim, U.S. Sur. #3102;

The Pigeon Patented Lode Mining Claim, U.S. Sur. #3695;

The Hawk Patented Lode Mining Claim, U.S. Sur. #3695;

The Grant Patented Lode Mining Claim, U.S. Sur. #3707;

The Jimbo Patented Lode Mining Claim, U.S. Sur. #3709;

The Sunshine Patented Lode Mining Claim, U.S. Sur. #3708;

Together with all of the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, and the rents, issues and profits therefrom.

Also all tools, machinery, tramways, or railroads and the equipment thereof, including three locomotives and all cars, trucks, etc., the saw mill with its tools and appurtenances, and all other personal property situate on or heretofore used in connection with the operation of the above described patented mining claims.

Also all water rights, ditches, flumes and pipe lines heretofore used in connection with said mining property, particularly the following to-wit:

The Riggs Springs, located about thirteen (13) miles south of the Coconino Smelter, in what is known as Hail Canyon in said Coconino County, the notice of location of which is dated October 27, 1900,

and recorded in the Recorder's office of said County on January 4, 1901, in Book 1 of Water Rights, Page 205;

The Big Spring, located about six (6) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County, the notice of location of which is dated October 27, 1900, and recorded in the Recorder's office of said County on January 4, 1901, in Book 1 of Water Rights, Page 204;

The Mangum Springs, located about one-and one-half (1½) miles North from what is known as Big Spring, and about six (6) miles south of the mouth of Warm Springs Canyon in said Coconino County, which spring is more fully described in the notice of location recorded in the Recorder's office on the 30th day of December, 1899, in Book 1 of Water Rights, Page 148;

The Moquitch Springs, situated about one (1) mile below the above described Magnum Springs, in said Coconino County;

Together with all pipes and pipe lines for conveying the waters of said springs to what is known as the Coconino Mill in said County.

Also a certain mill site, containing five (5) acres, situated at the mouth of Warm Springs Canyon in said County and State, commonly known as the Coconino Mill Site and particularly bounded and described as follows:

Beginning at the Southeast corner Monument #1, running thence North twenty rods to Northeast Monument #2; thence West forty-five degrees north, fifty six and six-tenths rods to the Northwest corner marked by a blazed cedar tree; thence South twenty rods to Southwest corner marked by a blazed cedar tree; thence East forty-five degrees South, fifty-six and six-tenths rods to the place of beginning; and more fully described in the notice of Location which was filed for record in the Recorder's office of said Coconino County on the 8th day of October, 1900 in Book 1 of Mill Sites, on Page 187. Together with all of the buildings, machinery and other improvements thereon. It being intended by this clause to convey the said mill site and the mill and reduction works and all of the machinery and appurtenances connected with and contained in the same.

RECITES: To have and to hold all and singular said mining property and said water rights, pipe lines, mill site, mills, machinery, and appurtenances and privileges in any way incident or belonging to said mines, water rights, mill site and mills, or heretofore used in connection therewith, unto the said Party of the Second Part, its successors and assigns forever.

SIGNED: John Mackin
Mary M. Mackin

ACKNOWLEDGED: October 16, 1929 by John Mackin and Mary M. Mackin, husband and wife, before Abbie F. Sorensen, Notary Public, Cook County, Illinois. (N. P. SEAL) Comm'n. expires 11/22/31.

C O P Y

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Kaibab National Forest

Williams, Arizona,
September 23, 1955.

United States Metals Corp.
Mr. Fred Carlson, Sec'y & Treas.
2607 W. 7th Street,
Los Angeles 5, California

Dear Sir:

We wish to acknowledge receipt of your letters of August 24th and September 13, including cashier's check for $48.00, covering back fees.

We regret delaying reply to your first letter and hope the following information will fully meet your request.

We will begin by explaining that through a land exchange transaction in 1950, the United States (U.S.Forest Service) acquired title from Whiting Bros. for surface rights to the following mineral patents listed in your letter of August 26th:

Mackin	Ray No. 1
Mackin No. 1	Shorty Ditto
Ray	Copper Glance
Grant	Copper Con
Hawk	Pigeon
Kennedy	

The same reservation of mineral rights involved in the sale of surface rights by the U. S. Metals Corp. to Whiting Bros. (Ralph E. and Nellie Whiting of Holbrook, Arizona) appears in the transfer of ownership of surface rights to the United States (U.S. Forest Service) said reservation as follows:

"Rights outstanding in the United States Metals Corp for all the oil, gas and mineral in, on, and under the surface, and the rights of ownership therein, for a period of fifty (50) years from and after January 1, 1950, with the right of license of exploring, mining, developing or operating for any and all said products, and of erecting thereon all necessary buildings, pipelines, roads and machinery necessary thereto; provided that this reservation shall be automatically extended from year to year thereafter so long as ore is produced in paying quantities."

The U. S. Metals Corporation, therefore, has the mineral rights described.

Taxes were paid prior to transfer of title from Whiting Bros. to the United States. No further taxes, therefore, are due and none will be assessed since title is in the United States.

No permit fees are due or involved.

The Jimbo Lode was acquired from Whiting Brothers by the U. S. Forest Service through a similar land exchange transaction. The same mineral reservation is held by the U. S. Metals Corp. on the Jimbo Lode as in the case of the above group. No taxes or permit fees are involved.

The Ensign Lode and Buster Lode are located in a group of patents a mile or so distant from the group above named. These two patents are in private ownership so far as our records show. We assume they were purchased by Whiting Bros. Since the Forest Service has no jurisdiction over such private lands any rights your Company has will be respected by this Bureau.

The eleven unpatented claims you have listed and one additional claim, the St. Paul, you did not list, presents an involved situation. A special use permit for the purpose of development of claims and shipping of ore was issued to the United States Metals Corporation by the U. S. Forest Service in 1941. The check you enclosed with your letter of September 13, 1955, covered the permit fees for Calendar Years 1954 and 1955. Since this permit was issued the propriety of and authority for issuance has been questioned by higher authority. The questioning was due to the fact that the area embracing the claims is an established National Game Preserve, having been established by proclamation of President Theodore Roosevelt in 1906. An opinion of the Attorney General of the United States is to the effect that lands within the Grand Canyon National Game Preserve would not appear to be subject to the eneral mining laws. The permits, such as the one issued to the U.S. Metals Corporation, issued prior to the Attorney General's opinion have been allowed to continue, but apparently without authority. Since activity following the issuance of the permits has been of a prospecting nature without activity, the cases have, you might say, been dormant all these years.

Our best advice to you at this time is for you to defer any plans for mining activity on the 12 permitted claims until we have time for definite clarification of th situation. We will place your check tendered in payment of 1954 and 1955 fees in special deposit until the situation is cleared, refunding the $48.00 later if it is determined the permits should be discontinued.

This will answer your question regarding patenting of claims in this area. The Attorney General's opinion indicates "No".

The situation on these unpatented claims is as indicated above, dormant. To our knowledge there has been no activity for years, little beyond exploratory initially. Whether or not filing has been done we do not know. Neither do we know if annual assessement requirements have been met. The reason for our lack of information is that mineral filings are made under the General Mining

Laws which are administered by the Department of the Interior, Bureau of Land Management. This Department and Bureau administers the mining laws on lands in Federal ownership whether it be on National Forest land or other Federal land. It is our opinion that the Bureau of Land Management would be governed by the Attorney General's opinion that the area is not open to mineral entry and patent. The office of the Bureau of Land Management having jurisdiction over the area in which the claims are located is in Phoenix, Arizona.

You have, of course, the right to operate on the patented claims on which you retain mineral rights. We suggest, however, that your field force contact the Forest Ranger at Fredonia, Arizona, before commencing operations. The Forest Ranger is familiar with the location of the patents and may be of assistance in directing your crews to the right areas.

If there are further questions please feel free to call on us.

Very truly yours,

F. M. REDDIN, Forest Supervisor

By: Gordon H. Dade, Acting.

No. 871

Abstract of Title

To the following described Real Estate

The Ensign Patented Lode Mining Claim, U.S. Sur. #3706

The Buster Patented Lode Mining Claim, U.S. Sur. #3694

The Mackin Patented Lode Mining Claim, U.S. Sur. #3102

The Mackin No. 1 Patented Lode Mining Claim, U.S. Sur. #3102

The Ray Patented Lode Mining Claim, U.S. Sur. #3102

The Ray No. 1, Patented Lode Mining Claim, U.S. Surv. #3102

The Shorty Ditto Patented Lode Mining Claim, U.S. Sur. #3102

The Copper Glance Patented Lode Mining Claim, U.S. Sur. #3102

The Copper Consolidated Patented Lode Mining Claim, U.S Sur. #3102

The Kennedy Patented Lode Mining Claim, U.S. Sur. #3102

The Pigeon Patented Lode Mining Claim, U.S. Sur. #3695

The Hawk Patented Lode Mining Claim, U.S. Sur. #3695

The Grant Patented Lode Mining Claim, U.S. Sur. #3707

The Jimbo Patented Lode Mining Claim, U.S. Sur. #3709

The Sunshine Patented Lode Mining Claim, U.S. Sur. #370

Also

The Riggs Springs, located about thirteen (13) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County.

The Big Spring, located about six (6) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County.

The Canyon Springs, located about one and one-half (1½) miles North from what is known as Big Spring, and about six (6) miles south of the mouth of Canyon Springs Canyon in said Coconino County.

No.

Abstract of Title

To the following described Real Estate

Continued:

The Moquitch Springs, situated about one (1) mile below the Mangum Springs, in said Coconino County.

Also

A certain mill site, containing five (5) acres, situated at the mouth of Warm Springs Canyon in said Coconino County, commonly known as the Coconino Mill Site and particularly bounded and described as follows:

Beginning at the Southeast corner Monument #1, running thence North twenty rods to Northeast corner Monument #2; thence West forty-five degrees north, fifty six and six-tenths rods to the Northwest corner marked by a blazed cedar tree; thence South twenty rods to Southwest corner marked by a blazed cedar tree; thence East forty-five degrees South, fifty-six and six-tenths rods to the place of beginning.

All the above situated in Coconino County, State of Arizona.

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS:

R E Whiting and Nellie Whiting

That [illegible]ting and Nellie Whiting, husband and wife, of Navajo County, Arizona, for and in consideration of the exchange therefor of national forest lands of not exceeding an equal value, and pursuant to the Act of Congress of March 20, 1922 (42 Stat. 465), as amended by the Act of February 28, 1925 ([illegible]) Stat. ([illegible]), 16 U.S.C. Secs. 485, 486, have granted, bargained, sold and conveyed and by these presents do grant, bargain, sell and convey unto the UNITED STATES OF AMERICA all that certain premises situated in Coconino County, State of Arizona, described as follows, to-wit:

> Grant Mineral Patent, Survey No. 3707, Hawk and [illegible] Mineral Patents, Survey No. 3695; Copper Con, Kennedy, Copper Glance, Shorty Ditto, Ray No. 1, Ray, Mackin, Mackin No. 1 Mineral Patents, Survey No. 3702, located in Sections 1, 11 and 12, Township 38 North, Range 1 East, and Section 7, Township 38 North, Range 2 East, Gila and Salt River Meridian, Coconino County, Arizona.

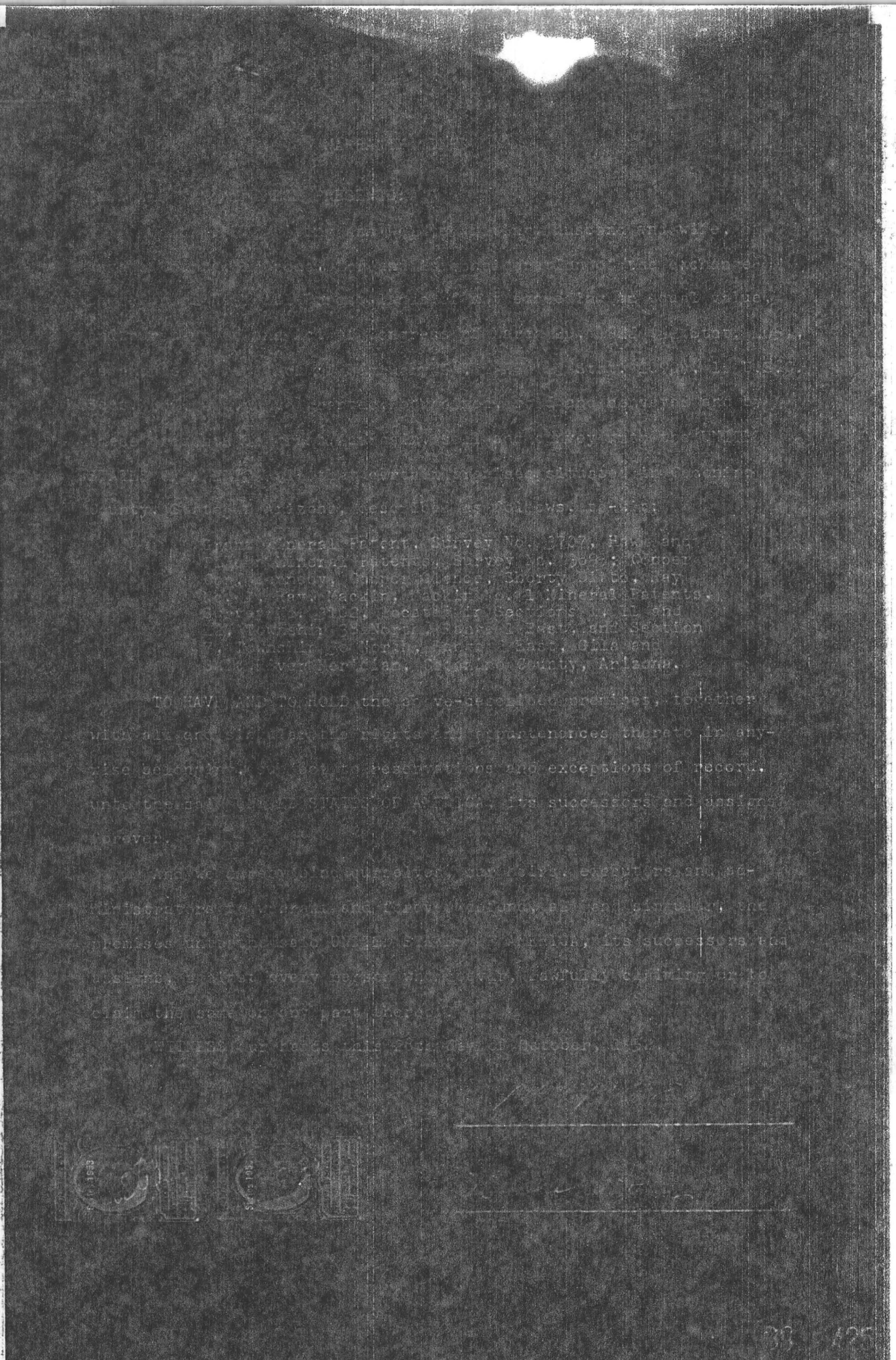
TO HAVE AND TO HOLD the above-described premises, together with all and singular the rights and appurtenances thereto in anywise belonging, subject to reservations and exceptions of record, unto the said UNITED STATES OF AMERICA, its successors and assigns forever.

And we hereby bind ourselves, our heirs, executors and administrators to warrant and forever defend, all and singular, the premises unto the said UNITED STATES OF AMERICA, its successors and assigns, against every person whomsoever, lawfully claiming or to claim the same or any part thereof.

WITNESS our hands this 2[illegible] day of October, 1952.

[signature]

[signature]



WARRANTY DEED

[illegible]

[illegible], husband and wife, of [illegible], for and in consideration of the exchange [illegible] lands [illegible] an equal value, [illegible] of Congress [illegible] March 20, 1922 (42 Stat. 465), as [illegible] Stat. 1090), 16 U.S.C. secs. [illegible] granted, bargained, sold and conveyed, and by these presents [illegible] and convey unto the UNITED STATES [illegible] that certain premises situated in Coconino County, State of Arizona, described as follows, to-wit:

> [illegible] Mineral Patent, Survey No. 3707, Hawk and [illegible] Mineral Patents, Survey No. 3698; Copper [illegible], Copper Blanco, Shorty Ditto, Ray No. [illegible] Ray, Mackin, Mackin No. 1 Mineral Patents, Survey No. [illegible], located in Sections [illegible] and [illegible] North, Range 1 East, and Section [illegible] North, Range 2 East, Gila and Salt River Meridian, Coconino County, Arizona.

TO HAVE AND TO HOLD the above-described premises, together with all and singular the rights and appurtenances thereto in anywise belonging, subject to reservations and exceptions of record, unto the said UNITED STATES OF AMERICA, its successors and assigns forever.

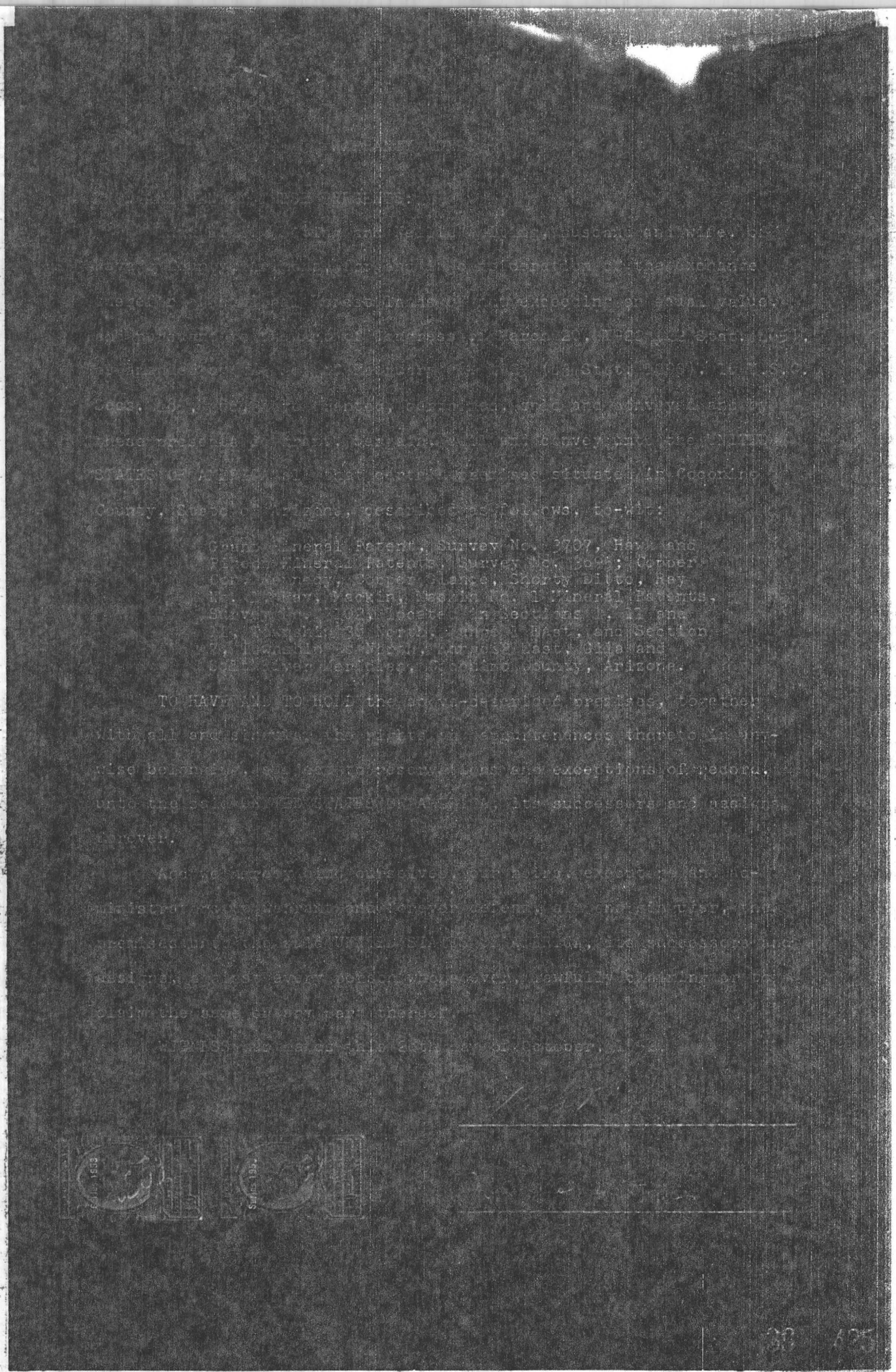
And we hereby bind ourselves, our heirs, executors and administrators to warrant and forever defend, all and singular, the premises unto the said UNITED STATES OF AMERICA, its successors and assigns, against every person whomsoever, lawfully claiming or to claim the same or any part thereof.

WITNESS our hands this [illegible] day of October, 1952.

[illegible]

[illegible]

30 A25



When recorded please return to:

PAGE LAND & CATTLE CO.
516 Luhrs Building
Phoenix, Arizona 85003

WARRANTY DEED

THIS INDENTURE, made this 1st day of July, 1971, between PAGE LAND & CATTLE CO., an Arizona corporation, Grantor, and the UNITED STATES OF AMERICA, Grantee,

WITNESSETH: That the Grantor, for and in consideration of an exchange of land pursuant to 16 U.S.C. 485, 486, as amended, whereby it will receive certain national forest land, which does not exceed in value the land herein conveyed, does by these presents grant, bargain, sell and convey unto the Grantee, and its assigns, that certain land in Coconino County, Arizona, containing 98.03 acres of land, more or less, and is particularly described as follows:

Those certain mining claims, situate in the Warm Springs Mining District, and in Sections 13 and 14, T. 38 N., R. 1 E., G&SRB&M, included in Mineral Survey No. 1655, bounded, described and platted as follows, with magnetic variation 15°32' E.:

Upright Lode Claim:

Beginning at Corner No. 1, a pine post 4 feet long, 4 inches square, marked 1-1655, with mound of stones, from which U. S. Location Monument No. 1 bears N. 14°44' W. 308.6 feet distant;

Thence, first course, N. 81°05' W. 1515.3 feet to Corner No. 2, a pine post 4 feet long, 4 inches square, marked 2-1655, with mound of stone, from which discovery bears N. 37°07' E. 259 feet distant;

Thence, second course, N. 05°40' W. 534 feet to Corner No. 3, a pine post 4 feet long, 4 inches square, marked 3-6-1655, with mound of stone;

Thence, third course, S. 83°31' E. 1,500 feet to Corner No. 4, a pine post 4 feet long, 4 inches square, marked 4-1655, with mound of stone;

Thence, fourth course, S. 05°40' E. 600 feet to Corner No. 1, the place of beginning; the survey of the lode claim as above described extending 1,500 feet in length along said Upright vein or lode.

Paupers Dream Claim:

Beginning at Corner No. 1, a pine post 4 feet long, 4 inches square, marked 1-1655, with mound of stone, from which said U. S. Location Monument No. 1 bears N. 66°28' E. 1418.8 feet distant;

Approved as to description, acreage, consideration and the condition of the ...
6/24/71

No. 5944
RECORDED AT REQUEST OF Page Land & Cattle Co. Inc.
July 2nd A. D. 19 71 at 10:45 o'clock A. M.
in Docket 392 Pages 705-708
of Coconino County, Arizona.
Edna Mae Thornton County Recorder
By ______ Deputy

DKT 392 PAGE 705

1060 MAR

Thence, first course, N. 84°06' W. 383.6 feet to Corner No. 2, a pine post four feet long, four inches square, marked 2-1655, with mound of stone;

Thence, second course, S. 89°29' W. 1108.5 feet to Corner No. 3, a pine post 4 feet long, 4 inches square, marked 3-1655, with mound of stone;

Thence, third course, N. 5°40' W. 494 feet to Corner No. 4, a pine post 4 feet long, 4 inches square, marked 4-1655, with mound of stone;

Thence, fourth course, N. 84° E. 1,104 feet to Corner No. 5, a pine post 4 feet long, four inches square, marked 5-1655, with mound of stone;

Thence, fifth course, S. 78°07' E. 394.2 feet to Corner No. 6, identical with Corner No. 3 of said Upright lode claim, from which discovery bears S. 42°32' W. 332.5 feet distant;

Thence, sixth course, S. 05°40' E. 558 feet to Corner No. 1, the place of beginning; the survey of the lode claim as above described extending 1498.2 feet in length along said Paupers Dream vein or lode.

Arizona Jim Claim:

Beginning at Corner No. 1, a pine post four feet long, four inches square, marked 1-1655, with mound of stone, from which U. S. Location Monument No. 1 bears S 63°05' E. 1362.1 feet distant;

Thence, first course, S. 84° W. 646 feet to Corner No. 5 of said Paupers Dream lode claim; 1,500 feet to Corner No. 2, a pine stump 4 feet high, 4 inches square, marked 2-1-1655 in mound of stone, from which discovery bears N. 33' W. 300.2 feet distant;

Thence, second course, N. 56' W. 600 feet to Corner No. 3, a pine post 4 feet long, 4 inches square, marked 3-4-2-1655, with mound of stone;

Thence, third course, N. 84° E. 1500 feet to Corner No. 4, a pine post 4 feet long, 4 inches square, marked 4-1655, with mound of stone;

Thence, fourth course, S. 56' E. 600 feet to Corner No. 1, the place of beginning; the survey of the lode claim as above described extending 1498 feet in length along said Arizona Jim Vein or lode.

Mumsump Claim:

Beginning at Corner No. 1, identical with Corner No. 2 of said Arizona Jim lode claim from which said U. S. Location Monument No. 1 bears S. 80°22' E. 2,745.1 feet distant, and discovery bears N. 01°19' W. 300.1 feet distant;

Thence, first course, N. 89°12' W. 1495 feet to Corner No. 2, a pine post 4 feet long, 4 inches square, marked 2-1655, with mound of stone;

Thence, second course, N. 56' W. 600 feet to Corner No. 3, a pine post 4 feet long, 4 inches square, marked 3-1655, with mound of stone;

Thence, third course, S. 89°12' E. 1,495 feet to Corner No. 4, identical with Corner No. 3 of said Arizona Jim lode claim;

Thence, fourth course, S. 56' E. 600 feet to Corner No. 1, the place of beginning; the survey of the lode claim as above described extending 1,495 feet in length along said Mugwump vein or lode.

Millsite Claim:

Beginning at Corner No. 1, a pine post 4 feet long, 4 inches square, marked 1-1655, with mound of stone, situate on line 3-4 of said Arizona Jim lode claim, from which said U. S. Location Monument No. 1 bears S. 59°32' E. 2,251 feet distant, and discovery bears N. 15°44' W. 304.6 feet distant;

Thence, first course, S. 84° W. 780 feet to Corner No. 2, identical with Corner No. 4 of said Mugwump lode claim;

Thence, second course, N. 89°12' W. 640 feet to Corner No. 3, a pine post 4 feet long, 4 inches square, marked 3-1655, in mound of stone;

Thence, third course, N. 13°52' W. 535 feet to Corner No. 4, a pine post 4 feet long, 4 inches square, marked 4-1655, with mound of stone;

Thence, fourth course, N. 84°21' E. 1,406.2 feet to Corner No. 5, a pine post 4 feet long, 4 inches square, marked 5-1655, with mound of stone;

Thence, fifth course, S. 13°52' E. 603 feet to Corner No. 1, the place of beginning; the survey of the lode claim as above described extending 1,406.2 feet in length along said Millsite vein or lode.

SUBJECT TO:

1. Rights-of-way for roads. canals, laterals and ditches.

2. Terms and conditions contained in the Patent issued by the United States.

TO HAVE AND TO HOLD THE SAME, together with all the tenements, hereditaments, and appurtenances, thereunto belonging or

in any wise appertaining to the said Grantee, and its assigns, forever. The Grantor, for itself, its successors, and assigns, does hereby covenant and agree with Grantee, and its assigns, that it is well seized in fee with title to the land and premises hereby granted and conveyed and has good right to bargain and sell said land in the manner and form set forth; that the same is free of all encumbrances; and that the above bargained and granted premises in the quiet and peaceable possession of the Grantee, and its assigns, against all persons lawfully claiming, or to claim, the whole or any part thereof, the Grantor will warrant and defend.

IN WITNESS WHEREOF, the Grantor has caused its corporate name and official seal to be set hereto, on the above written date, by its President and Assistant Secretary, acting within their authority as officers of the corporation.

PAGE LAND & CATTLE CO.

(SEAL)

By Robert H. Carlock
President

ATTEST: Joan P. Krupa
Assistant Secretary

ACKNOWLEDGMENT

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

On this 1st day of July, 1971, personally appeared before me, the undersigned officers, Robert H. Carlock and Joan P. Krupa, known to me to be, respectively, the President and Assistant Secretary of Page Land & Cattle Co., and acknowledged that they, being authorized to do so, executed the foregoing document for the uses and purposes therein contained.

IN WITNESS WHEREOF, I have hereto set my hand and official seal.

NOTARY PUBLIC MARICOPA COUNTY

(SEAL)

Notary Public

My commission expires: February 25, 1974

1060 RV2

Kaibab Copper Claims (Arizona) also known as Mackin Copper located North of the Grand Canyon in Coconino County, Ariz. Copper. 14 patented claims, 11 unpatented claims and 1 [illegible]

Comanche Mine (California) located in Blind Spring Mining District, Mono County, California, 2 miles south and west of Benton Station, near the Nevada State Line. Gold, silver, lead and copper. 36 Patented claims, 19 unpatented claims 240 acres of land.

Avawatz Crown Mine is located approximately 25 miles north and west of Baker, California, in San Bernardino County. Silver and lead. 6 Patented claims

Nevada-Goldfield Mine is located in the Gold Mountain Mining District, Esmeralda County, Nevada, approximately 10 miles west and north of Bonnie Claire, Nevada. Gold and silver. 8 Patented claims

Tonopah-Hasbrouck Mine is located in the Divide Mining District, Esmeralda County, Nevada, 6 miles south of Tonopah, about one mile from the paved highway running from Tonopah to Goldfield. Gold and silver. 6 Patented mining claims

Section 15 is 4 miles north and west of Kramer, California, in San Bernardino county. Borax prospect.

LEASED (?) Petoskey Mine is located near the Mackin Copper property (listed above). Copper. 5 Patented claims

Royal Drift Mine is located in Forks of Butte Mining District, Butte County, California, approximately 35 miles north of Oroville. Gold. 11 unpatented mining claims

Brannigan Mines located in the Solo Mountain District in San Bernardino County, California. Gold, possibly silver and lead.

Whitney Paymaster Gold Mines, Inc. located in Solo Mining District, San Bernardino County, approximately 10 miles S. E. of Baker. Gold, possibly silver and lead. 7 unpatented mining claims

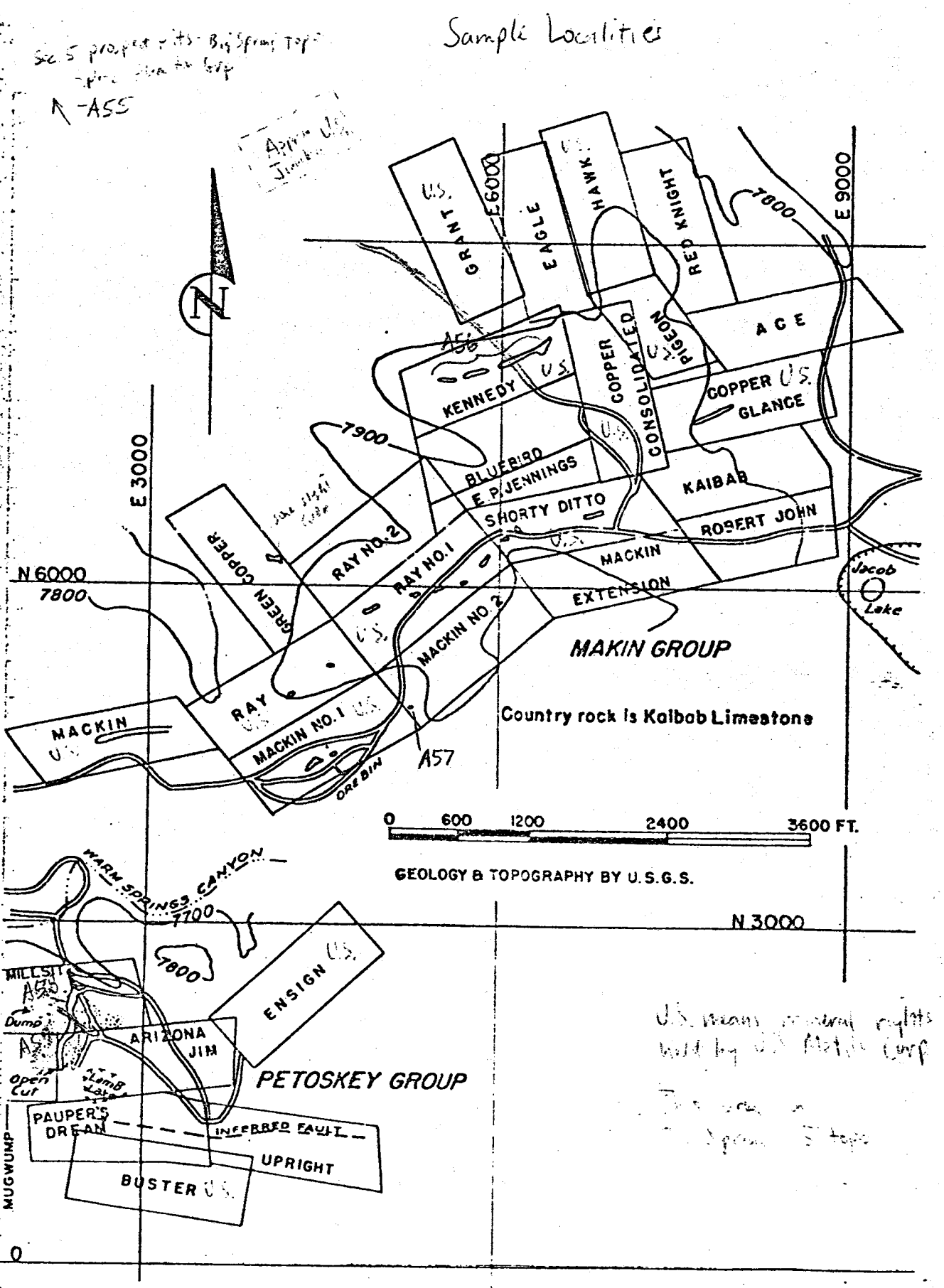


Figure 2.- Geologic plan, Apex copper project.

BAP

DEPCO, Inc.

MINERALS DIVISION

MEMO TO: J. B. Imswiler

DATE: March 12, 1981

FROM: G. A. Parkison

SUBJECT: Reconnaissance of Warm Springs Mining District, Coconino County, Arizona, January 28, 1981

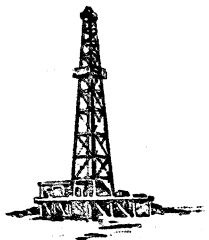
Summary: Near Jacob Lake, Arizona significant amounts of copper ore found in Kaibab limestone. As the area is within the Grand Canyon National Game Preserve only 14 patented claims owned by U.S. Metals are available for mining. These claims do contain significant amounts of copper but negligible silver. The claims are quite fragmented and mining would be difficult without U.S.F.S. cooperation. No further work planned at this time.

Location: The Warm Springs mining district is located about one to three miles west of the town of Jacob Lake in north-central Coconino County. Jacob Lake is about 40 miles north of the north rim of the Grand Canyon.

Geology: The Warm Springs district is located near the center of the Kiabab Plateau. The plateau is underlain by the generally flat-lying Permian Kaibab Formation. In the mineralized area the Kaibab is composed of limestone, cherty limestone, sandy limestone, and cherty sandstone. These lithologies are gradational and comprise beds ranging from a few inches to a few feet thick. The beds are generally white or tan in color, except where mineralized.

Mineralization: The Warm Springs district is mainly noted for its copper production, but apparently some small amounts of gold and silver have been noted. The ore bodies appear to be ribbon-like, irregular, and flat-lying runs generally following bedding. Individual runs range from 10 to 50 feet wide and from 0 to 15 feet thick. Depths range from 0 to about 30 feet. Some runs have been traced for distances of over 1,000 feet.

Malachite and azurite are the principal ore minerals with chalcopyrite and chalcocite reported locally. Mineralization is quite erratic but seems to follow individual beds to some extent. Where outcropping, the ore zones are overlain or associated with an oxidized, ferruginous jasperoid.



390 FREEPORT BLVD. • SUITE 12 • SPARKS, NEVADA 89431 • (702) 359-3211

The past production of the area is not known with certainty, but in recent years production has totaled about 15,000 tons of 6 percent copper.

Generally somewhat select grab samples were obtained from several of the open cuts. As detailed data on copper content and distribution are given in USBM RI 4013, these samples were taken mainly for determination of Pb, Zn, Au, Ag content. Sample sites are noted on attached maps.

Sample#	Au oz./T	Ag oz./T	Cu%	Mo%	Pb%	Zn%
A55	<.003	.23	5.23	.006	.009	.42
A56	<.003	.24	9.70	.011	.014	.33
A57	<.003	.07	13.9	.007	.007	.43
A58	<.003	.22	9.33	.003	.002	.07
A59	<.003	.14	11.6	.001	.001	.13

These samples show that very little silver is present in the ore but a surprisingly large amount of zinc. These samples confirm the Cu content as noted by USBS RI 4013. The high silica content (~80%) would make the ore valuable for its fluxing properties.

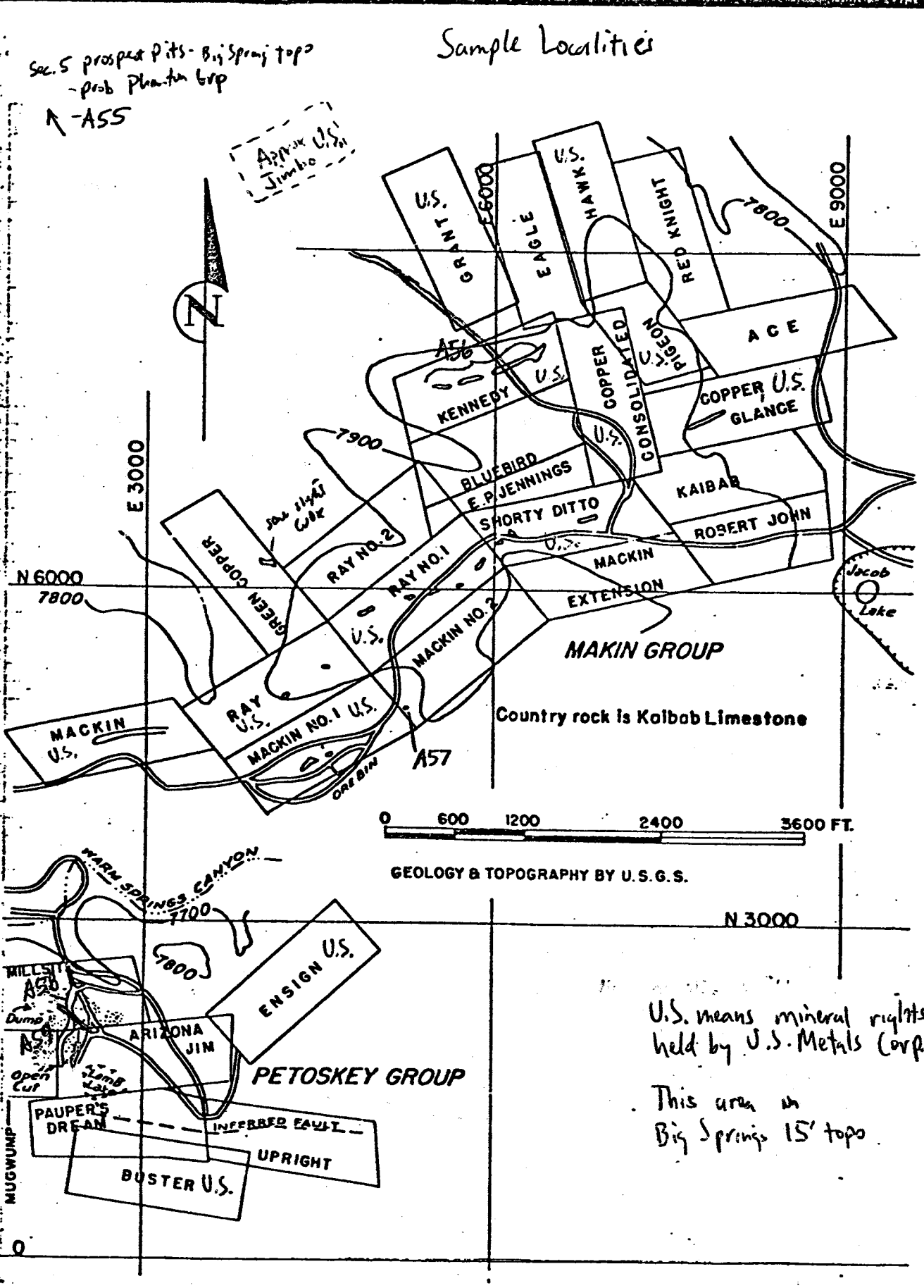
Land Status: All of the area is within the Kaibab National Forest. During 1952 and 1971 the U. S. Forest Service apparently exchanged, with the owners of 19 patented claims in the district, the surface and mineral rights to these claims with that of other forest land in other areas.

Checking with the BLM shows that the entire area is withdrawn from mineral entry because of the Grand Canyon National Game Preserve. However, on 14 of these patented claims the mineral rights have been retained. The mineral rights are held by United States Metals Corp., a Nevada corporation. It is not known if U. S. Metals still is registered as a corporation.

References:

Jennings, E. P., 1904, Copper Deposits Near Jacob Lake, Arizona; Trans. Am. Inst., Min. Eng., v. 34, p. 834

Tainter, S. L., 1947, Apex Copper Property, Coconino County, Arizona; USBM RI 4013, p. 23



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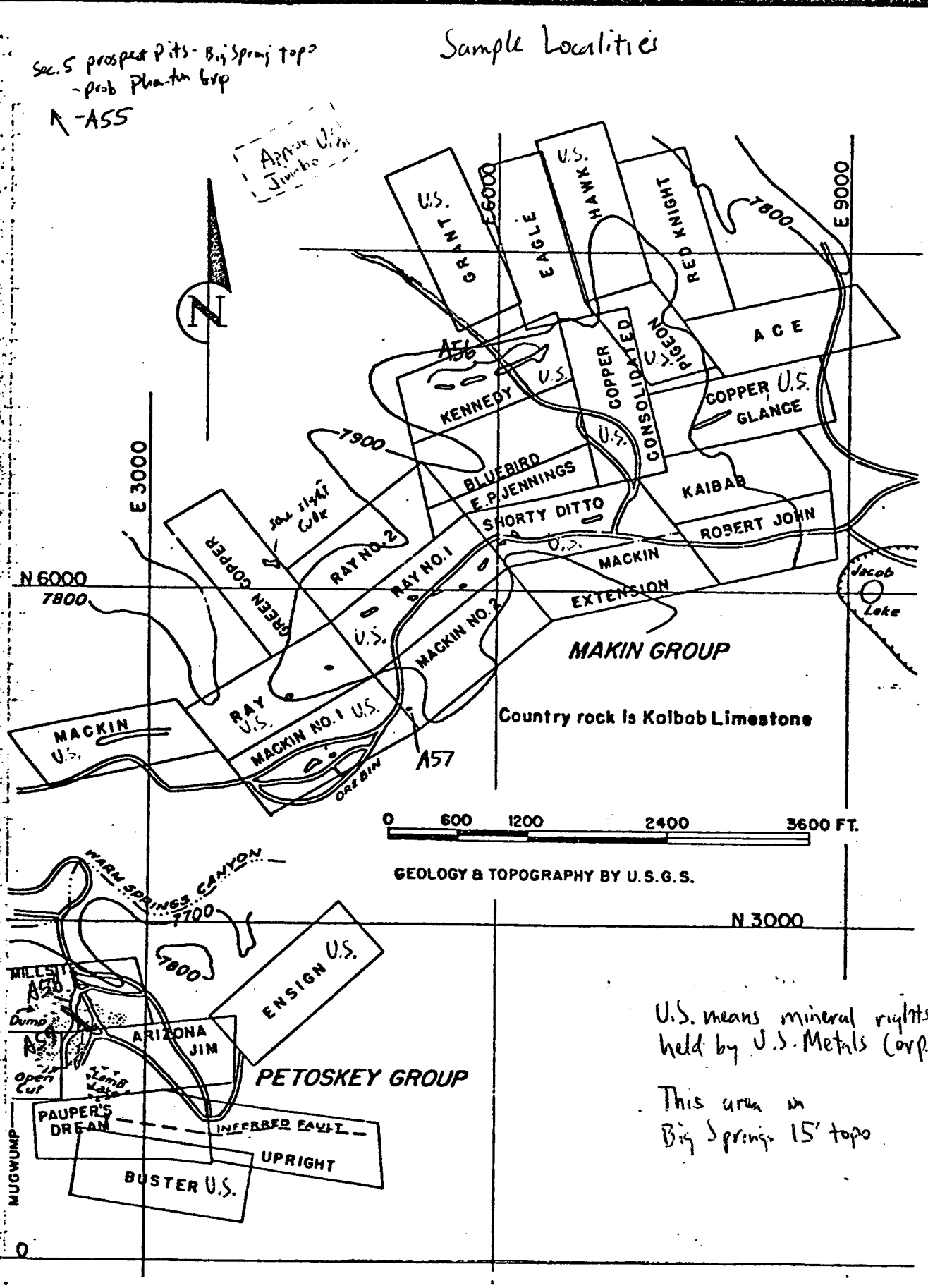

Figure 2.- Geologic plan, Apex copper project.

(9)

Los Angeles, Calif., Jan. 2, 1931.

REPORT ON KAIBAB MINES

The following report of the copper properties owned by the UNITED STATES METALS CORPORATION, is submitted together with excerpts and data from reports by other engineers, Mr. George R. Sheldon, Trans. AIME, pages 830 - 41 and references by U.S.C.S. Page 103 of Bulletin 285.

LOCATION AND DESCRIPTION

The company owns 14 patented mining claims located in the Warm Springs Mining District of Coconino County, Arizona. The millsite and mains camp are located at Ryan, Arizona, six miles westerly at an altitude of 6,000 feet. The altitude of the mining claims is 7,600 feet. The reason for locating the millsite at Ryan is on account of water supply and better location for a permanent camp to treat the ore.

Ryan is located thirty miles from Kanab, Utah, on excellent highways. In fact, these highways are a tremendous asset to the company, as transportation in the past had been expensive due to poor highways and long distance from railroad terminus. The nearest railroad point, Cedar City, Utah, is now only one hundred and eight miles northwesterly from Ryan over a fine road.

The Union Pacific R.R. has spent large sums of money on highways in cooperation with the Forest Service to make possible comfortable sightseeing bus routes from Cendar City, through the Kaibab Forest, to the north rim of the Grand Canyon. This work is a direct benefit to the U.S. Metals Corporation.

ORE

The ore exists as copper carbonate and oxide with some silicate in a quartz gangue; gold and silver values are negligible. A small amount of iron oxide accompanies the copper ore.

The following excerpts of Mr. George R. Sheldon's report is given here as it clearly explains what he found: "This report is based on a brief examination made November 17th and 18th, 1928. The examination was by no means complete and was made when there was from two to six inches of snow all over the plateau on which the mining claims are situated. However, the essential information desired was obtained.

Sampling was started on the Macklin claim. Here a trench was sampled as follows:

Sample - #1	33"	across	horizontal	bed	to	bottom.	Ore in bottom
-	72"	"	"	"	"	"	"
#2	72"	"	"	"	"	"	"
#3	75"	"	"	"	"	"	"
#4	60"	"	"	"	"	"	"
#5	78"	"	"	"	"	"	"
#6	72"	"	"	"	"	"	"
#7	78"	"	"	"	"	"	"
#8	84"	"	"	"	"	"	"
#9	96"	"	"	"	"	"	"
#10	72"	"	"	"	"	"	"

Samples #1 to 10 inclusive were combined in one assay, giving 6.30% Cu. and 75.0% SiO2.

Average thickness of bed sampled, 79" - 6' - 6". The bottom of the ore was not exposed at any place in the entire 700' of trench, but I would judge that the average thickness of the bed in this vicinity, can safely be assumed at 7'.

Sample #11 - 2 cuts, one of 84" and one of 60" across horizontal bed in trench near south line of Mackin #1 claim.

This gives 8.00% Cu. and 74.0% SiO2. The bed as exposed in this trench 240' long is rather irregular in thickness and in copper content.

Sample #12 - Taken in trench on Ray #1 claim, about 200' W. and N.W. from big boarding house. One cut 42", one cut 42", and one cut 72". Total of 3 cuts average thickness of bed 52", giving 6.80% Cu. and 77.0% SiO2. Just East of the East end of this trench is a shaft 22' deep. This shows the copper bearing bed to be 64" thick from surface. Samples of the underlying formation accompany the assay samples.

Sample #13 - 2 cuts, one 42" and one of 48" in trench near west end of Shorty Ditto claim. Ore in bottom of trench 100' long gives 7.75% Cu. and 72.0% SiO2. The rim of Warm Springs Canyon is about 100' south of this trench, so the mineralized bed is cut off here.

Sample #14 - One cut of 30" about 100' east of sample #13, some irregular trenches and shallow pits. One cut of 72" in pit at west end of trench on Shorty Ditto claim. One cut of 24" 130' east of 2nd cut. These three cuts give an average thickness of 42" assaying 7.60% Cu. and 69.0% SiO2.

Sample #15 - One cut 60" in pit, at east end of trench in Shorty Ditto claim. One cut of 72" in irregular trench near east end of Copper Glance claim. One cut of 48" in the same series if irregular trenches in Copper Glance. These three cuts of #15 give an average thickness of 60", assaying 6.85% Cu. and 67.0% SiO2.

The high silica is accounted for from the fact that the copper bearing bed in the Copper Glance is almost pure sandstone.

SAMPLE #16 - 5 cuts from long trench and pits on the Kennedy claim. These 5 cuts were 84", 84", 54" with ore in bottom, 54" with ore in bottom, and 78" respectively and cover from near west end of Kennedy to the east end. The average thickness sampled is 69", assayung 9.10% Cu. and 80.0% Si02.

An arithmetical average of all the samples out give the thickness of 5' for the mineralized bed, and an average assay of 7.46% Cu. and 76.3% Si02.

The dotted red line on accompanying map surrounds roughly the area examined. This area is approximately 10 million square feet assuming 20 Cu. ft. of ore in place to the ton, this gives one-half million tons of ore per foot in depth over this area if uniformly distributed. Accepting the figure of 5' for average thickness of mineralized bed, we get a tonnage of two and one-half million. Assuming that development proves only 50% of the mineralized bed to be workable, it leaves one and one quarter million tons of 7.5% cbpper ore under the area surrounded by red line on map. The company holdings are at least twice this area and it is positive that most of the area is underlain by the same mineralized bed, all of which is easily accessible.

The mineralized bed extends from the surface of the ground to an observed maximum depth of about 9'. There is practically no overburden except a few inches of soil. The topography is nearly level, the plateau having a general slope westerly.

It is three miles from here to Ryan, the mill site. The elevation of the plateau is about 7.900' and of Ryan about 6, 300'.

The geology of the district is very simple, the formation being entirely sedimentary, lying nearly horozontal. The predominating rock is sandstone, with minor beds of lime and some shale.

The mineralized bed forms the top of the general plateau and was probably a line. The copper minerals are mainly azurite and malachite with silicates and oxides of copper. No sulphides of any kind were observed.

The mineralized bed has lost all traces of its original state, having been entirely replaced by silica and the various copper and iron minerals.

(SIGNED) Geo. R. Sheldon
79 "P" Street
Salt Lake City.

Mr. Geo. R. Sheldon was field engineer for the U. S. Smelting Company at the time of making this report, in 1928 or 1929.

In addition to this statement and in his opinion they are very valuable valuable copper properties. Hugh exposures of high grade ore exists and indicate to him, that the original source of mineralization to this entire district is very probably located on the Petosky. Ore is exposed at depths over 20' and one shaft of 65' with 50' drifts each way are still in good copper ore.

There is also more iron here, a favorable indicator of the original mineralization source. One block of ore which the writer roughtly calculated on the ground after close observation was as follows: Taking a depth of 20', a width of 100' and a length of 800' gives a block of ore containing 1,600,00 cubic ft. of ore Calculating 20. cu. ft. of ore in place to the ton, there are 80,000 tons of copper ore, which from samples taken all over this area and in shaft average 9% copper. There are also other exposures of ore outside of the area just mentioned and to calculate tonnage accurately and still do justice to the property is a very difficult matter but enough good ore of high grade proper lays on the surface to satisfy the most skeptical engineer as to it's commercial value.

By reference to an article in 1903 in the Transactions of American Institute of Mining Engineers on pages 839-841, a good account of the geology and ore deposition is given, in which a statement is here quoted: "The ores range from 2% to 40% copper and average 7%." Further, the same article says: "The quantity of ore cannot be accurately estimated from the small amount of development work done, but it is believed that 1 million tons of 7% ore can be put in sight at the Jacobs Lake Beds alone."

The U.S. G.S. refers to the article as being authentic regarding the enormous deposit of copper ore on the Kaibab plateau, on page 103 of Bulletin #285.

Over a mile of trenches, some showing ore 15' in depth are exposed on the company's property and are the basis of forming a conclusion as to tonnage.

Copper bullion 99.9% copper was produced from the Kaibab ore.

ASSETS

Tonnage of Ore.

Ore in sight	1,600,000 tons	
Probable ore	2,000,000 tons	
TOTAL	3,600,000 tons	7% copper, or 140 lbs. of copper per ton, at 12¢ lb. - $60,480,000.

CONCLUSION

Considering the magnitude of the ore deposit, method of treatment and cost of producing per pound of copper, the Kaibob has great merit. It should appeal to investors who look to companies producing a met in which there is a constant demand end a good return on the investment.

Respectfully submitted,

Joseph McAuliffe, E.M.,
Denver, Colorado
January 2, 1951.

Since this report has been made there has been at least $50,000 new development work done on the property. In several of these sites of development the ore is still in place with the depth being 30'. Numerous air drill holes have pro ore at greater depths than the above report indicates.

The highway has been completed on Jacobs Lake south across the Colorado River to Flegstaff, Arizona, where it connects with the Santa Fe Railroad. This is the Federal Highway and it has been completed from Jacobs Lake north and east through Kanab, Utah, to Martsville, Utaz, where it connects with the Denver & Rio Grande Railroad, and the highway is also completed to Salt Lake City to Garfield Smelter.

Now the ore can be hauled from mine to Flagstaff, Arizona, and shipped to El Paso, Texas, for treatment, or from Jacobs Lake to Marysville and from there by Denver & Rio Grande Railroad to Garfield Smelter at Salt Lake City, or it can be hauled direct by truck from the mine, which is at Jacobs Lake, straight to Salt Lake City, which would be a haul of 300 miles but on a good Federal Highway.

There is one leaser on the property at the present time, working one claim and shipping from 10% to 12% copper ore to the smelter. In case the price of copper should go to 14¢ or 15¢ per pound, the ore could be mined with steam shovel without sorting and shipped direct to the Garfield Smelter at Salt Lake City at a good profit.

In the shape the mine is at the present time, they could ship from 100 to 500 tons a day for several years, and if additional development work was done it could increase the life of the mine considerably.

* * * * * *

Copy of Article which appears on Pages 839-41 of the TRANSACTIONS OF AMERICAN INSTITUTE OF MINING ENGINEERS FOR 1903

(Note: On page 103 "Bulletin #285" United States Geological Survey, Constributions to Economic Geology, 1905, the United States Geological Survey refers to the article as being authentic regarding the enormous deposit of copper ore on the Kaibob Plateau).

THE ENORMOUS DEPOSITS OF COPPER ON THE KAIBAB PLATEAU

These unique copper deposits occur on the top of the Laibab Plateau in Coconino County, Arizona, and extends from the Northern edge of the Grand Canyon of the Colorado River to near the Utah State line. The best developed deposits are near Jacobs Lake, 30 miles south of the Utah line, where they are 16' thick, of known width and more or less continuous for 5 miles.

From Jacobs Lake to the edge of the Grand Canyon, a distance of 40 miles, outcrops of ore have been found, but no explorations have been made except those of wandering cowboys and hunters.

The Kaibob Plateau, the highest of the Colorado River plateaus, is a great uplift about 90 miles long, from north to south, and from 10 to 20 miles wide from east to west. It's southern face is the Grand Canyon; it's western boundary a north south fault plane which separates it from the Kanab plateau, lying 1500' below. It's eastern edge is a monocline which brings the horizontal beds of the high plateau to the level of the plateau country of the eastern Utah.

The elevation of the plateau near the Colorado River is over 8000' and about 6,000' at the Utah line. It's structure, as shown by the western fault, consist of about 500' of Aubrey limestone underlain by 1,000' of red sandstone. The limestone is the upper member of the carboniferous, and is overlain by the marls and shales of the Permian, 25 miles to the north of the Kanab plateau at the town of Kanab, near the Utah line; the Permian strata pass under the magnificient red sandstone cliffs of the Triassic, that rise to heights of 1,000' above the desert.

The Grand Canyon exposes a section a mile deep at the southern end of the plateau, showing all the formations from the Archean to the top of the Carboniferous. This mountain pass, cut by two sections, the canyon and the western fault, shows no mineral veins of mineralization above the Pre-Cambrian, near the bottom of the canyon. The ancient metamorphic strata contain a few copper bearing dikes, with the usual contact in pregnation of copper ore and copper stained rocks. All the Paleozoic strata are barren, both in the canyon and along the western fault until the copper beds are reached at the top of the plateau.

I have described the formation of the plateau for the purpose of showing that the possibilities of any connection between the copper veins and dikes of the Pre-Cambrian and the horizontal copper beds of the Carboniferous limestone are, to say the least, remote.

The ore beds are white chert, impregnated with malachite and azurite; small amounts of earthy cuprite copper glance and chalcopyrite also have been observed. Silver and gold are present in very minute quantities. The ores range from 2% to 40% of copper and average 7%. They are too silicious for smelting but are good leaching ores.

Some leaching experiments have been made in a small way but no copper has been produced commercially. The ore is covered by a few inches of soil and often outcrops. The upper portion of some of the beds have been leached, leaving a mass of honeycombed iron stained rock.

The beds are intersected by many small faults; the ore near the faults have been crushed and re-cemented by silica and copper, showing the period of deposition was long. The quantity of ore cannot be accurately estimated from the small amount of development work done, but it is believed that 1,000,000 tons of 7% ore can be put in sight at the Jacobs Lake beds alone.

I am not aware that any theory has been advanced to explain the occurence of these ores. Evidently they are replacements of the limestone by silica and copper. The ore bearing solution was descending carbonated alkaline water, which dissolved both silica and copper from the Permian and Mesozoic measures that, in former times, covered the Carboniferous. This theory is rendered more probable

from the fact that the Triassic sandstones to the north and east are copper bearing, and sufficiently so to be mined at a profit.

There are no known eruptions that could furnish the copper, except the dikes of the Pre-Cambrian, a mile below the present copper horizon; the Aubrey limestone being the precipitant.

The deposits can be considered as horizontal bedded veins, from which the hanging wall or roof, and also much of the ore, has been removed by erosion. The beds are similar in physical characteristics to the iron deposits of the Mesabi; the taconite or iron chert of the latter corresponding to the copper chert of the Kaibab. The chemistry of the formations of the two may be alike, but the Kaibab ores lack the subsequent enrichment the iron ires have received.

Summary: Near Jacob Lake, Arizona significant amounts of copper ore found in the Kaibab limestone. As the area is within the Grand Canyon National Game preserve only 14 ~~claims~~ patented claims owned by U.S. Metals are available for mining. These claims do contain significant amounts of copper but negligible silver. The claims are quite fragmented and mining would be difficult without U.S.F.S. cooperation. No further work planned at this time.

Reconnaissance of Warm Springs Mining District, Coconino County, Arizona, January 28, 1981

Location: The Warm Springs ~~District~~ mining district is located about one to three miles west of ~~Jacob~~ the town of Jacob Lake in ~~north~~ north-central Coconino County. Jacob Lake is about 40 miles north of the north rim of the Grand Canyon.

Geology: The Warm Springs district is located near the center of the Kaibab Plateau. The plateau is underlain by the generally flat-lying Permian Kaibab Formation. In the mineralized area the Kaibab is composed of limestone, cherty limestone, sandy limestone and cherty sandstone. These lithologies are gradational and comprise beds ranging from a few inches to a few feet thick. The beds are generally white ~~or~~ or tan in color, except where mineralized.

Mineralization: ~~Mineralization is confined to the Kaibab Fm. in this area and takes the form of malachite and azurite. The Mineralization~~ The Warm Springs district is mainly noted for its copper production but apparently some small amounts of gold and silver have been noted. The ore bodies appear to be rebbonlike, irregular and flat-lying ~~mass~~ generally following bedding. Individual runs range from 10 to 50 feet wide and from 0 to 15 feet thick. Depths range from 0 to about 30 feet. Some runs have been traced ~~for~~ for distances of over 1000 feet.

Malachite and azurite are the principal ore minerals with chalcopyrite and chalcocite reported locally. Mineralization is quite erratic but seems to follow individual beds to some extent. Where not outcropping, the ore zones are overlain or associated with an oxidized, ferruginous gossanoid. So

The past production of the area is not known with certainty, but in recent years production has totaled about 15,000 tons ~~at about~~ ~~of~~ of 6 percent copper.

Generally ~~select~~ somewhat select grab samples were obtained from several of the open cuts. As detailed data on copper content and distribution ~~are~~ are given in USBM RI 4013, these samples ~~are~~ ~~most~~ were taken mainly for determination of Pb, Zn, Au, Ag content. Sample sites are noted on attached maps.

Sample #	Au oz/T	Ag oz/T	Cu %	Mo %	Pb %	Zn %
A55	<.003	.23	5.23	.006	.009	.42
A56	<.003	.24	9.70	.011	.014	.33
A57	<.003	.07	13.9	.007	.007	.43
A58	<.003	.22	9.33	.003	.002	.07
A59	<.003	.14	11.6	.001	.001	.13

These samples show that very little silver is present in ~~the~~ the ore but a surprisingly large amount of zinc. These samples confirm the Cu content as noted by ~~USBM~~ USBM RI 4013. The high silica content (~80%) would make ~~the~~ the ore valuable for its fluxing properties.

Land Status: All of the area is within the Kaibab National Forest. During 1952 and 1970 the U.S. Forest ~~Serv~~ Service apparently exchanged ~~swapped~~ ~~the owners of 11~~ ~~the surface and mineral rights of the patent 19 patented claims in the district for property in other areas~~ with the owners of the 19 patented claims in the district the surface and mineral rights to these claims with that of other forest land in other areas.

Checking with the BLM shows that the entire area is withdrawn from mineral entry because of the Grand Canyon National Game Preserve. However, on 14 of these patented claims the ~~or~~ ~~ownership~~ ~~has~~ mineral rights have been retained. The mineral rights are held by United States Metals Corp. ~~It is not~~, a Nevada corporation. It is not known if U.S. Metals still is registered as a corporation.

References:

Jennings, E.P., 1904, Copper Deposits near Jacob Lake, Arizona; Trans. Am. Inst. Min. Eng., v. 34, p. 839

Tainter, S.L., 1947, ~~Apex Copper Property~~ Apex copper property, Coconino County, Arizona.; U.S. Bur. Mines, R.I. 4013, 23p.

property file

DEPCO, Inc.

MINERALS DIVISION

MEMO TO: J. B. Imswiler

DATE: March 12, 1981

FROM: G. A. Parkison

SUBJECT: Reconnaissance of Warm Springs Mining District, Coconino County, Arizona, January 28, 1981

Summary: Near Jacob Lake, Arizona significant amounts of copper ore found in Kaibab limestone. As the area is within the Grand Canyon National Game Preserve only 14 patented claims owned by U.S. Metals are available for mining. These claims do contain significant amounts of copper but negligible silver. The claims are quite fragmented and mining would be difficult without U.S.F.S. cooperation. No further work planned at this time.

Location: The Warm Springs mining district is located about one to three miles west of the town of Jacob Lake in north-central Coconino County. Jacob Lake is about 40 miles north of the north rim of the Grand Canyon.

Geology: The Warm Springs district is located near the center of the Kiabab Plateau. The plateau is underlain by the generally flat-lying Permian Kaibab Formation. In the mineralized area the Kaibab is composed of limestone, cherty limestone, sandy limestone, and cherty sandstone. These lithologies are gradational and comprise beds ranging from a few inches to a few feet thick. The beds are generally white or tan in color, except where mineralized.

Mineralization: The Warm Springs district is mainly noted for its copper production, but apparently some small amounts of gold and silver have been noted. The ore bodies appear to be ribbon-like, irregular, and flat-lying runs generally following bedding. Individual runs range from 10 to 50 feet wide and from 0 to 15 feet thick. Depths range from 0 to about 30 feet. Some runs have been traced for distances of over 1,000 feet.

Malachite and azurite are the principal ore minerals with chalcopyrite and chalcocite reported locally. Mineralization is quite erratic but seems to follow individual beds to some extent. Where outcropping, the ore zones are overlain or associated with an oxidized, ferruginous jasperoid.

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The past production of the area is not known with certainty, but in recent years production has totaled about 15,000 tons of 6 percent copper.

Generally somewhat select grab samples were obtained from several of the open cuts. As detailed data on copper content and distribution are given in USBM RI 4013, these samples were taken mainly for determination of Pb, Zn, Au, Ag content. Sample sites are noted on attached maps.

Sample#	Au oz./T	Ag oz./T	Cu%	Mo%	Pb%	Zn%
A55	<.003	.23	5.23	.006	.009	.42
A56	<.003	.24	9.70	.011	.014	.33
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These samples show that very little silver is present in the ore but a surprisingly large amount of zinc. These samples confirm the Cu content as noted by USBS RI 4013. The high silica content (~80%) would make the ore valuable for its fluxing properties.

Land Status: All of the area is within the Kaibab National Forest. During 1952 and 1971 the U. S. Forest Service apparently exchanged, with the owners of 19 patented claims in the district, the surface and mineral rights to these claims with that of other forest land in other areas.

Checking with the BLM shows that the entire area is withdrawn from mineral entry because of the Grand Canyon National Game Preserve. However, on 14 of these patented claims the mineral rights have been retained. The mineral rights are held by United States Metals Corp., a Nevada corporation. It is not known if U. S. Metals still is registered as a corporation.

References:

Jennings, E. P., 1904, Copper Deposits Near Jacob Lake, Arizona; Trans. Am. Inst., Min. Eng., v. 34, p. 834

Tainter, S. L., 1947, Apex Copper Property, Coconino County, Arizona; USBM RI 4013, p. 23

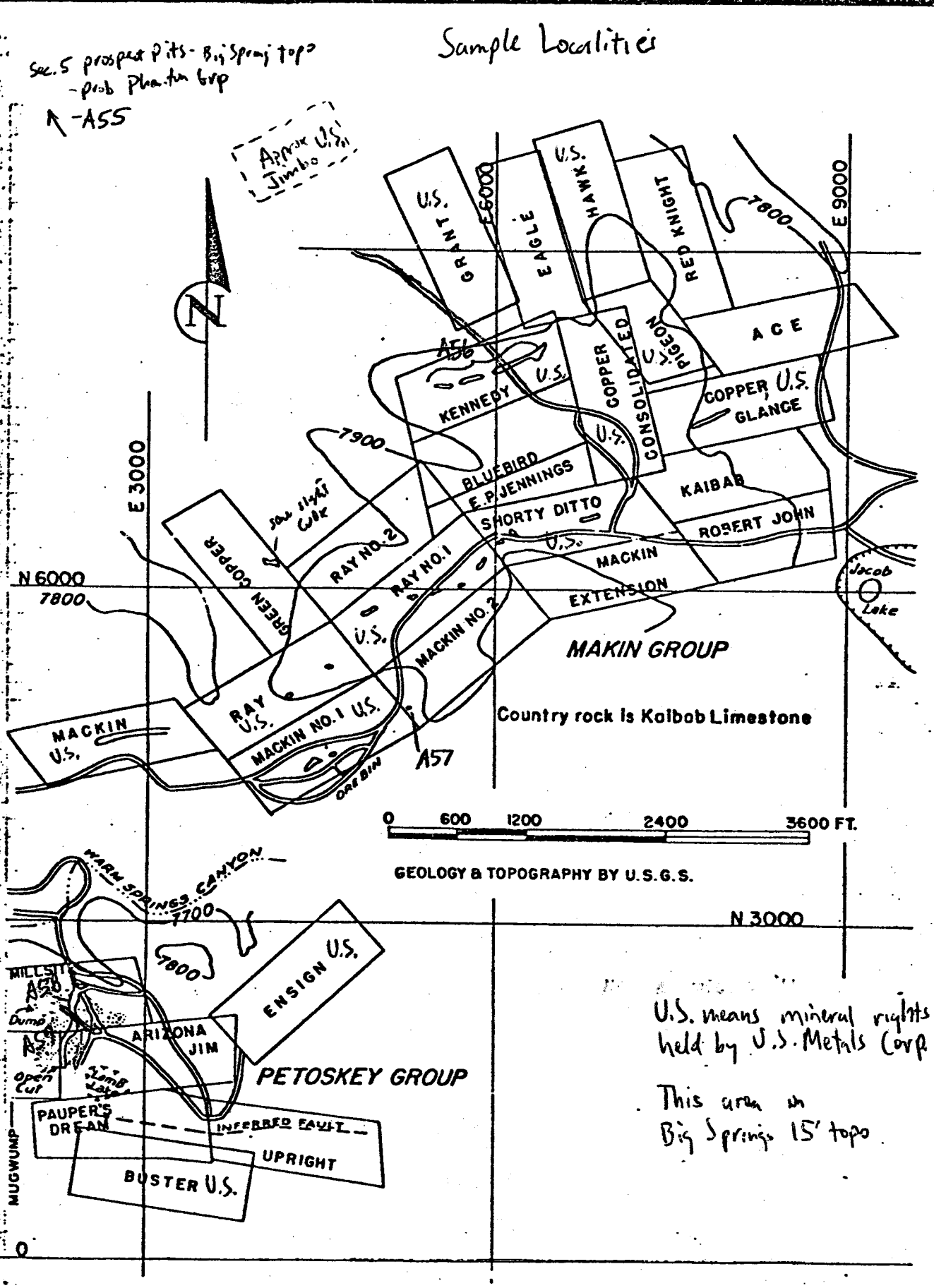

Figure 2.- Geologic plan, Apex copper project.

Kaibab Copper Claims (Arizona) also known as Mackin Copper located North of the Grand Canyon in Coconino County, Ariz.
Copper. 14 patented claims, 11 unpatented claims and 1 millsite.

Comanche Mine (California) located in Blind Spring Mining District, Mono County, California, 2 miles south and west of Benton Station, near the Nevada State Line.
Gold, silver, lead and copper. 36 Patented claims, 19 unpatented claims, 240 acres of land.

Avawatz Crown Mine is located approximately 25 miles north and west of Baker, California, in San Bernardino County.
Silver and lead. 6 Patented claims

Nevada-Goldfield Mine is located in the Gold Mountain Mining District, Esmeralda County, Nevada, approximately 10 miles west and north of Bonnie Claire, Nevada.
Gold and silver. 8 Patented claims

Tonopah-Hasbrouck Mine is located in the Divide Mining District, Esmeralda County, Nevada, 6 miles south of Tonopah, about one mile from the paved highway running from Tonopah to Goldfield.
Gold and silver. 6 Patented mining claims

Section 15 is 4 miles north and west of Kramer, California, in San Bernardino county.
Borax prospect.

LEASED (?)

Petoskey Mine is located near the Mackin Copper property (listed above).
Copper. 5 Patented claims

Royal Drift Mine is located in Forks of Butte Mining District, Butte County, California, approximately 35 miles north of Oroville.
Gold. 11 unpatented mining claims

Brannigan Mines located in the Solo Mountain District in San Bernardino County, California. Gold, possibly silver and lead.
Whitney Paymaster Gold Mines, Inc. located in Solo Mining District, San Bernardino County, approximately 10 miles S. E. of Baker.
Gold, possibly silver and lead. 7 unpatented mining claims

Kaibab Copper Claims (Arizona) also known as Mackin Copper located North of the Grand Canyon in Coconino County, Ariz.
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Gold and silver. 8 Patented claims

Tonopah-Hasbrouck Mine is located in the Divide Mining District, Esmeralda County, Nevada, 6 miles south of Tonopah, about one mile from the paved highway running from Tonopah to Goldfield.
Gold and silver. 6 Patented mining claims

Section 15 is 4 miles north and west of Kramer, California, in San Bernardino county.
Borax prospect.

LEASED (?) Petoskey Mine is located near the Mackin Copper property (listed above).
Copper. 5 Patented claims

Royal Drift Mine is located in Forks of Butte Mining District, Butte County, California, approximately 35 miles north of Oroville.
Gold. 11 unpatented mining claims

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Whitney Paymaster Gold Mines, Inc. located in Solo Mining District, San Bernardino County, approximately 10 miles S. E. of Baker.
Gold, possibly silver and lead. 7 unpatented mining claims

C O P Y

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Kaibab National Forest

Williams, Arizona,
September 23, 1955.

United States Metals Corp.
Mr. Fred Carlson, Sec'y & Treas.
2607 W. 7th Street,
Los Angeles 5, California

Dear Sir:

We wish to acknowledge receipt of your letters of August 24th and September 13, including cashier's check for $43.00, covering back fees.

We regret delaying reply to your first letter and hope the following information will fully meet your request.

We will begin by explaining that through a land exchange transaction in 1950, the United States (U.S.Forest Service) acquired title from Whiting Bros. for surface rights to the following mineral patents listed in your letter of August 24th:

Mackin	Ray No. 1
Mackin No. 1	Shorty Ditto
Ray	Copper Glance
Grant	Copper Con
Hank	Pigeon
Kennedy	

The same reservation of mineral rights involved in the sale of surface rights by the U. S. Metals Corp. to Whiting Bros. (Ralph E. and Nellie Whiting of Holbrook, Arizona) appears in the transfer of ownership of surface rights to the United States (U.S. Forest Service) said reservation as follows:

"Rights outstanding in the United States Metals Corp for all the oil, gas and mineral in, on, and under the surface, and the rights of ownership therein, for a period of fifty (50) years from and after January 1, 1950, with the right of license of exploring, mining, developing or operating for any and all said products, and of erecting thereon all necessary buildings, pipelines, roads and machinery necessary thereto; provided that this reservation shall be automatically extended from year to year thereafter so long as ore is produced in paying quantities."

The U. S. Metals Corporation, therefore, has the mineral rights described.

Taxes were paid prior to transfer of title from Whiting Bros. to the United States. No further taxes, therefore, are due and none will be assessed since title is in the United States.

No permit fees are due or involved.

The Jimbo Lode was acquired from Whiting Brothers by the U. S. Forest Service through a similar land exchange transaction. The same mineral reservation is held by the U. S. Metals Corp. on the Jimbo Lode as in the case of the above group. No taxes or permit fees are involved.

The Insign Lode and Buster Lode are located in a group of patents a mile or so distant from the group above named. These two patents are in private ownership so far as our records show. We assume they were purchased by Whiting Bros. Since the Forest Service has no jurisdiction over such private lands any rights your Company has will be respected by this Bureau.

The eleven unpatented claims you have listed and one additional claim, the St. Paul, you did not list, presents an involved situation. A special use permit for the purpose of development of claims and shipping of ore was issued to the United States Metals Corporation by the U. S. Forest Service in 1941. The check you enclosed with your letter of September 18, 1955, covered the permit fees for Calendar Years 1954 and 1955. Since this permit was issued the propriety of and authority for issuance has been questioned by higher authority. The questioning was due to the fact that the area embracing the claims is an established National Game Preserve, having been established by proclamation of President Theodore Roosevelt in 1906. An opinion of the Attorney General of the United States is to the effect that lands within the Grand Canyon National Game Preserve would not appear to be subject to the mineral mining laws. The permits, such as the one issued to the U.S. Metals Corporation, issued prior to the Attorney General's opinion have been allowed to continue, but apparently without authority. Since activity following the issuance of the permits has been of a prospecting nature without activity, the cases have, you might say, been dormant all these years.

Our best advice to you at this time is for you to defer any plans for mining activity on the 12 permitted claims until we have time for definite clarification of the situation. We will place your check tendered in payment of 1954 and 1955 fees in special deposit until the situation is cleared, refunding the $40.00 later if it is determined the permits should be discontinued.

This will answer your question regarding patenting of claims in this area. The Attorney General's opinion indicates "No".

The situation on these unpatented claims is as indicated above, dormant. To our knowledge there has been no activity for years, little beyond exploratory initially. Whether or not filing has been done we do not know. Neither do we know if annual assessment requirements have been met. The reason for our lack of information is that mineral filings are made under the General Mining

Laws which are administered by the Department of the Interior, Bureau of Land Management. This Department and Bureau administers the mining laws on lands in Federal ownership whether it be on National Forest land or other Federal land. It is our opinion that the Bureau of Land Management would be governed by the Attorney General's opinion that the area is not open to mineral entry and patent. The office of the Bureau of Land Management having jurisdiction over the area in which the claims are located is in Phoenix, Arizona.

You have, of course, the right to operate on the patented claims on which you retain mineral rights. We suggest, however, that your field force contact the Forest Ranger at Fredonia, Arizona, before commencing operations. The Forest Ranger is familiar with the location of the patents and may be of assistance in directing your crews to the right areas.

If there are further questions please feel free to call on us.

Very truly yours,

F. H. HEDGCOCK, Forest Supervisor

By: Gordon H. Bade, Acting.

MINING CLAIM DEED

This indenture, made in the City of Los Angeles, State of California, on January 31, 1950, by United States Metals Corporation, a corporation created and existing under and by virtue of, the laws of the State of Nevada, (herein called the Seller), and R. E. Whiting and Nellie Whiting, husband and wife, (herein called the Buyers),

W I T N E S S E T H :

That the seller for and in consideration of the sum of One Dollar ($1.00) lawful money of the United States, and other valuable consideration, to it in hand, the receipt of which is hereby acknowledged, has bargained, sold, conveyed, remised, released and forever quitclaimed, and does by this act, bargain, sell, remise, release and forever quitclaim to buyers, their heirs and assigns, forever, all the right, title and interest, estates, claim and demand of seller in and to the surface rights only of the following described property, mining claims and mining rights in the County of Coconino, State of Arizona, and more particularly described as follows:

Mackin Lode mining claim,
U. S. Survey No. 3102

Mackin Lode No. 1 mining claim
U. S. Survey No. 3102

Ray Lode mining claim,
U. S. Survey No. 3102

Hawk Lode mining claim,
U. S. Survey No. 3695

Grant Lode mining claim,
U. S. Survey No. 3707

Kennedy Lode mining claim,
U. S. Survey No. 3102

Ray No. 1 Lode mining claim,
U. S. Survey No. 3102

Shorty Ditto Lode mining claim,
U. S. Survey No. 3102

Copper Glance Lode mining claim,
U. S. Survey No. 3102

Copper Con. Lode mining claim,
U. S. Survey No. 3102

Pigeon Lode mining claim,
U. S. Survey No. 3695

Ensign Lode mining claim,
U. S. Survey No. 3706

Jimbo Lode mining claim,
U. S. Survey No. 3709 and

Buster Lode mining claim,
U. S. Survey No. 3694.

Excepting and reserving to seller and its assigns all the oil, gas and minerals in, on or under the surface of said land, and all the rights of ownership therein, and the seller hereby further reserves to itself and its assigns, the right and license of exploring, mining, developing or operating for any or all of said products upon said lands, and of erecting thereon all necessary buildings, pipe-line, roads, machinery and equipment necessary in and about the business of mining, developing or operating for any of said products, and hereby reserves all of the rights of a full owner operating on his own land, according to all the privileges and customs of the field that may be developed about said tract of land.

That the above reservation shall extend for a period of fifty (50) years from and after the date of this deed; provided that, if upon the expiration of said fifty year period any of said claims are being operated, and ore is being produced in paying quantities, this reservation shall be automatically extended from year to year thereafter so long as ore is produced in paying quantities, otherwise all mineral rights

hereby reserved by seller shall cease upon the expiration of said period.

Seller hereby warrants that it has a good and sufficient title and right to convey the interest herein referred to and agrees to defend the same against any person claiming a superior title.

Buyer assumes and agrees to pay all taxes and assessments against the real property herein conveyed. Seller agrees to pay any taxes levied against mineral rights.

IN WITNESS WHEREOF, the seller has signed this instrument, by its President, thereunto duly authorized and has caused its corporate seal to be hereunto affixed, attested to by its Secretary, and buyer has set its hand and seal the day and year first above written.

UNITED STATES METALS CORPORATION

By_____
President

ATTESTED:

By_____
Secretary

Ralph E. Whiting

Nellie P. Whiting

Buyer

STATE OF CALIFORNIA)
0 ss
COUNTY OF LOS ANGELES)

On January 31, 1950, before me, Stephan B. Robinson, a Notary Public in and for the County of Los Angeles, State of California, personally appeared Roger C. Peery, known to me to be the president of the corporation that executed the within instrument, and acknowledged to me that such corporation executed the same.

Notary Public in and for said
County and State

STATE OF ~~CALIFORNIA~~ ARIZONA)
0 ss
COUNTY OF ~~LOS ANGELES~~ NAVAJO)

On January 31, 1950, before me, a Notary Public in and for the County of ~~Los Angeles~~ NAVAJO, State of ~~California~~ ARIZONA, personally appeared R. E. Whiting and Nellie Whiting, husband and wife, known to me to be the persons whose names are subscribed to the within instrument, and acknowledged that they executed the same.

Notary Public in and for said
County and State

My Commission expires August 27, 1952

Los Angeles, Calif., Jan. 2, 1931.

REPORT ON KAIBAB MINES

The following report of the copper properties owned by the UNITED STATES METALS CORPORATION, is submitted together with excerpts and data from reports by other engineers, Mr. George R. Sheldon, Trans. AIME, pages 830 - 41 and references by U.S.C.S. Page 103 of Bulletin 285.

LOCATION AND DESCRIPTION

The company owns 14 patented mining claims located in the Warm Springs Mining District of Coconino County, Arizona. The millsite and mine camp are located at Ryan, Arizona, six miles westerly at an altitude of 6,000 feet. The altitude of the mining claims is 7,600 feet. The reason for locating the millsite at Ryan is on account of water supply and better location for a permanent camp to treat the ore.

Ryan is located thirty miles from Kanab, Utah, on excellent highways. In fact, these highways are a tremendous asset to the company, as transportation in the past had been expensive due to poor highways and long distance from railroad terminus. The nearest railroad point, Cedar City, Utah, is now only one hundred and eight miles northwesterly from Ryan over a fine road.

The Union Pacific R.R. has spent large sums of money on highways in cooperation with the Forest Service to make possible comfortable sightseeing bus routes from Cendar City, through the Kaibab Forest, to the north rim of the Grand Canyon. This work is a direct benefit to the U.S. Metals Corporation.

ORE

The ore exists as copper carbonate and oxide with some silicate in a quartz gangue; gold and silver values are negligible. A small amount of iron oxide accompanies the copper ore.

The following excerpts of Mr. George R. Sheldon's report is given here as it clearly explains what he found: "This report is based on a brief examination made November 17th and 18th, 1928. The examination was by no means complete and was made when there was from two to six inches of snow all over the plateau on which the mining claims are situated. However, the essential information desired was obtained.

Sampling was started on the Macklin claim. Here a trench was sampled as follows:

Sample - #1	33"	across	horizontal	bed	to	bottom.	Ore in bottom
-	72"	"	"	"	"	"	"
#2	72"	"	"	"	"	"	"
#3	75"	"	"	"	"	"	"
#4	60"	"	"	"	"	"	"
#5	78"	"	"	"	"	"	"
#6	72"	"	"	"	"	"	"
#7	78"	"	"	"	"	"	"
#8	84"	"	"	"	"	"	"
#9	96"	"	"	"	"	"	"
#10	72"	"	"	"	"	"	"

Samples #1 to 10 inclusive were combined in one assay, giving 6.30% Cu. and 75.0% SiO2.

Average thickness of bed sampled, 79" - 6' - 6". The bottom of the ore was not exposed at any place in the entire 700' of trench, but I would judge that the average thickness of the bed in this vicinity, can safely be assumed at 7'.

Sample #11 - 2 cuts, one of 84" and one of 60" across horizontal bed in trench near south line of Mackin #1 claim.

This gives 8.00% Cu. and 74.0% SiO2., The bed as exposed in this trench 240' long is rather irregular in thickness and in copper content.

Sample #12 - Taken in trench on Ray #1 claim, about 200' W. and N.W. from big boarding house. One cut 42", one cut 42", and one cut 72". Total of 3 cuts average thickness of bed 52", giving 6.80% Cu. and 77.0% SiO2. Just East of the East end of this trench is a shaft 22' deep. This shows the copper bearing bed to be 64" thick from surface. Samples of the underlying formation accompany the assay samples.

Sample #13 - 2 cuts, one 42" and one of 48" in trench near west end of Shorty Ditto claim. Ore in bottom of trench 100' long gives 7.75% Cu. and 72.0% SiO2. The rim of Warm Springs Canyon is about 100' south of this trench, so the mineralized bed is cut off here.

Sample #14 - One cut of 30" about 100' east of sample #13, some irregular trenches and shallow pits. One cut of 72" in pit at west end of trench on Shorty Ditto claim. One cut of 24" 130' east of 2nd cut. These three cuts give an average thickness of 42" assaying 7.60% Cu. and 69.0% SiO2.

Sample #15 - One cut 60" in pit, at east end of trench in Shorty Ditto claim. One cut of 72" in irregular trench near east end of Copper Glance claim. One cut of 48" in the same series if irregular trenches in Copper Glance. These three cuts of #15 give an average thickness of 60", assaying 6.65% Cu. and 87.0% SiO2.

- The high silica is accounted for from the fact that the copper bearing bed in the Copper Glance is almost pure sandstone.

SAMPLE #16 - 5 cuts from long trench and pits on the Kennedy claim. These 5 cuts were 84", 84", 54" with ore in bottom, 54" with ore in bottom, and 78" respectively and cover from near west end of Kennedy to the east end. The average thickness sampled is 69", assayung 9.10% Cu. and 80.0% Si02.

An arithmetical average of all the samples cut give the thickness of 5' for the mineralized bed, and an average assay of 7.46% Cu. and 76.3% Si02.

The dotted red line on accompanying map surrounds roughly the area examined. This area is approximately 10 million square feet assuming 20 Cu. ft. of ore in place to the ton, this gives one-half million tons of ore per foot in depth over this area if uniformly distributed. Accepting the figure of 5' for average thickness of mineralized bed, we get a tonnage of two and one-half million. Assuming that development proves only 50% of the mineralized bed to be workable, it leaves one and one quarter million tons of 7.5% copper ore under the area surrounded by red line on map. The company holdings are at least twice this area and it is positive that most of the area is underlain by the same mineralized bed, all of which is easily accessible.

The mineralized bed extends from the surface of the ground to an observed maximum depth of about 9'. There is practically no overburden except a few inches of soil. The topography is nearly level, the plateau having a general slope westerly.

It is three miles from here to Ryan, the mill site. The elevation of the plateau is about 7.900' and of Ryan about 6, 300'.

The geology of the district is very simple, the formation being entirely sedimentary, lying nearly horozontal. The predominating rock is sandstone, with minor beds of lime and some shale.

The mineralized bed forms the top of the general plateau and was probably a line. The copper minerals are mainly azurite and malachite with silicates and oxides of copper. No sulphides of any kind were observed.

The mineralized bed has lost all traces of its original state, having been entirely replaced by silica and the various copper and iron minerals.

(SIGNED) Geo. R. Sheldon
79 "P" Street
Salt Lake City.

Mr. Geo. R. Sheldon was field engineer for the U. S. Smelting Company at the time of making this report, in 1928 or 1929.

In addition to this statement and in his opinion they are very valuable valuable copper properties. Hugh exposures of high grade ore exists and indicate to him, that the original source of mineralization to this entire district is very probably located on the Petosky. Ore is exposed at depths over 20' and one shaft of 65' with 50' drifts each way are still in good copper ore.

There is also more iron here, a favorable indicator of the original mineralization source. One block of ore which the writer roughtly calculated on the ground after close observation was as follows: Taking a depth of 20', a width of 100' and a length of 800' gives a block of ore containing 1,600,00 cubic ft. of ore Calculating 20 cu. ft. of ore in place to the ton, there are 80,000 tons of copper ore, which from samples taken all over this area and in shaft average 9% copper. There are also other exposures of ore outside of the area just mentioned and to calculate tonnage accurately and still do justice to the property is a very difficult matter but enough good ore of high grade proper lays on the surface to satisfy the most skeptical engineer as to it's commercial value.

By reference to an article in 1903 in the Transactions of American Institute of Mining Engineers on pages 839-841, a good account of the geology and ore deposition is given, in which a statement is here quoted: "The ores range from 2% to 40% copper and average 7%." Further, the same article says: "The quantity of ore cannot be accurately estimated from the small amount of development work done, but it is believed that 1 million tons of 7% ore can be put in sight at the Jacobs Lake Beds alone."

The U.S. G.S. refers to the article as being authentic regarding the enormous deposit of copper ore on the Kaibab plateau, on page 103 of Bulletin #285.

Over a mile of trenches, some showing ore 15' in depth are exposed on the company's property and are the basis of forming a conclusion as to tonnage.

Copper bullion 99.9% copper was produced from the Kaibab ore.

ASSETS

Tonnage of Ore.

Ore in sight	1,600,000 tons	
Probable ore	2,000,000 tons	
TOTAL	3,600,000 tons	7% copper, or 140 lbs. of copper per ton, at 12¢ lb. - $60,480,000.

CONCLUSION

Considering the magnitude of the ore deposit, method of treatment and cost of producing per pound of copper, the Kaibob has great merit. It should appeal to investors who look to companies producing a met in which there is a constant demand and a good return on the investment.

Respectfully submitted,

Joseph McAuliffe, E.M.,
Denver, Colorado
January 2, 1931.

Since this report has been made there has been at least $50,000 new development work done on the property. In several of these sites of development the ore is still in place with the depth being 30'. Numerous air drill holes have prov ore at greater depths than the above report indicated.

The highway has been completed on Jacobs Lake south across the Colorado River to Flagstaff, Arizona, where it connects with the Santa Fe Railroad. This is the Federal Highway and it has been completed from Jacobs Lake north and east through Kanab, Utah, to Martsville, Utaz, where it connects with the Denver & Rio Grande Railroad, and the highway is also completed to Salt Lake City to Garfield Smelter.

Now the ore can be hauled from mine to Flagstaff, Arizona, and shipped to El Paso, Texas, for treatment, or from Jacobs Lake to Marysville and from there by Denver & Rio Grande Railroad to Garfield Smelter at Salt Lake City, or it can be hauled direct by truck from the mine, which is at Jacobs Lake, straight to Salt Lake City, which would be a haul of 300 miles but on a good Federal Highway.

There is one leaser on the property at the present time, working one claim and shipping from 10% to 12% copper ore to the smelter. In case the price of copper should go to 14¢ or 15¢ per pound, the ore could be mined with steam shovel without sorting and shipped direct to the Garfield Smelter at Salt Lake City at a good profit.

In the shape the mine is at the present time, they could ship from 100 to 500 tons a day for several years, and if additional development work was done it could increase the life of the mine considerably.

* * * * * *

Copy of Article which appears on Pages 839-41 of the
TRANSACTIONS OF AMERICAN INSTITUTE OF MINING ENGINEERS FOR 1903

(Note: On page 103 "Bulletin #285" United States Geological Survey, Constributions to Economic Geology, 1905, the United States Geological Survey refers to the article as being authentic regarding the enormous deposit of copper ore on the Kaibob Plateau).

THE ENORMOUS DEPOSITS OF COPPER ON THE KAIBAB PLATEAU

These unique copper deposits occur on the top of the Laibab Plateau in Coconino County, Arizona, and extends from the Northern edge of the Grand Canyon of the Colorado River to near the Utah State line. The best developed deposits are near Jacobs Lake, 30 miles south of the Utah line, where they are 16' thick, of known width and more or less continuous for 5 miles.

From Jacobs Lake to the edge of the Grand Canyon, a distance of 40 miles, outcrops of ore have been found, but no explorations have been made except those of wandering cowboys and hunters.

The Kaibob Plateau, the highest of the Colorado River plateaus, is a great uplift about 90 miles long, from north to south, and from 10 to 20 miles wide from east to west. It's southern face is the Grand Canyon; it's western boundary a north south fault plane which separates it from the Kanab plateau, lying 1500' below. It's eastern edge is a monocline which brings the horizontal beds of the high plateau to the level of the plateau country of the eastern Utah.

The elevation of the plateau near the Colorado River is over 8000' and about 6,000' at the Utah line. It's structure, as shown by the western fault, consist of about 500' of Aubrey limestone underlain by 1,000' of red sandstone. The limestone is the upper member of the carboniferous, and is overlain by the marls and shales of the Permian, 25 miles to the north of the Kanab plateau at the town of Kanab, near the Utah line; the Permian strata pass under the magnificient red sandstone cliffs of the Triassic, that rise to heights of 1,000' above the desert.

The Grand Canyon exposes a section a mile deep at the southern end of the plateau, showing all the formations from the Archean to the top of the Carboniferous. This mountain pass, cut by two sections, the canyon and the western fault, shows no mineral veins of mineralization above the Pre-Cambrian, near the bottom of the canyon. The ancient metamorphic strata contain a few copper bearing dikes, with the usual contact in pregnation of copper ore and copper stained rocks. All the Paleozoic strata are barren, both in the canyon and along the western fault until the copper beds are reached at the top of the plateau.

I have described the formation of the plateau for the purpose of showing that the possibilities of any connection between the copper veins and dikes of the Pre-Cambrian and the hor izontal copper beds of the Carboniferous limestone are, to say the least, remote.

The ore beds are white chert, impregnated with malachite and azurite; small amounts of earthy cuprite copper glance and chalcopyrite also have been observed. Silver and gold are present in very minute quantities. The ores range from 2% to 40% of copper and average 7%. They are too silicious for smelting but are good leaching ores.

Some leaching experiments have been made in a small way but no copper has been produced commercially. The ore is covered by a few inches of soil and often outcrops. The upper portion of some of the beds have been leached, leaving a mass of honeycombed iron stained rock.

The beds are intersected by many small faults; the ore near the faults have been crushed and re-cemented by silica and copper, showing the period of deposition was long. The quantity of ore cannot be accurately estimated from the small amount of development work done, but it is believed that 1,000,000 tons of 7% ore can be put in sight at the Jacobs Lake beds alone.

I am not aware that any theory has been advanced to explain the occurence of these ores. Evidently they are replacements of the limestone by silica and copper. The ore bearing solution was descending carbonated alkaline water, which dissolved both silica and copper from the Permian and Mesozoic measures that, in former times, covered the Carboniferous. This theory is rendered more probable

from the fact that the Triassic sandstones to the north and east are copper bearing, and sufficiently so to be mined at a profit.

There are no known eruptions that could furnish the copper, except the dikes of the Pre*Cambrian, a mile below the present copper horizon; the Aubrey limestone being the precipitant.

The deposits can be considered as horizontal bedded veins, from which the hanging wall or roof, and also much of the ore, has been removed by erosion. The beds are similar in physical characteristics to the iron deposits of the Messabi; the taconite or iron chert of the latter corresponding to the copper chert of the Kaibab. The chemistry of the formations of the two may be alike, but the Kaibab ores lack the subsequent enrichment the iron ires have received.

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Page 630

The Copper Deposits of the Kaibab Plateau, Arizona

By L. P. Jennings, Salt Lake City, Utah

New York Meeting, 1903.

These unique Copper Deposits occur on the top of the Kaibab Plateau, in Coconino County, Arizona. . . . . The best developed deposits are near Jacob's Lake, 30 miles south of the Utah line, where they are 16 feet thick, of unknown width and are more or less continuous for five (5) miles. . . . . The ore beds are white Chert impregnated with Malachite and Azurite; small amounts of earthy cuprite, Copper glance and Chalcopyrite also have been observed. Silver and gold are present in every minute quantities. The ores range from 2 to 40 percent Copper and average 7 percent. They are too silicious for smelting but are good leaching ores. . . . . .The ore is covered by a few inches of soil and often outcrops. . . . . .The quantity of ore cannot be accurately estimated from the development work done, but it is believed that 1,000,000 Tons of 7 percent ore can be put in sight at the Jacob's Lake beds alone. . . . . The deposits can be considered as horizontal bedded veins from which the hanging wall or roof has been removed by erosion as also much of the ore.

United States Metals Corporation.

United States Metals Corporation is a Nevada corporation, incorporated December 13,1927.

The capitalation is One Million Dollars of stock of Par value of One ($1.00) dollars per share, all of which are outstanding, fully paid and non-assessable. The number of stockholders approximate 100. Fourteem stockholders own about 90% of the corporation. In 1951. the capitalization was increased to 2,500,000 shares. none of the 1,500,000 shares increased have been issued.

The corporation has never sold stock to the public and has not received any money from sale thereof. It was formed originally as a closed corporation of four persons. Death of one of the incorporators and the"sluffing off" of stock by two other incorpators caused the increase in the number of stockholders.

Properties owned by
United States Metals Corporation.

In Arizona:	Mackin Copper Property, 14 Patented Claims, Surface rights and Mineral rights reserved for 45 yeares.
IN California:	Comanche Mine and Royal Drift Mine. Avawatz Crown Mine.

Comanche Mine is located in Blind Springs Mining District, Nono County, California. Two miles South and West of Benton Station, 30 miles North of Bishop, California. The property consists of 55 lode mining claims, 36 of which are patented, ~~and 19 unpatented,~~ anr 240 acres of land on the East side of Blind Springs Hill. The Camp and the millsite are located on the 240 acres.

The mine has a production of from four to six million dollars in ore. A tunnel extends into the East side into the hill 4350 feet to where it connects with a shaft down from the top of the hill 1300 feet, The tunnel has rails in but is caved where the tunnel has cut veins in thehill, which are supposed to be 13 in number.

From the side of the hill a tunnel runs in 1400 feet to the largest vein known as the Comanche, which vein has produced more than a Millionn Dollars in ore.The faces of the east and west tunnels are about1200 feet apart. There are several reports and maps on this property.

Avawatz Crown Mine: consits of 6 patented lode mining claims. It is located in the Avawatz Mountains about 25 miles north of Baker, California. The values in its ores are lead and silver. There is a shaft on the property down 325 feet with a drift off at the 300 foot level. It is at present filled with water to within 125 feet of the collar of the shaft.

We have been unable to obtain reports on this property. The claims were patented about 1910, which show that more than $14,000.00 worth of workwas performed. It was operated during the first world war.

At the moment, however, our policy is to concentrate on the base metals, and especially copper and lead; and that brings me to the remarkable Avawatz-Crown lead-silver property, consisting of six patented claims.

AVAWATZ MINE

This property has been, to all intents and purposes, lost for some thirty odd years. It lies in the heart of the very rugged Avawatz range which crosses the southern base of Death Valley. Several years ago, while operating in Death Valley, an officer of the company heard of this property; but as almost none of the 'old timers' knew how to reach the property it seemed more of a myth than a mine. Finally he sent in a crew who located the mine and brought back very surprising samples. The ownership was located and the mine purchased in fee by United States Metals Corporation. Our examination convinces us that we have in the Avawatz a very attractive and exceptional property.

The development is described in the California State Reports as consisting of a shaft 325 feet deep, and a 210 foot cross cut at the 300 foot level, with all workings entirely in ore. The Reports further describe the vein as being more than 200 feet in width with its exact width as yet unknown, and as showing on the surface for a distance

Quoting from the 27th report of the California State Mineralogist-1931 re: Avawatz Crown Mine.

"... on this property is a highly brecciated qurtzite 210 feet wide and exposed for a length of several thousand feet. is mineralized across its full width. The richest portion is next to the hanging wall, samples which gave an assay value of 150 ounces silver, 20% lead, 5½% copper and 6% zinc. Samples across the entire width showed an average value of 4 ounces silver, and 8⅗ lead. The ore is in the form of silver bearing galena. Development consists of a 325 foot shaft, and a 210 foot cross-out on the 300 foot level".

Royal Drift Mine is an underground placer property situated in Forks of Butte mining District, Butte County, California, about 55 miles north of Oroville, California. It consists of eleven unpatented placer claims of 1040 acres more or less, extending for one and one-half miles over the course of an ancient river channel. Property above and property below the chanel have been large producers.

A lease and option has been given on this property for ten(10) years, price of $150,000 ($50,000.00) of which is payable to the corporation and the lease carries a 10% royalty on gross returns.

With interest being focused on base metals as being more essential than ever for armament purposes, the very extensive surface deposit which we designate as the Kaibab group will prove very valuable. In any event let us turn to this group for our first examination:

Discovery of high grade copper ore at Jacobs Lake in the heart of what is now Kaibab National Forest was made by roving cowboys in the year 1900. After the first rush and preliminary opening of the area the claims covering the apparent entire extent of the enrichment were acquired by prominent copper men, including Ryan, Ray, and Kennedy. At that time the Kaibab Plateau was one of the most inaccessible areas on the continent, but, after holding the properties for a number of years, Ryan decided the high cost of transportation could be beaten, built a town just off the plateau at the mill site, and proceeded to import equipment for the erection of a smelter. Several hundred men were actively engaged on the property at this time, and Ryan's expenditures were reported to have been in excess of half a million dollars. Before a ton of ore could be treated at the new smelter the town of Ryan was destroyed by fire. Ryan commenced rebuilding, but before he had progressed very far, a second fire wiped out his efforts. After this period the property passed to John Mackin of Chicago. With the passage of some years Mackin felt that the excessively high cost of transporting machinery and equipment to the property had diminished somewhat, and proceeded to transport two smelters, a complete saw mill, generators, and all the necessary items for a very large mining and smelting operation. Seven miles of railroad was surveyed, graded, and the track graded for three miles. Electric locomotives were brought to the property. And again, before running a pound of ore, Mackin was forced to shut down. His efforts established the high rate of $30.00 per ton for hauling in and out of the property and inasmuch as his smelting operation called for the hauling of large quantities of flux material to offset the silica content of the ores, Mackin saw that his development could not succeed until roads were built through the Kaibab.

At this point Mackin, who had grown quite elderly, allowed a group of promoters to assume management of the property with the usual result. Nothing was done, and the valuable equipment was lost or stolen! Our inventories show that equipment of a value of nearly $400,000 was lost in this manner. United States Metals Corporation, upon acquiring the properties, instituted proceedings in an effort to regain at least a portion of this loss, but the matter had gone too long and a few thousand dollars was all they could retrieve.

We have gone into this history for this reason: Non-mining people frequently ask about this or that property, 'why has it not been worked before?' - and, in fact, that is the first question a mining man asks, himself. Until we can answer that very question ourselves we are very chary about proceeding on any deal on any property.

In the case of the Kaibab properties the value of the ore was and is certainly high. In the case of a surface flow deposit, with the ore easy of access, this is a matter established quickly. Two factors made the Kaibab an uncommercial factor; high cost of transportation, and the high silica content of the ores. The problem of transportation was not solved until just prior to the acquisition of the property by the United States Metals Corporation when a grade A through highway from Flagstaff to Salt Lake City was completed directly through the property.

Truck transport is now so low that the ore may actually be shipped to the A.S. & R. Smelter at Salt Lake City, as has been proven by our experimental shipment of some thirty cars of ore, trucked to Marysvale and shipped the balance of the way by rail. And as to the silica content the changes in mill and smelter processes has changed the ore from a penalty ore to a bonus ore. So we have the interesting facts established that our predecessors considered the property worthy of very tremendous aggregate expenditure even in the face of prohibitive transport costs and high recovery or treatment costs; factors which we do not face today.

Our fee holdings in the Kaibab comprise 25 claims of which 15 are patented. We control, on bond and lease, the 5 Petoskey claims adjacent to our own group on the South. This area, which we may point out is very extensive, controls or rather blankets the entire known mineralized district. The engineers, Sheldon and McAuliffe, give the property, on the basis of several thousand feet of trenching and pits, from 1,000,000 to 2,000,000 tons of evident ore, which, on their sampling, they average at 7½% copper content. Now 7½% copper means 150 pounds of copper to the ton of ore which, at the present price of 11½¢ per pound is the equivalent of $17.25 per ton of ore. Of course, a considerable value part of the ore will not run better than 2% to 4%- but that is high for a large surface copper deposit-and yet the ore that runs from 12%-17% will certainly raise the average of the whole. The deepest hole at present of the Kaibab claims of approximately 10 feet, and on the Petoskey, 30 feet, allin ore. If the depth of the ore estimated by Sheldon and McAuliffe, who took an average depth of 5 feet in their reports, extends downwards to 50 feet, we would have a deposit containing between ten and twenty million tons of copper ore. Such a figure as fully developed ore would certainly look well on a balance sheet, having, as it would, a gross value of one hundred fifty to two hundred million. That, of course, remains to be determined, but indications of such tonnage are certainly there. In passing, the instructor in Geology at the University of Utah referred to the Kaibab property as being the 'largest undeveloped copper property in the United States'.

Let us now examine the Comanche Group, as to history, development, and possibilities.

The bonanza enrichment of Blind Spring Hill, which lies on the present road to Tonopah, about 35 miles north of Bishop, California, was first opened in the late 1860's. The values were silver, copper, lead and gold. The hill was quickly divided into old time small mining claims, and some thousand or more miners plunged into working the eighteen or twenty mines of the district. The strike of the veins was north and south across the broad uplift of the mountains, and shafts and pits were sunk at many points over the high rise.. The camp produced millions in a hurry, even though the ore had to be shipped by wagon to the sea, and thence to Wales for smelting. The California State Reports give the production of the hill at six million dollars, but, in view of the fact that the bulk of production occurred before any semblance of reporting it is more likely that the total production of the hill reached seventeen to eighteen million.

All of this production was taken from holes and shafts usually no more than 20 to 200 feet in depth. The deepest working on the entire hill was no more than 650 feet from the surface. The reason for this very shallow working was the fact that horizontal faultings throughout the entire hill moved the

STATEMENT

Title Insurance and Trust Company

IN ACCOUNT WITH

149 NORTH EDWARDS STREET • P. O. BOX 11 • INDEPENDENCE, CALIFORNIA
INDEPENDENCE 2-221

Our No. 13090

Mr. Fred Carlson
2607 West 7th Street
Los Angeles, 5, California

DATE Jan. 16, 1958

TERMS NET CASH
FIRST OF EACH MONTH

PLEASE DETACH THIS PORTION AND RETURN WITH CHECK WHICH IS YOUR RECEIPT $152.50

NUMBER	DATE OF INVOICE	DESCRIPTION	AMOUNT	BALANCE
13090	1/16/58	Policy	$150.50	
		Rec. Certified copy of Dismissal	2.00	
				$152.50

TITLE INSURANCE AND TRUST COMPANY

AGREEMENT OF LEASE made and entered into as of the 24th day of August, 1950, by and between UNITED METALS CORPORATION, a Nevada Corporation (duly qualified to carry on business in the States of Arizona and California), Party of the First Part, and ALLEN L. HILL, JR. AND AUBREY C. HENDON, Co-partners, Box 1602, Salt Lake City 10, Utah, Party of the Second Part.

W I T N E S S E T H :

WHEREAS, party of the first part is owner of a lease of the following described mining claims:

Arizona Jim, Lugwump, Prouper's Dream, Upright, and Millsite, all U. S. Survey No. 1655, situate and lying in the Cherry Springs Mining District, County of Coconino, State of Arizona;

and

WHEREAS, party of the first part is desirous of subleasing the aforedescribed mining claims to party of the second part on the terms and conditions hereinafter set forth; and

WHEREAS, party of the second part is desirous of subleasing said aforedescribed mining claims from party of the first part on the terms and conditions hereinafter set forth;

NOW, THEREFORE, for and in consideration of the covenants, agreements, payments, rents and royalties and hereinafter reserved and by said party of the second part to be performed, kept and paid, said party of the first part by these presents does hereby sublet unto party of the second part all of the aforedescribed mining claims and appurtenances thereunto belonging for the purpose of mining, milling and shipping of ores therefrom for the term of five (5) years, unless sooner forfeited or determined through violation of any agreement, covenant or condition hereinafter contained to be kept and performed by party of the second part.

From date of this sublease party of the second part shall have the right ot possession of all of said mining claims and the right to explore, develop, mine and work the same, and to extract, ship, mill, sell and otherwise dispose of ores, minerals and meterials taken therefrom, and to construct, make and use thereon and therein such dumps, excavations, shafts, stopes, drifts, tunnels, drill holes and other workings as may be useful to and convenient for the working and development of said mining claims or any part thereof.

In consideration of the sublease said party of the second part does hereby covenant and agree with party of the first part as follows:

1. Party of the second part agrees to take possession of said mining claims immediately and to carry on mining operations thereon under the terms of this sublease, and agrees to have performed thereon not less than one hundred(100) man shifts of labor during each month of the term of this sublease, except as prevented by weather conditions.

2. Party of the second part agrees to carry on mining operations on said mining claims in good minerlike fashion and shall keep all existing and new work securely timbered, drained and clear of rock and rubbish, and shall keep all openings in good workable condition.

3. Party of the second part hereby pays the sum of ninety six dollars ($96.00), and agrees to pay and additional ninety six dollars ($96.00), on or before November 15th, 1950, and thereafter agrees to pay all taxes upon the above described property before delinquency.

4. Party of the second part shall comply with all state and federal laws and regulations effecting the conduct of his mining or milling operations.

5. Party of the second part shall protect party of the first part from labor claims and material claims, and party of the first part shall have the right ot post on said mining claims a notice or notices of non-liability of party of the first part for debts to laborers and to materialmen, and party of the second part shall see that such notice or notices as are posted on said mining claims by party of the first part are protected as far as possible from destruction. Party of the second part covenants that he will at no time permit any lien or encumbrance of any nature resulting from his operations on said mining claims to attach to said claims or to any improvements thereon.

6. Party of the second part shall keep party of the first part harmless from injury to person and from damage to property resulting from his operations on said mining claims by procuring and constantly maintaining Workman 's Compensation Insurance covering all hired men at work on said mining claims.

7. Party of the second part agrees to perform assessment work on that certain group of unpatented mining claims known as the Mackin Calims, consisting mostly of road Maintenance.

8. Party of the second part agrees to pay to party of the first part or to its order on all ores, concentrates, precipitates, slimes, bullion and other mineral products taken from said mining claims, when shipped, sold or milled by party of the second part a royalty or rental as follows:

Twelve and One-half percent (12½%) on all ores,
which shall be of the net smelter or net mill returns. Net smelter returns shall mean the amount of payment received from sale of said ore to smelter or ore buyer, less only smelting charges, or mill charges, and railroad freight. Said royalty payable by party of the

second part as herein provided shall also apply on any overage, bonus or advance in price of copper or other minerals and materials taken from said mining claims, paid and allowed by the government or other agency.

Party of the second part shall cause to be sent directly to party of the first part or its order the royalty or rental provided for hereinbefore from smelter or other purchasing agent or buyer to which the ores, bullion, concentrates or precipitates are sold and when such sales are made.

9. Party of the second part shall keep accurate books of account and shall reder party of the first part a statement of accounting on the 15th day of each month hereafter showing all ores shipped, milled, date of same, to whom shipped, sold or otherwise disposed of, and the proceeds received therefrom during the preceding month; and party of the first part or its authorized agent shall have the r right to inspect said books of account at any time.

10. Party of the first part reserves the right to keep a duly authorized agent or agents on said property at all times, and said agent or agents shall have the right to observe all ores classed graded, sorted or shipped and shall be permitted to take samples of any and all ores mined or sorted for examination or assay. Said agent or agents shall be permitted by party of the second part at any and all times to visit and enter all parts of said mining claims and the working thereon for the purpose of inspection and to have surveys made of working whether above or under ground or both.

11. Party of the second part shall have the right to remove or cut timber on said mining claims in order to carry on his mining operations and for use in building and mining purposes on said mining claims; and in removing any trees or timber he shall top, trim, and pile same, and burn all trim, branches and refuse

therefrom in a manner so as to prevent fire hazard and not to unnecessarily mar the beauty of the national forest, and with due care and regard for the regulations and wishes of the United States Forestry Department.

12. Party of the second part shall furnish party of the first part with copies of all maps made and all data obtained in his coring, sampling, prospecting and mining operations on said mining claims included within the terms of this sublease.

13. Any failure on the part of party of the second part to perform any of the covenants and agreements of this sublease shall at the option of party of the first part operate as a forfeiture of this sublease, but no such forfeiture shall be declared unless party of the first part shall first give party of the second part notice in writing by registered mail of its intention to declare a forfeiture if the default or defaults complained of are not rectified or remedied within ten (10) days after date of posting registered letter containing such notice of default or defaults.

14. Party of the second part may at any time surrender and cancel this sublease by giving party of the first party thirty(30) days notice in writing by registered mail of his intention to do so, and by paying all royalties and accrued taxes to date of termination, and also delivering a quit-claim deed to party of the first part to said mining claims as of the date of termination; and that within thirty (30) days after said termination party of the second part shall have the right to remove all his equipment placed by him on said mining claims, except improvements to buildings and permanent improvements.

IN WITNESS WHEREOF, the respective parties hereto have hereunto set their hands and seals as to the day and year first hereinbefore written in this agreement of sublease.

[illegible] METALS CORPORATION,

party of the first part

By Roger C. Peery

Roger C. Peery
President

Parties of the second part

Allen L. White, Jr.

Allen L. White, Jr.

Aubrey C. Norwood

Aubrey C. Norwood

COPY

UNITED STATES METALS CORPORATION.

United States Metals Corporation is a Nevada Corporation incorporated December 18, 1937, and is qualified to carry on business in the States of Arizona and California.

The capitalization is One Million shares of stock of the par value of One Dollar ($1.) per share, all of which are outstanding, fully paid and non-assessable. The number of stockholders approximate 100. Fourteen stockholders own about 80% of the stock.

The corporation has never sold stock to the public and has never received any money from sale thereof. It was formed originally as a closed corporation of four persons. Death of one of the incorporators and the "sluffing-off" of stock by two other incorporators caused the increase in the number of stockholders.

The corporation owns free and clear of incumbrances, other than perhaps taxes, and at present not under lease or lease and option of purchase (except [redacted] and the Royal Drift Mine, hereinafter referred to) which are the following:

In Arizona:	Mackin Copper Property.
In California:	Avawatz Crown Mine; Comanche Mine, and [redacted].
In Nevada:	~~Nevada-Goldfield Mine, and~~ Tonopaugh-Hasbrouck Mine.

The corporation hold title to the following named property subject to agreement to reconvey in the event of failure to perform stipulations of an agreement, which is

In California:	The Royal Drift Mine.

The corporation holds under agreement of lease and option of purchase the following named property:

In Arizona:	Petoskey Copper Property.

The aforementioned properties are hereinafter more particularly described and commented upon.

MACKIN COPPER PROPERTY consists of 25 lode mining claims, 14 of which are patented and 11 held by location, and is situate in Warm Springs Mining District in the Kaibab Forest north of the Grand Canyon Coconino County, Arizona. It is joined by the PETOSKEY COPPER PROPERTY which consists of 5 patented mining claims, and which said claims are held under lease and option of purchase. The terms of said agreement provide for work of 100 shifts per month, and 7-1/2% royalty on net smelter or net mill returns. All payments of royalty apply on a purchase price of $100,000.00 This lease is for so long as the claims are worked with excuse for continuous performance due to inclement weather, strikes, Acts of God and the like.

In 1944 our lessees netted from their operations of the copper properties after all expenses including payment of royalties in excess of $155,000.00. In 1945 the same lessees operated the properties again but quit in September because, they said, their profits were placing them in too high an income bracket.

In 1946 they were again to operate the properties but were prevented from doing so on account of the premiums on copper being removed.

During the years 1944 and 1945 - 286 railroad cars averaging better than 60 tons per car, were shipped from the properties and the ore so shipped based on smelter returns gave a cumulative average of better than 7-1/2%copper content.

It should be mentioned here that operations can be carried on only during the months from the middle of May to or through December of each year because of the elevation which is about 8000 feet. However, a mill or reduction plant on or near the property could handle ore from the properties throughout the year. In 1944 the lessees were paying $8. per ton trucking charge on ore mined from the property to Marysvale, Utah, a distance of 162 miles at which point it was placed on railroad cars and carried to the smelter of the American Smelting and Refining Company at Garfield, Utah.

Leased for 1948 on basis of 1/3rd net profits, and settlement will not be made until year is ended.

THE COMANCHE MINE is situated in Blind Springs Mining District Mono County, California, two miles south and west of Benton Station, not far from the Nevada State Line. This property consists of 55 lode mining claims, 36 of which are patented and 19 unpatented, and 240 acres of patented land on the East side of Blind Spring Hill. The camp and townsite are located on the 240 acres. Plenty of water.

There are several reports and maps of the property.

This is a lead-silver property; production record to date between Six and Ten Million Dollars.

From east side of property tunnel runs into hill approximately 4550 feet - well timbered - and is reported to cut 13 veins. A shaft 1800 feet connecting with this tunnel at about 4,000 feet from adit of tunnel. There are crosscuts where the tunnel cuts the veins. From the west side a tunnel runs in 1400 feet to contact the largest vein of the property known as the "COMANCHE", which is 8 to 10 feet wide and is reported to have produced more than One Million dollars in ore.

AVAWATZ CROWN MINE consits of 6 patented lode mining claims. It is in the Avawatz Mountains about 35 miles north of Baker, California. The values in its ore run in lead and silver. There is a shaft on the property down 325 feet with a drift off at the 300 foot level. It is at present filled with water up to about the 125 foot level.

We have been unable to obtain reports on this property. The claims were patented about 1910 and the last work performed on the property was during the first world war.

Quoting from the 27th Report of the California State Mineralogist 1931 (re Avawatz Crown Mine.)

"...On this property is a highly brecciated quartzite 210 feet wide and exposed for a length of several thousand feet, is mineralized across its full width. The richest portion is next to the hanging wall, sample which gave an assay result of 150 ounces silver, 20% lead, 5½% copper and 6% zinc. Samples across the entire width showed an average value of 4 ounces silver, and 8½% lead. The ore is in the form of silver bearing galena. Development consists of a 325 foot shaft, and a 210 foot cross-cut on the 300 foot level."

~~SECTION 15 is 640 acres of patented land about 4 miles north and west of Kramer, California. Its value is borax prospect, and is under lease and option to responsible people for $25,000.00.~~

NEVADA-GOLDFIELD MINE lies in the Gold Mountain Mining District Esmeralda County, Nevada. It is about 10 miles north and west of Bonnie Claire and about 30 miles south of Goldfield, Nevada. The property consist of 8 patented claims. Gold.

The main development on the property was performed long ago, and was owned by a former Governor of the State of Michigan and his engineer. During their ownership a shaft was sunk 600 feet between 2 veins after the completion of which the engineer died. Thereafter the Governor held the property for 10 years with a watchman in charge. The values in the ore are gold and silver.

The Gold Mountain Mining District to my way of thinking is the most neglected district in Nevada. The old-timers just skipped over the district on their way from Tonopah to Goldfield and on to Rhyolite. The richest ore exhibited at the Exposition in Philadelphia in 1875 from the State of Nevada came from the Gold Mountain District.

On a property adjacent to the Nevada-Goldfield Mine a party has been carrying on a small operation, taking out ore intermittently, which I have been told runs $100. and better per ton.

TONOPAH-HASBROUCK MINE is 6 miles south of Tonopah, Nevada, in the Divide Mining District, Esmeralda County, Nevada. The paved highway is 1½ miles from the property, which highway runs from Tonopah to Goldfield.

The property was formerly owned by Charles Schwab and two associates. One of the associates during the boom days in Tonopah and Goldfield sold his 1/3rd interest in the property for $250,000.00 cash.

On the property is a drift into the hilld 1650 feet. An engineer who examined the property several years ago, for a period of 11 days reported to me that there were 300,000 tons of $10. to $12. ore off the tunnel and that the values run about 50% gold and 50% silver.

There is a shaft on the property down 400 feet with several drifts off the shaft at about 200, 250 and 350 feet levels. Although the shaft is timbered, the timbers have rotted and the shaft is in a dangerous condition. It is reported that there is a vein from 25 to 50 feet wide running $25. to $50. per ton encountered on either the 250 or 350 foot level, off the shaft.

ROYAL DRIFT MINE is an underground and placer property situate in the Forks of Butte Mining District, Butte County, California, about 35 miles north of Oroville, California. It consists of 11 unpatented placer mining claims of 1020 acres more or less extending for one and one half miles over the course of an ancient river channel. Property above and below on the channel have been large producers, the Dix and Portugese properties above on the channel having produced from four to six millions in gold.

Lease and Operating

Best of the Best & Belcher of the Comstock commenced mining operations on the property in 1878, but his company became involved in contests of management and the property was finally sold for labor claims. Production from tributaries to the main channel on the property have produced more than $50,000.00. The property has been in litigation and the company owning the claims lately in bankruptcy, from which difficulties the United States Metals Corporation about 5 years ago cleared the title.

During the late war mining for gold was prohibitive and no activity has been carried on on the property. Negotiations to lease the property to others now pending.

lava on top of the ancient ridges was eroded away, the streams cut faster into the underlying bed rock and the present day streams follow what in ancient times were the ridges, leaving the old streams with their deep lava cap as the modern ridges.

As the present day streams are deeper, they have cut all the tributaries coming in from the sides and in some places have cut through the main streams for short distances.

The section of Butte Creek paralleling the Dix Channel is reported to have yielded $12,000,000.00. Of course some of this gold came from the quartz veins eroded in the few hundred feet of bed rock, cut by the present channels, below the lava, but the bulk of it is ancient channel gold. The amount taken from the present streams is a very small proportion of what is left in the ancient channels.

The Dix Channel traversing the Royal Drift property is approximately two and one-half miles in length and several hundred feet wide. The tributaries also aggregate several miles. The pay gravel does not extend the full width of the stream in any case as the gold follows the main current, but it is safe to estimate that it runs from fifteen to two hundred feet wide.

It is useless to try to estimate the average gold value of gravel in these channels or the total amount they will yield, although these estimates are frewuently made in efforts to sell stock. Later I will speak of values found in different development work and am sure that this will show that sufficient values will be found to make a profitable mine.

The Royal Drift property lies about twenty-two miles N.E. of Chico, California in TS23 and 24 M. Range 3E. M.D.B. & M. It is traversed for its full length by a good road, the Ponderosa Truck Trail, recently completed by the Forest Service. This road leaves the Stirling City highway at De Sabla and connects with the State Highway, known as the Humboldt Road at Forest Ranch.

Under the lava cap of the ancient canyons are several different aged channels. The primary run, generally capped by rhyolite lava, contains the best values and is generally the only one that pays to work. Many of the failures in drift mining are caused by trying to work the later runs, which are naturally much lower in value. This condition is treated in the geological report of Mr. Veatch, attached.

Early development of the Dix and Tributary Channels.

The West Branch of Butte Creek cut the Dix Channel at what is known as Portugee Point. The Channel was worked half a mile up stream from this point and is reported to have yielded three million dollars in coarse gold. The largest single piece, taken by Scribner and Wiseman from their claim, being $990.00 at the old price of gold.

The Dix incline was run down stream on the West side of the West Branch for a distance of approximately 2600 feet. This was all down stream work with pumping and hoisting. It is impossible to find out what was produced. Both the primary and secondary runs were worked as they lay side by side and of course much unnecessary gravel was handled. The foreman for this work told me that the old run averaged $8.00 per yard. It is certain that the production from this

work was very large.

The next development south was on the Calderbank channel, a small tributary which was worked in early days and was undoubtedly very rich. Much of this still remains intact.

The next work was done on the Best or Garland Channel, a large tributary coming into the Dix from the N.E.. Mr. Garland, who worked a short section of about 300 feet took out $33,000.00. Best who worked the ground down stream from Garland, is reported to have had a large production ut there is no record of the value per yard. All indications are that it was very good.

The next development was done on the Royal Drift Channel, near the south end of the property. This was worked down stream for a short distance and is reported to have paid well in spite of pumping and hoisting.

As the main channel lay some where in a belt of lava, 900 feet deep and 3000 feet wide, it was hard to determine its exact position and depth, and has made later attempts to open up the channel, expensive, and in some cases, useless, but they have determined the position and value of the channel, and make it possible to go ahead with certainty in future development. A summary of later developments and results will now be given.

The Wilson Ravine Incline

This incline was started to tap the little Royal Drift channel about one half mile south of the old Royal Drift workings. It soon became apparent that this tributary channel had confluenced with a larger channel further up stream and the incline was

turned to follow in a more westerly direction, down the rim of the larger channel. As we were using a small steam rig for pumping and hoisting, it was hard to make headway. Finally the Dix channel was encountered at a little over 800 feet. In this case the late run lay of top of the rhyolite capping of the primary run, and contained fairly good values. The primary channel was encountered under the rhyolite and found to contain high grade vlaues in the small amount prospected. As it had been necessary to make so many turns in the incline to follow the dips of the rim and the rim and the machinery originally designed to work the small channel, was found inadequate to handle the water of the large channel. The ground was merely prospected and the incline abandoned. A new incline 406 feet in depth at 35° incline was surveyed to tap this channel. As it will all be in lava and gravel it can be driven very cheaply. For about $12.00 per foot. With a good sump to allow the water to accumulate for pumping it will afford cheap and convenient access to the channel for a long distance up stream.

A drain tunnel here is impractical as it will be very long and in hard rock and will also be so near the DeSabla power hause that trouble over tailings will be inevitable. If sufficient capital is available this incline should be driven as early as possible.

The next major development was in the Best tunnel near the center of section 27, T 24 N. Range 3 E. This tunnel had been driven 1200 foot in early days, into the Best tributary and all the channel worked out from the tunnel level, up stream to the point where it had entered the bill. This tunnel was then extended 2000 feet past the Best channel in an effort to tap the main Dix channel. This tunnel proved too high

and an incline was sunk into the Dix channel but such a flow of water was encountered that it could not be handled. This tunnel proved the location of the Dix channel.

An incline was then continued down the Best Channel for several hundred feet below the tunnel level and the ground breasted. Much low grade gravel was worked in prospecting, but this gravel averaged $4.90 per yard., in steep hard bed rock. This gravel would pay a good profit with a drain tunnel but it is certain that the values in this channel will be much higher in a short distance down stream, where slate and serpentine bed rock will be encountered.

One half mile south of this work, a tunnel was started by the Double Eagle Mng. Co. before the ground was acquired by the Royal Drift Co. This tunnel is low enough to drain both the Best and Dix channels and is ideally located for working both of them.

It is possible that the Best and Dix channels have confluenced above this point but the same results will have been attained in either case.

This tunnel is now in five hundred and fifty feet and it is safe to estimate that eight hundred feet more will put it in the channel. The tunnel so far is driven in a hard amphibole schist that will cost in the neighborhood of $20.00 per foot to run. A softer slate and arphlaceous schist formation shows in the side of Butte Creek Canyon, immediately south, and it is certain that this formation will be encountered very soon in the tunnel and make it much cheaper to complete.

This tunnel when completed will be low enough to give considerable down stream work as well as a long distance up stream on both channels. This would take many years to work out.

In the past the Dix channel has been considered the big chance on this property and most of the efforts have been concentrated on its development. It is undoubtedly very good but our experience has proven the Best channel also a paying proposition under proper working conditions and its development should not be neglected.

Another feature that we believe will be a big factor in economical working of these channels, is improved methods of handling gravel, as with a drag line or mechanical shovel.

In any placer mine the source of gold is the chief consideration. In this the Royal Drift seems more favored than most mines. Besides the numerous small veins that have fed their pockets into the ancient streams, we have the will and or Mathewson dyke crossing the channels at the north end of the property. This is a large gold bearing porphery dyke, which has undoubtedly enriched the channel to a great extent. It is certain that very few small channels have paid above the dyke, while they were rich below it, and the same conditions should prevail with a large channel.

Faulting has also been a great factor in the failure of drift mining in the past but is a condition that will not bother on this property. Past development work and a close study of surface conditions have revealed two faults in the length of channel

No. 871

SUPPLEMENTAL

Abstract of Title

To the following described Real Estate

The Ensign Patented Lode Mining Claim, U.S. Sur. #3706

The Buster Patented Lode Mining Claim, U.S. Sur. #3694

The Mackin Patented Lode Mining Claim, U.S. Sur. #3102

The Mackin No. 1 Patented Lode Mining Claim, U.S. Sur. #3102

The Ray Patented Lode Mining Claim, U.S. Sur. #3102

The Ray No. 1, Patented Lode Mining Claim, U.S. Surv. #3102

The Shorty Ditto Patented Lode Mining Claim, U.S. Sur. #3102

The Copper Glance Patented Lode Mining Claim, U.S. Sur. #3102

The Copper Consolidated Patented Lode Mining Claim, U.S. Sur. #3102

The Kennedy Patented Lode Mining Claim, U.S. Sur. #3102

The Pigeon Patented Lode Mining Claim, U.S. Sur. #3695

The Hawk Patented Lode Mining Claim, U.S. Sur. #3695

The Grant Patented Lode Mining Claim, U.S. Sur. #3707

The Jimbo Patented Lode Mining Claim, U.S. Sur. #3709

The Sunshine Patented Lode Mining Claim, U.S. Sur. #3708

Also

The Riggs Springs, located about thirteen (13) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County.

The Big Spring, located about six (6) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County.

The Mangum Springs, located about one and one-half (1½) miles North from what is known as Big Spring, and about six (6) miles south of the mouth of Warm Springs Canyon in said Coconino County.

No.

Abstract of Title

To the following described Real Estate

Continued:

The Moquitch Springs, situated about one (1) mile below the Mangum Springs, in said Coconino County.

Also

A certain mill site, containing five (5) acres, situated at the mouth of Warm Springs Canyon in said Coconino County, commonly known as the Coconino Mill Site and particularly bounded and described as follows:

Beginning at the Southeast corner Monument #1, running thence North twenty rods to Northeast corner Monument #2; thence West forty-five degrees north, fifty six and six-tenths rods to the Northwest corner marked by a blazed cedar tree; thence South twenty rods to Southwest corner marked by a blazed cedar tree; thence East forty-five degrees South, fifty-six and six-tenths rods to the place of beginning.

All the above situated in Coconino County, State of Arizona.

John Mackin and Mary M. Mackin, husband and wife

to

The Los Angeles Exploration & Metals Co. Ltd., a Nevada corporation

: MINING DEED (Quitclaim)
: Dated: October 16, 1929
: Recorded: November 19, 1929
: Book: 57 DEEDS
: Page: 572
: Consideration: $10.00, etc.

CONVEYS: All of the right, title and interest of the Parties of the First Part in or to the following described real property situate in the County of Coconino, State of Arizona, more particularly bounded and described as follows, to-wit:

The Ensign Patented Lode Mining Claim, U.S. Sur. #3706;

The Buster Patented Lode Mining Claim, U.S. Sur. #3694;

The Mackin Patented Lode Mining Claim, U.S. Sur. #3102;

The Mackin No. 1 Patented Lode Mining Claim, U.S. Sur. #3102;

The Ray Patented Lode Mining Claim, U.S. Sur. #3102;

The Ray No. 1, Patented Lode Mining Claim, U.S. Sur. #3102;

The Shorty Ditto Patented Lode Mining Claim, U.S. Sur. #3102;

The Copper Glance Patented Lode Mining Claim, U.S. Sur. #3102;

The Copper Consolidated Patented Lode Mining Claim, U.S. Sur. #3102;

The Kennedy Patented Lode Mining Claim, U.S. Sur. #3102;

The Pigeon Patented Lode Mining Claim, U.S. Sur. #3695;

The Hawk Patented Lode Mining Claim, U.S. Sur. #3695;

The Grant Patented Lode Mining Claim, U.S. Sur. #3707;

The Jimbo Patented Lode Mining Claim, U.S. Sur. #3709;

The Sunshine Patented Lode Mining Claim, U.S. Sur. #3708;

Together with all of the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, and the rents, issues and profits therefrom.

Also all tools, machinery, tramways, or railroads and the equipment thereof, including three locomotives and all cars, trucks, etc., the saw mill with its tools and appurtenances, and all other personal property situate on or heretofore used in connection with the operation of the above described patented mining claims.

Also all water rights, ditches, flumes and pipe lines heretofore used in connection with said mining property, particularly the following to-wit:

The Riggs Springs, located about thirteen (13) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County, the notice of location of which is dated October 27, 1900,

and recorded in the Recorder's office of said County on January 4, 1901, in Book 1 of Water Rights, Page 205;

The Big Spring, located about six (6) miles south of the Coconino Smelter, in what is known as Nail Canyon in said Coconino County, the notice of location of which is dated October 27, 1900, and recorded in the Recorder's office of said County on January 4, 1901, in Book 1 of Water Rights, Page 204;

The Mangum Springs, located about one-and one-half (1½) miles North from what is known as Big Spring, and about six (6) miles south of the mouth of Warm Springs Canyon in said Coconino County, which spring is more fully described in the notice of location recorded in the Recorder's office on the 30th day of December, 1899, in Book 1 of Water Rights, Page 148;

The Moquitch Springs, situated about one (1) mile below the above described Magnum Springs, in said Coconino County;

Together with all pipes and pipe lines for conveying the waters of said springs to what is known as the Coconino Mill in said County.

Also a certain mill site, containing five (5) acres, situated at the mouth of Warm Springs Canyon in said County and State, commonly known as the Coconino Mill Site and particularly bounded and described as follows:

Beginning at the Southeast corner Monument #1, running thence North twenty rods to Northeast Monument #2; thence West forty-five degrees north, fifty six and six-tenths rods to the Northwest corner marked by a blazed cedar tree; thence South twenty rods to Southwest corner marked by a blazed cedar tree; thence East forty-five degrees South, fifty-six and six-tenths rods to the place of beginning; and more fully described in the notice of Location which was filed for record in the Recorder's office of said Coconino County on the 8th day of October, 1900 in Book 1 of Mill Sites, on Page 187. Together with all of the buildings, machinery and other improvements thereon. It being intended by this clause to convey the said mill site and the mill and reduction works and all of the machinery and appurtenances connected with and contained in the same.

RECITES: To have and to hold all and singular said mining property and said water rights, pipe lines, mill site, mills, machinery, and appurtenances and privileges in any way incident or belonging to said mines, water rights, mill site and mills, or heretofore used in connection therewith, unto the said Party of the Second Part, its successors and assigns forever.

SIGNED: John Mackin
Mary M. Mackin

ACKNOWLEDGED: October 16, 1929 by John Mackin and Mary M. Mackin, husband and wife, before Abbie F. Sorensen, Notary Public, Cook County, Illinois. (N. P. SEAL) Comm'n. expires 11/22/31.

Los Angeles Exploration and Metals Company Ltd., a corporation,
Party of the first part, lessor

and

Ward Collars,
Party of the second part, lessee

: LEASE AGREEMENT
: Dated: May 3, 1933
: Recorded: July 14, 1933
: Book: 3 LEASES
: Page: 296
: Consideration: $10.00, etc.

AGREES: Lessor agrees that it is the sole and rightful owner of all of the fourteen patented mining claims known as the Mackin Mines, and enumerated as follows: Sunshine, Buster, Mackin, Mackin No. 1, Copper Glance, Copper Consolidated, Ray, Ray No. 1, Shorty Ditto, Kennedy, Pigeon, Hawk, Grant, Jumbo. (Also unpatented claims)

LEASES: Free and clear of all encumbrances, all of said claims to party of the second part, and his assigns, for a period of 10 years from and after May 3, 1933, with a privilege of 10 additional years if requested by party of the second part.

CONSIDERATION: That the second party will within 90 days from date pay all the taxes due and payable against said property and continue to pay the following annual taxes when due during the life of this agreement and keep up the assessment work on all of the above named unpatented claims.

That when copper has reached and maintained a price of 10¢ per lb or better for a period of six months, second party will begin and diligently carry on the construction of a mill or treating plant of at least 100 tons daily capacity and will operate the same continuously; that second party will pay to first party 10% of the amount of net smelter or mill returns, including railroad freight from all ores marketed from said properties.

RECITES; Second party will keep possession of said properties but first party has right to go upon the property for the purpose of inspection and shall have access to the mill, smelter or treatment plant and the books of the company for inspection and second party will render an account on 10th day of each month and make settlements of all royalties due from the preceding month.

All water rights belonging to the party of the first part go with the property.

Failure of second party to perform the terms and conditions of this agreement for a period of 30 days shall be deemed a forfeiture and this agreement may be declared null and void upon 15 days written notice and all payments made hereunder shall be forfeited as liquid damages.

SIGNED: DIRECTORS AND OFFICERS OF LOS ANGELES EXPLORATION AND METALS CO. LTD.,
By D. A. Kenoree, Pres.
Charles A. Palmer, Vice Pres.
Oscar Smith
John Van Daam Director Secy
A. H. Swallow Director
(CORPORATE SEAL) Party of the first part.

Ward Collar
Party of the second part.

ACKNOWLEDGED: July 1, 1933 by Charles A. Palmer, Vice-President, of the California Smelting & Refining Company, the Corporation that executed the within instrument, before Howard M. Binford, Notary Public, Los Angeles County, California. (N. P. SEAL) Comm'n. expiration date not shown.

ASSIGNMENT: Ward Collar.....in consideration of the sum of $10.00, etc.,.....does by these presents sell, transfer, assign and set over to Charles A. Palmer and John Van-Daam their heirs and assigns, the said instrument and all his right, title and interest in and to the same, authorizing them in his name or otherwise, but at their own cost, charge and expense, to enforce the same according to the tenor thereof, and to take all legal measures which may be proper or necessary for the complete recovery and enjoyment of the assigned premises.

SIGNED: Ward Collar

ACKNOWLEDGED: May 15, 1933 by Ward Collar before W. C. Gorman, Notary Public, Los Angeles County, California. (N. P. SEAL) Comm'n. expires 12/14/34.

IN THE SUPERIOR COURT OF THE STATE OF ARIZONA
IN AND FOR THE COUNTY OF COCONINO

Lutie Neil, Plaintiff	
vs.	
Los Angeles Exploration Metals Company, Ltd., a Corporation,	CIVIL #2553
Defendant	

COMPLAINT: Filed 7/10/30. Prays judgment in the sum of $126.09 for services rendered and 10% of the net profits with 6% interest from 12/20/29, and for costs of suit. That J. A. Neil has owing $360.75 and that he has assigned said claim to plaintiff. Prays judgment for the sum of $360.75 with 6% interest from 12/20/29, and costs. Signed, F. M. Gold, Attorney for Plaintiff.

SUMMONS: Dated 7/10/30.

AFFIDAVIT OF PUBLICATION OF SUMMONS: F. E. Wells, Publisher of The Williams News, a newspaper published weekly at Williams, Arizona, swears that a copy of the summons was published weekly in the regular and entire issue of said newspaper for 4 consecutive weeks commencing with issue dated 8/29/30 and ending with the issue dated 9/19/30. Duly signed and acknowledged. Attached is newspaper clipping.

AFFIDAVIT OF LUTIE NEIL: Dated and filed 9/22/30. Shows that affiant mailed a copy of the complaint and summons by registered mail to the defendant and that she received the return receipt. Attached is receipt for registered letter and Return Receipt signed by Los Angeles Exploration and Metals Co by Donald Tetloff.

DEFAULT: Dated and filed 12/30/30.

JUDGMENT: Dated 12/30/30; filed 12/31/30. That plaintiff have and recover the sum of $486.84 with interest at 6% from 12/20/29 until paid, together with costs and that plaintiff have execution against the property of the defendant. Signed, G. O. Nolan, Judge.

MOTION TO VACATE JUDGMENT: Filed 5/10/33. Signed, F. M. Gold, Attorney for Plaintiff. MEMORANDUM SUPPORTING MOTION: That there is an apparent want of service of summons on defendant. Signed, F. M. Gold, Attorney for Defendant.

ANSWER: Filed 9/12/33. Denies each and every allegation contained in complaint. Signed, Wilson, Wood, and Compton, Attorneys for Plaintiff. Verified by Charles A. Palmer, Vice President of Los Angeles Exploration & Metals Co., Ltd., Plaintiff.

DEPOSITIONS OF CHARLES A. PELLER AND JOHN VAN DAAM: Filed October 12th, 1933. Envelope not opened.

NOTICE AND CLAIM OF LIEN OF JOHN R. NEIL: For further particulars see next page of this abstract.

John R. Neil

vs.

St. Anthony Copper Company, John Mackin and Mary Mackin, and John Van Daam

: NOTICE AND CLAIM OF LIEN
: Dated: December 6, 1929
: Recorded: December 7, 1929
: Book: 2 MECHANICS LIENS
: Page: 337
: Consideration: $442.75.

RECITES: John R. Neil, being first duly sworn, deposes and says: That he has performed labor and furnished materials in the construction and repair of certain buildings, pipe line and improvements upon that certain lot or parcel of land known as the Coconino Mill Site and Ryan, Arizona, containing approximately five acres, and a pipe line running from Moquitch Springs, located about five miles south of said mill site and connected and appurtenant to the said mill site and water tanks connected thereto, and located on the said mill site situated at Ryan in the County of Coconino, State of Arizona, and sought to be charged together with said improvements with the lien claim hereby and more particularly described as follows, to-wit:

(describes personal property)

That the St. Anthony Copper Company, John Mackin and Mary Mackin, is the name of the owner or reputed owners of said premises and through its agent, John Van Daam, known as manager of said mill and mill site, caused said buildings, mill and pipe line herein mentioned to be altered and repaired by the claimant, John R. Neil.

That the name of the person by whom he was employed was John Van Daam, known as the manager and agent of the St. Anthony Copper Company, John Mackin and Mary Mackin.

That on 5/1/29 he entered into a contract with the said John Van Daam for the alteration and furnishing of material of the said mill site and pipe line which said contract was oral

That John R. Neil is the assignee and holder of a lien created on the above mentioned premises by Lutie Neil, wife of John R. Neil, and the claimant herein, the said lien being for labor performed on the said mill site as cook and caretaker thereof. That the said lien is in the amount of $215.00.

That the contract was completed on 9/21/29 and approved by John Van Daam, and that 60 days have not elapsed since the day the improvements were completed.

That the said affiant claims a lien upon the above described property, structures and improvements and the benefits of the laws of the State of Arizona relating to liens of mechanics, material men, laborers and others, for the sum due him under the above account and assignment.

SIGNED: John R. Neil

ACKNOWLEDGED: December 6, 1929 before Tom L. Rees, Clerk of the Superior Court. (SEAL OF THE SUPERIOR COURT.)

CERTIFICATE

No. 871

STATE OF ARIZONA }
County of Coconino } ss

I, the undersigned, hereby certify that I have examined the records in the office of the County Recorder, the Superior Court, and the County Treasurer and ex-officio Tax Collector, of the County of Coconino, State of Arizona, and find:

No conveyances or other instruments affecting the title to the lands described in the caption of this Abstract, executed by any of the parties named herein as Grantor or Grantee, or any other person or persons, shown thereby to have been recorded in the Recorder's office of said County, and no proceedings had or judgments rendered in any Court of record in said Coconino County, Arizona, which are a lien upon or affect the title to said premises, except as shown by the preceding sheets, since October 23, 1929.

And, no taxes or tax sales or forfeitures of said premises remaining unredeemed or uncancelled of record, except taxes for the year 1937 which are not yet payable.

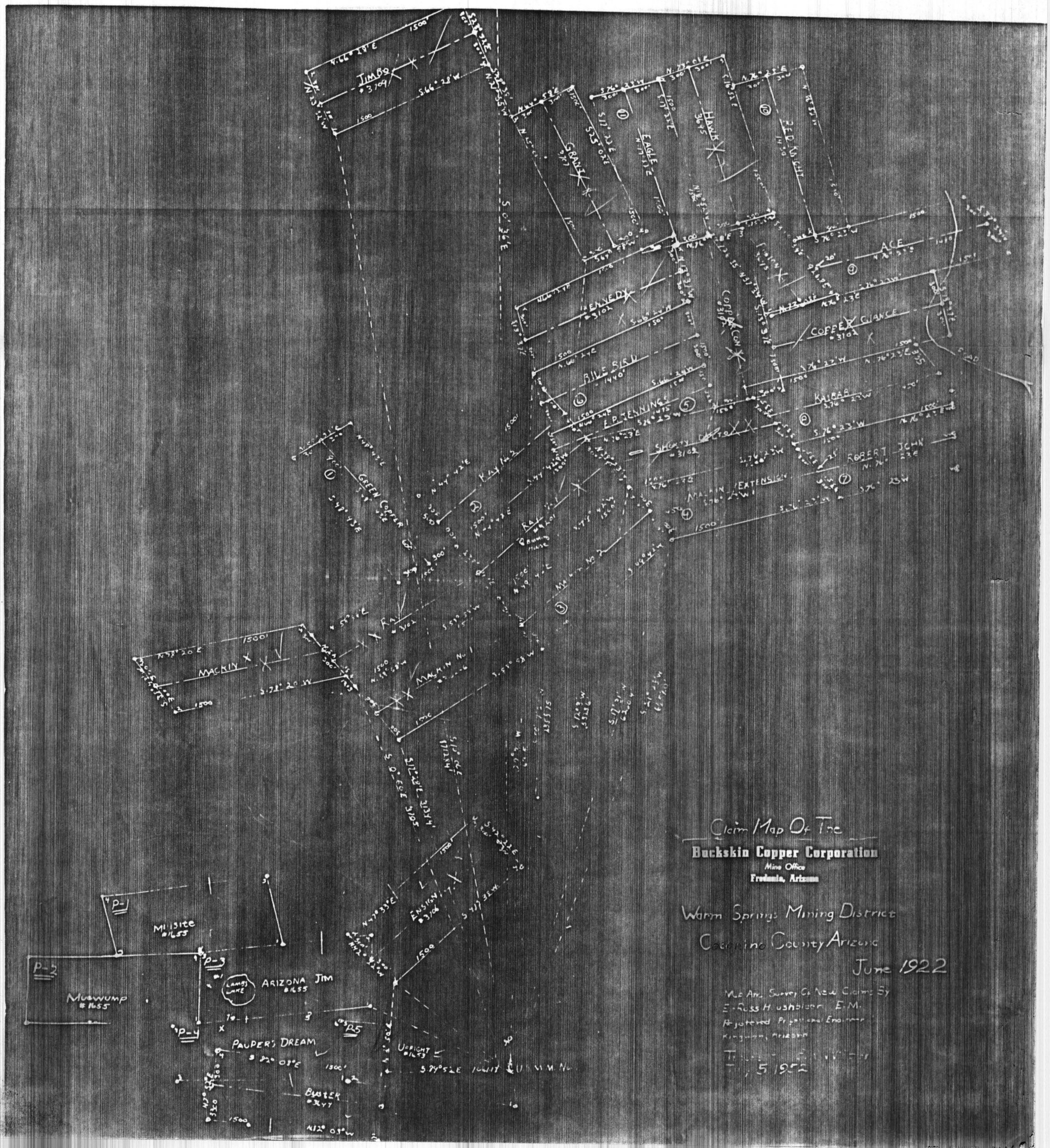
IN WITNESS WHEREOF, I have hereunto set my hand this 30th day of April, A. D. 193 7, at 10:15 o'clock, A. M.

COCONINO COUNTY ABSTRACT COMPANY

By K. H. Cameron
Abstracter.

No. 871

FLAGSTAFF JOURNAL



Claim Map Of The

Buckskin Copper Corporation

Mine Office
Fredonia, Arizona

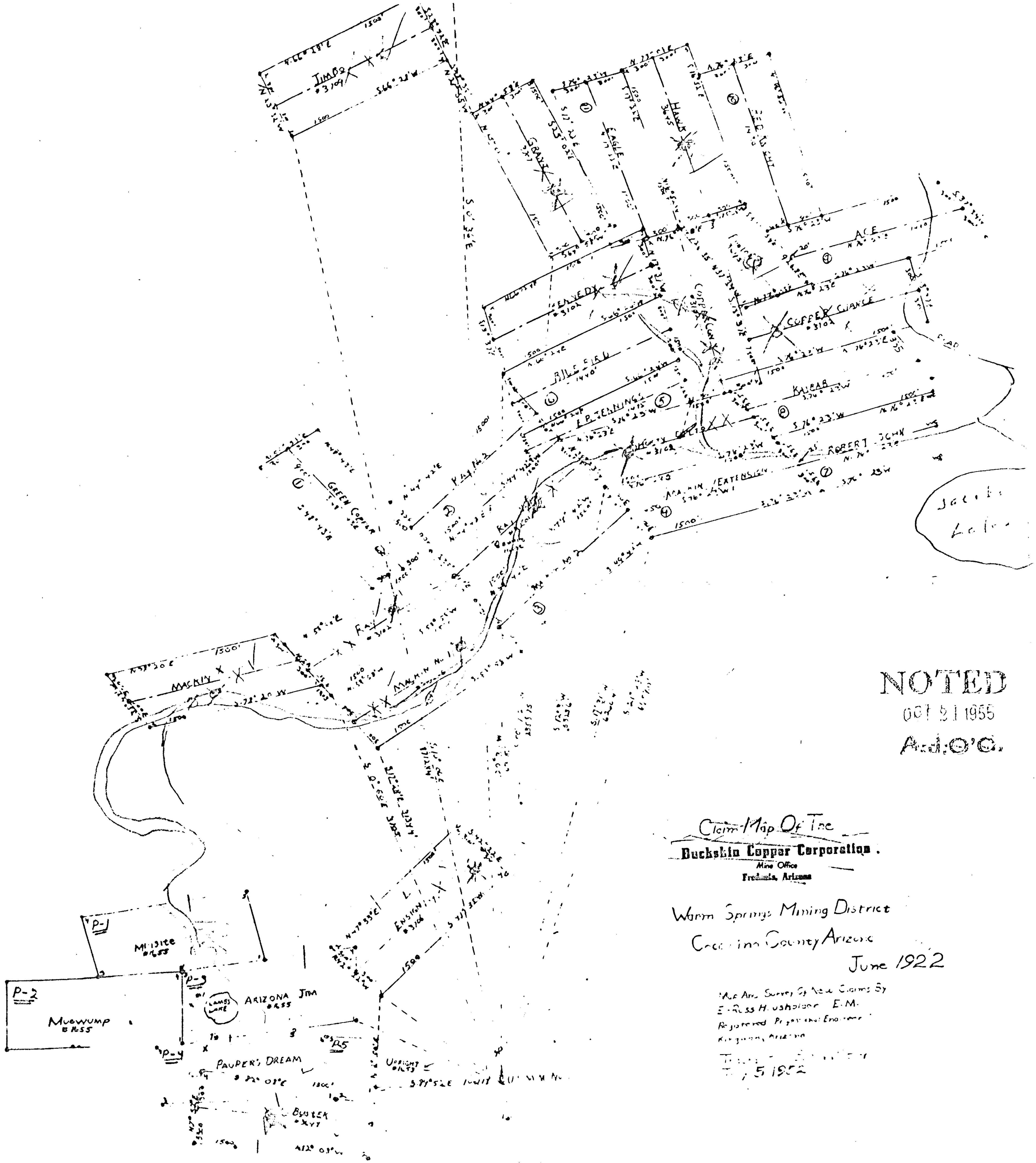
Warm Springs Mining District

Coconino County Arizona

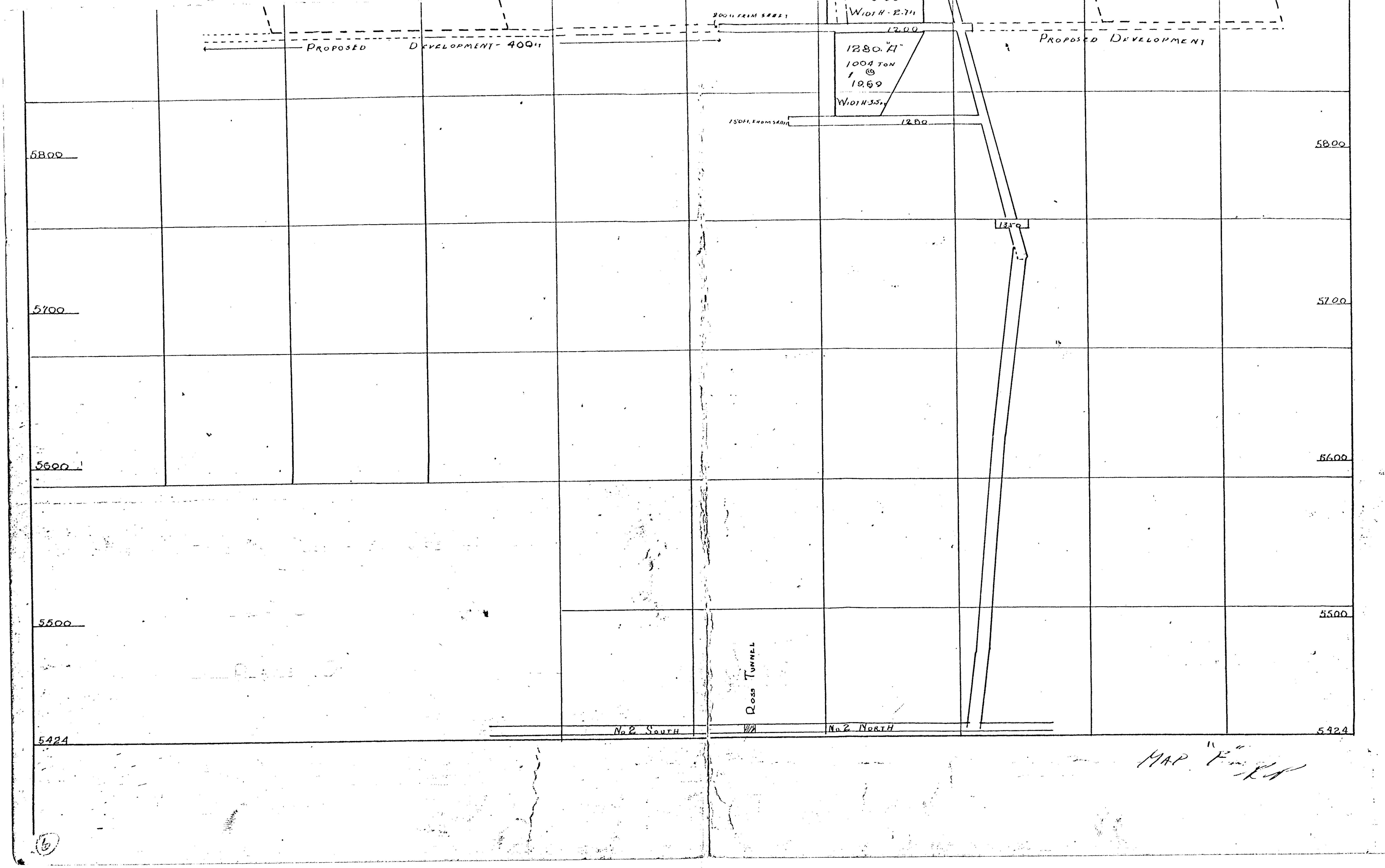
June 1922

Mine Area Survey Of New Claims By
E. Ross Hushbeck E.M.
Registered Professional Engineer
Kingman, Arizona

Filed
F. 5 1922



JIMBO
GRANT
EAGLE
HAWK
ACE
COPPER CHANCE
E.P. JENNINGS
KAIBAB
ROBERT JOHN
GREEN COPPER
MACHIN
MACHIN No. 1
ENSIGN
P-1
Millsite
P-2
Mugwump
P-3
ARIZONA JIM
P-4
PAUPER'S DREAM
NOTED
OCT 21 1955
Claim Map Of The
Buckskin Copper Corporation.
Mine Office
Fredonia, Arizona
Warm Springs Mining District
June 1922



PROPOSED DEVELOPMENT - 400 ft
WIDTH - 2.7 ft
1200
1280 "A"
1004 TON
@
19.69
WIDTH 3.5
1280
PROPOSED DEVELOPMENT
5800
5700
5600
5500
5424
1350
ROSS TUNNEL
No 2 SOUTH
No 2 NORTH
MAP "F"

6200

6100

6000

5900

KERRICK INCLINE

FAULT

800-A
809 TON @ $19.04
WIDTH - 2 FT

800-B
1533 TON @ $20.33
WIDTH - 2.3 FT

800-C
667 TON @ $15.32
WIDTH - 2 FT

820 FT FROM SHAFT

850

850

180 FT FROM SHAFT

850-A
1037 TON @ $14.84
WIDTH - 2.3 FT

1000-C
5158 TON @ 20.58
WIDTH - 4.4 FT

1000-D
2478 TON @ $11.79
WIDTH 2.6 FT

1000-A
2730 TON @ $22.30
WIDTH - 3 FT

1000-B
1894 TON @ $15.61
WIDTH - 3.8 FT

650' FROM SHAFT

GRANITE

1000

1000

240 FT. FROM SHAFT

POSSIBLE ORE - 2625 TON

POSSIBLE ORE - 8185 TON

POSSIBLE ORE - 6245 TON

1200-A
1152 TON @

SOUTH

NORTH