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

The following file is part of the Grover Heinrichs Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

SUNRISE RELIEF

Sec. 28 | Sec. 27 | Sec.

2	1	20	19	18	17
4	3	22	21	16	15
6	5	24	23	14	13
		26	25	12	11
		28	27	10	9
		30	29	8	7
		32	31	6	5
		34	33	4	3
		36	35	2	1

Sec. 33 — Sec. 34 — Sec.

Township 5 North, Range 1 East

Township 4 North, Range 1 East

10	11	16	17
9	12	18	19
8	13	20	21
7	14	22	23
6	15	24	25
5		26	27
		28	29
			4
1	2		3

Sec. 3

Sec. 4 — Se

Cold Rush Claims 1-29

Cold Rush Extension Claims 1-36

Cold Rush Annex Claims 1-6

Patented Claims:

Sunrise 1-6,8,
Pick Me Up, BLM
#4038, Deeds, 228/124.
Venus Relief, Relief No. 1&2,
BLM #1614, Deeds, 65/487.

U.S. MINT SERVICE FORM NO. 42 A.

MEMORANDUM OF GOLD DEPOSITED AT THE U. S. MINT

WEIGHT							
Before Melting	After Melting						
Ounces	Ounces	Fineness	Gold Value	Silver Value	Charges	Net Value
25.24	23.10	.755	361.00	1.23	1.96	360.27
44.70	44.67	.991 2	832.45	1.69	2.87	831.27
62.74	62.30	.911	1173.23	1.14	3.60	1170.77
42.92	42.85	.889	787.46	.39	2.79	785.06
35.80	35.71	.871 2	643.33	.06	2.49	640.90
77.60	77.45	.931	1490.55		4.25	1486.30
94.75	94.71	.969 2	1898.10	.04	4.98	1893.16
31.53	31.50	.949 2	618.27	.07	2.32	615.02
56.78	56.75	.989	1160.20		3.38	1153.83
64.14	64.08	.967	1280.93		3.69	1277.24
42.00	41.97	.985	854.57		2.76	851.81
68.55	68.52	.986	1396.60		3.88	1392.72
35.73	35.70	.992 1/4	732.25		1.07	731.19
50.10	50.07	.994 1/2	1029.34		1.11	1028.23
50.80	50.75	.989	1037.54		3.13	1034.41
73.13	73.10	.993	1500.52		1.15	1499.37
63.92	63.89	.994 3	1313.79		1.13	1312.66
38.38	38.35	.995 2	789.19		1.08	788.11
47.22	47.19	.996	971.59		1.10	970.49
40.34	40.31	.992 1/4	826.81		1.08	825.73
43.97	43.94	.978 1/2	888.78		2.85	885.93
46.35	46.32	.988	946.03		2.94	943.09
51.83	51.80	.985 2	1055.27		3.17	1052.10
22.72	22.67	.912	427.39		1.95	425.44
29.00	28.97	.951 2	569.80		2.22	567.58
43.57	43.54	.960	864.04		2.82	861.22
31.10	31.07	.976	626.85		2.30	624.55
28.74	28.73	.985	584.99		1.20	583.79
34.17	34.15	.979 1/2	691.47		1.24	690.23
26.44	26.42	.985 1/2	538.23		1.18	537.05
32.13	32.11	.920	610.67	.10	2.34	608.43
51.27	51.24	.976 1/2	1034.33		1.36	1032.97
45.66	45.64	.986 1/2	930.96		1.32	929.64
35.74	35.71	.902 1/2	666.21	1.70	2.50	665.41
46.98	46.96	.982 1/2	953.76		1.32	952.44
56.32	56.28	.989 1/2	1151.19		1.39	1149.80
48.22	48.20	.988 1/2	984.92		1.34	983.58
41.80	41.79	.985	850.92		1.29	849.63
62.64	62.61	.959 1/2	1254.79		1.43	1253.36
54.21	54.17	.983	1100.76		1.38	1099.38
36.51	36.48	.985 1/2	728.07	.16	2.53	725.70
36.52	36.49	.966	728.65	.17	2.53	726.29
34.63	34.60	.971	694.49	.33	2.45	692.37
30.86	30.83	.968 1/2	617.23	.32	2.30	615.25
76.00	75.97	.978 1/2	1536.67	.66	4.21	1533.12
49.32	49.29	.983	1001.58	.31	3.08	998.81
40.63	40.60	.970	814.10	.09	2.70	811.49
50.23	50.20	.980	1016.97	.32	3.12	1014.17
37.91	37.85	.910	712.00	.31	2.59	709.72
52.13	52.05	.983 1/2	1074.47	.24	3.23	1071.48
54.33	54.10	.970 1/2	1085.34	.43	3.28	1082.49
74.15	50.30	.943	980.52	.57	3.12	977.97
94.51	74.12	.924 1/2	1416.50	.52	4.11	1412.91
70.33	94.42	.864	1686.38	.77	4.96	1682.19
	70.30				1.49	

77.45	.969^2	1898.10	.04	4.98	1893.13
94.71	.949^2	618.27	.07	2.32	616.02
31.50	.989	1160.20		3.38	1156.82
56.75	.967	1280.93		3.69	1277.24
64.08	.985	854.57		2.76	851.81
41.97	.986	1396.60		3.88	1392.72
66.52	.992$\frac{1}{4}$	732.25		1.07	731.19
35.70	.994$\frac{1}{2}$	1029.34		1.11	1028.23
50.07	.989	1037.54		3.13	1034.41
50.75	.993	1500.52		1.15	1499.37
73.10	.994^3	1313.79		1.13	1312.66
63.89	.995^2	789.19		1.08	788.11
38.35	.996	971.59		1.10	970.49
47.19	.992$\frac{1}{4}$	826.81		1.08	825.73
40.31	.978$\frac{1}{2}$	888.78		2.85	885.93
43.94	.988	946.03		2.94	943.09
46.32	.985^2	1055.27		3.17	1052.10
51.80	.912	427.39		1.95	425.44
22.67	.951^2	569.80		2.22	567.58
28.97	.960	864.04		2.82	861.22
43.54	.976	626.85		2.30	624.55
31.07	.985	584.99		1.20	583.79
28.73	.979$\frac{1}{2}$	691.47		1.24	690.23
34.15	.985$\frac{1}{2}$	538.23		1.18	537.05
26.42	.920	610.67	.10	2.34	608.43
32.11	.976$\frac{1}{2}$	1034.33		1.36	1032.97
51.24	.986$\frac{1}{2}$	930.96		1.32	929.64
45.64	.902$\frac{1}{2}$	666.21	1.70	2.50	665.41
35.71	.982$\frac{1}{2}$	953.76		1.32	952.44
46.96	.989$\frac{1}{2}$	1151.19		1.39	1149.80
56.28	.988$\frac{1}{2}$	984.92		1.34	983.58
48.20	.985	850.92		1.29	849.63
41.79	.959$\frac{1}{2}$	1254.79		1.43	1253.36
62.61	.983	1100.76		1.38	1099.38
54.17	.985$\frac{1}{2}$	728.07	.16	2.53	725.70
36.48	.966	728.65	.17	2.53	726.29
36.49	.971	694.49	.33	2.45	692.37
34.60	.968$\frac{1}{2}$	617.23	.32	2.30	615.25
30.83	.978$\frac{1}{2}$	1530.67	.66	4.21	1553.12
75.97	.983	1001.58	.31	3.98	998.81
49.29	.970	814.10	.09	2.70	811.49
40.60	.980	1016.97	.32	3.12	1014.17
50.20	.910	712.00	.31	2.59	709.72
37.85	.983$\frac{1}{2}$	1074.47	.24	3.23	1071.48
52.85	.970$\frac{1}{2}$	1085.34	.43	3.28	1082.49
54.10	.943	980.52	.57	3.12	977.97
50.30	.924$\frac{1}{2}$	1416.50	.52	4.11	1412.91
74.12	.864	1686.38	.77	4.96	1682.19
94.42	.973	1413.99		1.49	1412.50
70.30	.985	1433.06		1.49	1431.57
70.38	.993	1254.41		1.28	1253.13
61.16					
61.11					

2795.18 oz.

$55149.31 at old price of gold.

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978 WALTER G. STALLER Date Signed 1/14/80 ARIZONA, U.S.A.

John B Thompson
8013 E Palm Lane
Scottsdale, AZ

Jan. 14, 1980

SAMPLE NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
1	R #1	.004						
2	R #2	.072						
3	R #3	.050	Nil					
4	R #4	.078						

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978 WALTER G. STALLER Date Signed 1/14/80 ARIZONA, U.S.A.

John B Thompson
8013 E. Palm Lane
Scottsdale, Ariz

Jan. 14, 1980

SAMPLE NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
17-A	#I 0-2'	.032						
18	#I 2'-4'	.026						
19	#I 4'-6'	.106						
20	#4 0-4'	.040						
21	#4 4-8'	.028						
22	#4 8-11'	.042						
23	#2	.014						

$83.25

ASSAYER

G. C. Familiar

Phoenix, Arizona,

December 1908.

Through an arrangement with Mr. Ezra W. Thayer, of Phoenix, Arizona Territory, the writer made a survey and map of the workings of The Relief Gold Mining Company's property, and, with a view of obtaining a general idea of the distribution and value of the oresm secured a number of samples from the various levels and stopes.

By this means a certain degree of familiarity with the deposit was acquired, and, at Mr. Thayer's request I have written the following report on such features as appear to be of importance or interest.

The work referred to was done during September and October 1908.

In taking the samples, I was obliged to work entirely alone; the rock was broken with a small pick, and I depended more for accuracy to the selection of the place and material than upon the amount taken. My precautions were such that I have confidence in believing that the samples fairly represent the values in place. As the value of the ore in the stopes had been practically tested, I limited my work in these to sampling an occasional pillar and directed my attention more particularly to the margins of these openings and to such parts of the levels as had not been exploited for ore, with the object of getting at the value of those portions of the fissure that had been rejected.

In view of enlarging the output of the Mine and adopting a permanent method of treating the ore, it became essential to know whether large masses of vein stuff remaining in the stopes and in undeveloped portions of the vein, carried sufficient values to allow of their being removed with the richer portions, to furnish a tonnage such as was contemplated.

The samples taken by me therefore DO NOT represent the ore

bodies in the Mine, but of outside vein stuff, or rejected portions, excepting only the few samples taken from pillars.

The Mine is in a northerly direction from Phoenix, and something over twenty miles distant; the roads are good, and country traversed is interesting.

Peoria, a station on the Prescott & Phoenix branch of the Santa Fe Railway, is within eight miles of the property, with excellent transportation facilities to or from either.

The Company has made public the information regarding the organization and capitalization, the exact location of the property, its acreage and the number of patented claims, etc. in prospectus form, and I will therefore confine my writing to less familiar aspects of the Mine.

The elevation is only slightly above that of the surrounding country at the foot of a small group of low granite hills, which rise island-like from the sea of level, cactus covered plain, only to achieve an altitude of a few hundred feet, quite out of keeping with the massive character of the rock.

The group is composed of a type of Granite known locally as "Bradshaw" from the name of the neighboring mountain ranges; it is coarse in texture, light grey in color, and is characterized by prominent bunches of black mica (biotite); in the mass it contains numerous enclosures of mica schists or fine grained segregations of theoriginal magma. Extending across the south slope of the hills, in a nearly Eastward direction the Relief vein occupies a zone of shearing in this granite which conforms with more or less irregularity to areas of the enclosed schists.

Several hundred feet west of the main workings, a second distinct type of granite occurs as a dyke or elongated boss, rending the face of the hill from top to bottom with a strike approximately north-south; this rock is very hard and compact; pink in color, and shows large pink feldspars and scarce diminutive crystals of

mica (muscovite).

Where the dyke intersects the line of the fissure, the latter is much shattered and faulted locally; the vein, however, continues many hundred feet to the East of the dyke fault, and its values have been proved by two prospect shafts on that portion.

Some four hundred feet south of the working shaft, and at the foot of the hill's slope, there is a large mound of cinter, representing the site of a defunct geyser, or group of thermal springs, and is of interest, since the original waters were without doubt active in relation to the ore deposits.

The mound is of considerable extent, suggesting a long period of activity; the material has the appearance of being composed of silica and shows the fine banded structure and grotto-like cavities consequent to its origin.

The deposit I should classify as an unusually strong vein occupying a shearing zone in granite along enclosures of mica schist, mineralized by ascinding hot solutions or pregnant magmatic waters.

The type is not an uncommon one, and is considered one of the most promising for producing large and continuous amounts of diffused ore. The vein stuff consists of/quartzose gangue and impregnated portions of the "country" or wall rock.

Free gold occurs both in the schist and in the granite; considerable portions of each has been stoped, especially of the latter.

The mica schist forms with some irregularity the footwall of the stopes and leached portions of it compose a considerable portion of the vein, filling sometimes occuring as large "horses" and more rarely as patches replacing the hanging wall.

The quartz stopes hug this footwall and the adjacent portions is broken with the quartz and furnishes from eight to eighteen inches of rich ore and many beautiful specimens. The average combined width is about five feet. The granite ore lies above and parallels the quartz vein; it shows only slight alteration in texture, but is blocky and full of minute cracks or seams, on the face of which the gold

appears as little flakes. The metal is also found disseminated throughout the homogeneous rock itself, occasionally forming specimens of rare beauty. This granite ore rarely forms the immediate hanging wall of the quartz vein; there is a zone or partition of altered schist separating the two, unfortunately too low in values to permit of its being broken with the ores.

The absence of other metals than the gold in these ores is noteworthy. Except for a very low percentage of the usual iron oxides and an almost negligable appearance of copper carbonates there is only gold.

This condition furnishes a product unusually simple of treatment either by amalgamating or by cyanide treatment.

The recovered gold is of an unusual degree of purity.

I failed to discover any trace or indication of sulphides anywhere in the Mine.

The stopeing so far done extends from surface workings to a depth of two hundred and eighty feet measured on the dip which approximates to 45 degrees. Above the two hundred foot level (140 feet vertical) the double stopes of the parallel veins average about two hundred feet in length and about eighty feet on the dip; the combined width of the quartz and granite stopes averages not less than eight feet.

The size of these shoots promises much for the future possibilities of the Mine.

Stopeing is now being carried on from the three hundred foot level (240 feet vertical) in the quartz stope which averages here not less than five feet in width. From a small winze sunk in the foot wall six feet below the level floor in granite ore three and one-half feet wide to the west face of the working stope the distance along this drift isthree hundred feet.

Unfortunately this drift is irregular and does not run in ore throughout its length. The work has been prosecuted in the

softer portions of the fissure, thus making it impracticable under conditions to sample the shoot continuously. From the bottom of the inclined shaft at the water level a crosscut has been run to the south two hundred feet in length. Two veins of quartz are intersected by this drift. The smaller one is within a few feet of the south face and was not measured by me. The larger vein crosses the drift at 160 feet from the shaft and occupies a brecciated zone of considerable width. This portion of the drift has caved in to some extent and is very wet; the vein evidently connecting with the surface and forming a water course. A portion of the filling is composed of a prominent band of quartzose material of irregular width averaging about two feet. The connection of this vein with the one in the upper workings is a matter of some doubt. It possesses the same strike in an east-west direction but dips decidedly nearer to the perpendicular. No driftins has been done on this vein from this level.

Shortly after passing below the three hundred foot level, the working shaft, which is unfortunately several hundred feet east of the ore bodies, passes through the vein, and conditions below this level must remain a matter of speculation waiting further development. Throughout the workings, the fissure shows a tendency to minor faults across the dip and parallel with the strike. In view of this feature, I should condemn further exploitation by means of inclined shafts; a fault of any magnitude at right angles to the dip (across the dip) would cause great inconvenience in carrying on the work. I am furthermore convinced that the ores could be treated successfully by cyanidation at much less cost than by the present method of milling them.

Undoubtedly, however, the first step should be to exploit and block out sufficient ores below the present working levels, in order to justify the installation of a plant on a scale sufficiently large to handle the ores on an economic basis.

The general country is granite, showing many phases. Along the mineralized zone the granite is generally coarse grained, dark, contains much biotite and is rather soft. To the North (on the H.W. side) appears a great mass of light colored, hard, very siliceous granite. Here and there small tongues of the softer, coarser granite, extend into this mass. In places, particularly west of the gulch, (about 900' W of the shaft) this siliceous phase cuts across the softer phase, appearing there as a N-S intrusive tongue. South of the Black shaft quite a mass of the siliceous phase is noted, showing, near its contact with the softer phase, included angular fragments of the latter. In the more siliceous phase some minor quartz and aplite segregations are found - in the coarser and softer phase, almost none.

In the mineralized zone are numerous dikes of fine grained dark rock (perhaps syenite or trachyte-syenite). These dikes vary in width from 2" to many feet, and cut the granite on every conceivable course and dip - the major ones, however, roughly paralleling the course of the mineralized zone or cutting it at nearly right angles. Angular fragments of the dark dike rock are frequently found included in the softer granite mass. Only seldom do the dark dikes intrude the harder, more siliceous granite.

At the extreme West end of the claims some rhyolite and Andesite were noted.

Thin sections, followed by proper classifications, should be made of all the rocks mentioned.

A structural survey is necessary.

The mineralized zone thus far known extends roughly perhaps 200' East and 1300' West from the Main shaft. This zone may eventually be limited only by the ultimate limits of the favorable softer granite.

On surface, fracture zones, showing low values across their entire width, with some free gold in narrow streaks, and good values over widths of several feet, have been found up to 40' wide. It is noteworthy that the wide fracture zones found on surface in area 1 W overlie the stopes and known wide underground orebody. Also is it noteworthy that, in area 2 W where the ore exposed on the 200 West is narrow and limited, no fracture zones or the same type have yet been seen on surface.

The principal values found at surface and shallow depths seem to occur in or near the dark dikes in the fracture zones - particularly near cross fractures or dikes. Values frequently here - and still more frequently at greater depths, where the dikes are harder and narrower - penetrate the softer granite

to a considerable distance. Free gold is frequently seen both in the dark dike rock and in the granite. The gold occurs occasionally as thin flakes along cleavage planes, but more frequently as fine particles in the hard rock. Quartz streaks, mainly tabular, are found in the fracture zones, and while not as a rule carrying the best values, can be considered excellent "indicators". Copper stain usually accompanies values. Silver thus far has been negligible. A trace of lead was found in Area 3 W, 150' West of the Intrusive Tongue. Other metallic minerals are suspected, and should be determined as work progresses. Phosphorus has been found at several points and Manganese seems wide-spread. There is some evidence of surface leaching of gold values at a number of points, in Areas 1 W and 3 W. Sulphide casts, pretty well oxidized, are found in the quarts. The values are very "spotty."

The gold is not freed from the rock except by fine grinding. The ore slimes readily, and some of the gold floats on water in panning.

Much cross fracturing and a good deal of minor faulting is noted at surface and shallow depths. There is some evidence of major faulting, particularly just West of the main shaft and again in Area 2 W about 500' West of the shaft.

It is noteworthy that at some points severe cross shattering has not particularly disturbed the main E-W fracture zone and that no vein material has entered the cross fracture, but yet free gold has penetrated the surrounding rock. On the 200 W about 300' West of the shaft is an illustration of this.

The orebody- at least in Area 1 W, does not occur as a vein, but as a series of irregular masses - more or less parallel - along one or more fracture zones within the main mineralized zone. Offhand I should call it an irregular replacement along a major line of weakness - with concentrations of values at favorable points extending at times into the adjacent favorable granite and dark fine grained dike rock. It may easily be that the hard siliceous intrusive phase of granite, and the dark dikes, have influenced deposition. An exact statement of the type and cause of the deposit is impossible until after considerable geological work has been done with thin sections and mineralogical studies by a geologist experienced in this typeof deposit. Such a determination may be safely left until development has opened new ground and furnished adequate technical data.

Careful gathering and co-ordinating of all possible technical data is essential.

Development must be kept as far as possible on ore - following it or its indicators to the limits of favorable ground - and all exposures, whether of vein material or country rock, must be carefully sampled.

I think that there can be developed a method of stope sampling

keeping hoisted ore up to a profitable grade. In places mining widths up to 40' at least will be encountered and I think rather cheap mining costs can be realized.

The ground encountered above the 200 level stands well. It will apparently drill and break easily.

AREA EAST OF MAIN SHAFT is pretty much covered by debris. I did not see any interesting exposures and think that surface discoveries would be accidental.

The 200 level East is apparently driven on a narrow fracture. It is questionable whether or not this is the principal ore zone. Development does not seem justified now, but this level should be sampled and later explored by extension of the drift and adequate crosscutting.

AREA 1 WEST - Main Shaft to Black Shaft, for a distance of about 400' on surface is very important. It shows parallel exposures (not continuous, but broken) of wide fracture zones, filled with crushed dark dike, quartz streaks, and favorable granite. Numerous cross dikes are seen. Several cuts, pits and shafts show widespread values, usually low, but good in places over substantial widths. Much copper stain and manganese is seen. Free Gold is frequently found in dike rock. Some evidence of leaching in granite is found. The main ore body of the old mine underlay this area. This body still contains much material in the old stopes that should make low grade sorting ore and above the stopes there remains about 100' of depth from surface that is virgin. Just above the old stopes - below the Black shaft, at about 120' deep a cave has exposed a very wide mineralized area, verifying the surface indications.

On the 200 level W cross cut 2 South was driven toward the fracture zone exposed in surface cut A but apparently not far enough. An extension of this cross cut and more N-S cross-cutting between the main shaft and a point 250' west may show segments of ore as yet undiscovered.

This area should be developed to the 500 level as quickly as possible. The main shaft can be cheaply repaired. Some cutting out to straighten both vertical and horizontal curves is needed. The shaft must be retimbered. Lagging is probably needed on the roof only. This shaft offers an excellent point of attack for immediate development (using it for hoisting only and using the later suggested Black shaft manway for air and escape). The Main shafts will later serve as a pumpway and escape.

Reference is made to assay sheet.

Reference is made to Plan of Reopening and Development.

on surface shows a great amount of favorable granite with many dark dikes, and at the head of gulch evidence of shattering and possible faulting. At the west end the hard siliceous granite appears as a N-S intrusive tongue cutting the mineralized zone.

On the 200 West a streak of quartz and silicified favorable granite 1' to 5' wide extends to a fault 150' West of Chute 15 accompanied by a parallel dark dike. Four samples were taken here at 25' intervals for 100' W of Chute 15. They showed low values.

Some parallel and some cross dikes are seen. For 30' or 40' about 200' West of Chute 15 the granite is badly shattered and a short cross cut North shows a narrow dark dike, reported to show free gold, in very favorable granite. This cross cut should be extended North.

At about 277' West from Chute 15 a shallow winze on North side of drift shows at least 5' of silicified and fractured favorable granite, adjoining a dark dike and showing copper stain. The dike rock showed free gold. Two samples, not including the dike rock, taken in this winze showed practically no value. It seems very important that this winze be deepened and the ore followed to its limits.

At a point just West of this winze the intrusive hard siliceous granite tongue (mentioned on surface) appears and all the level beyond is more or less in it. The main drift extends about 120' further with the face in the Intrusive. A 200' drift (probably S W) is all in Intrusive. A short drift (probably N W) starting about 360' West of Chute 15 shows dark dike, some Intrusive, and some crushed favorable granite.

Not much can be said about this area underground until a survey tied into surface survey - gives a real orientation. The area may have possibilities with proper study and cross-cutting.

AREA 3 W - Intrusive Tongue Westerly is important. A fracture zone at least 40' wide and carrying low values, appears just west of the Intrusive. The Red shaft, sunk about 80' on a quartz seam in this fracture zone, shows, with a short adit level, low values, and a favorable dark dike. Just West of this shaft the fracture is apparently faulted, and is disclosed again in a cut West and South. A dike of hard fine grained, dark and very siliceous rock adjoins the fracture on the North. In this zone the quartz looks good, carries copper stain and occasionally fair values. Westerly about 350' from the Intrusion the granite shaft shows a fracture 4' - 6' wide. It is reported to have carried values. One sample at the collar and one at the dump were very low. Still farther West are three cuts which show narrow fractures in the granite. No values were found. Beyond this west end line is an old shaft, the dump from which shows low values and a little lead.

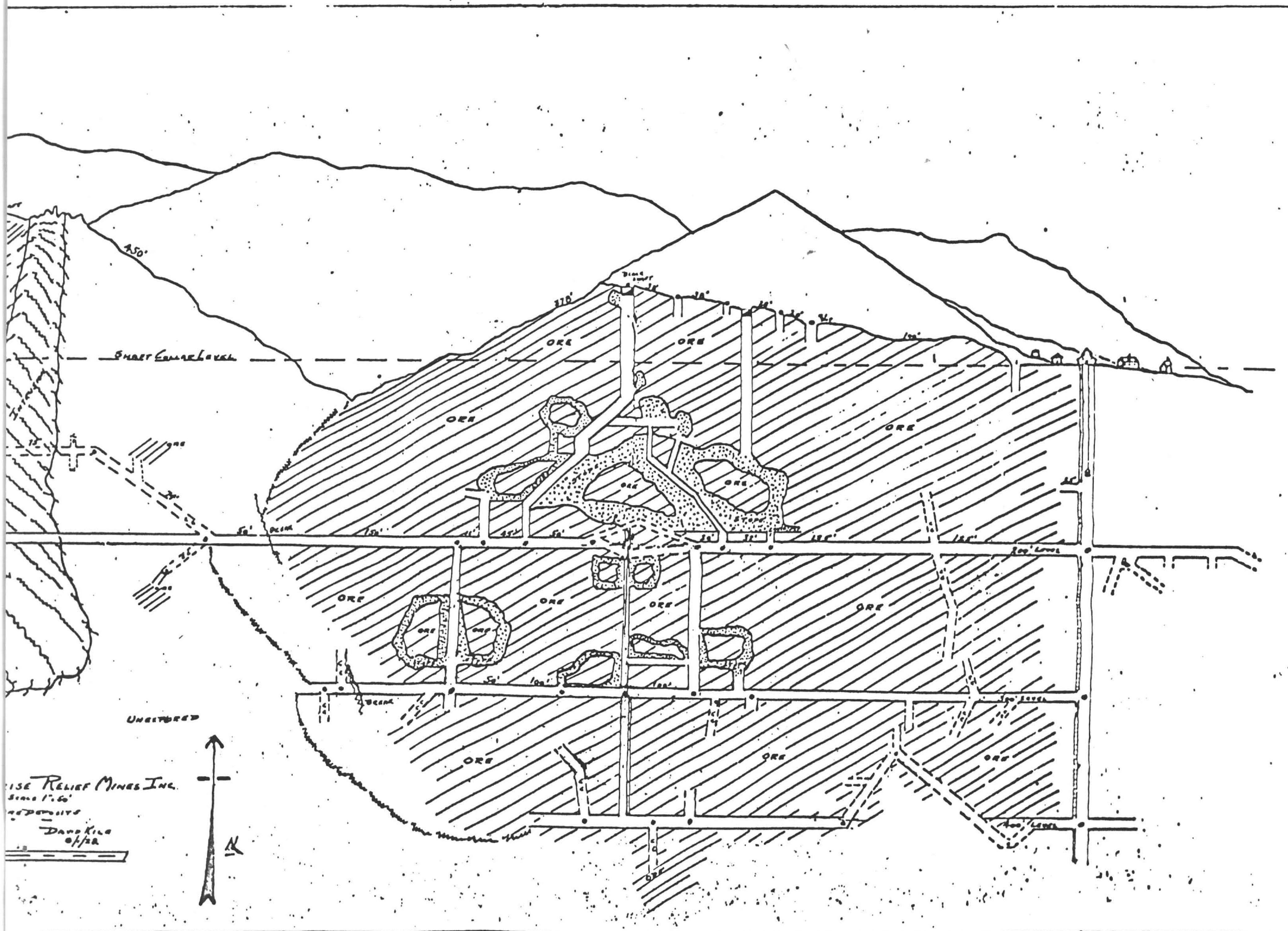
This area is practically unexplored. No underground work has been done. The granite is favorable. Faulting can be expected. It is my opinion that the quartz seam is an "indicator" and that adequate underground exploration - crosscutting the favorable granite as well as drifting - will show ore. It may be that such exploration, with proper surveys, will show the present exposures to be not the same, but parallel to, the fracture zone of Area 1 W.

Reference is made to Assay sheet.

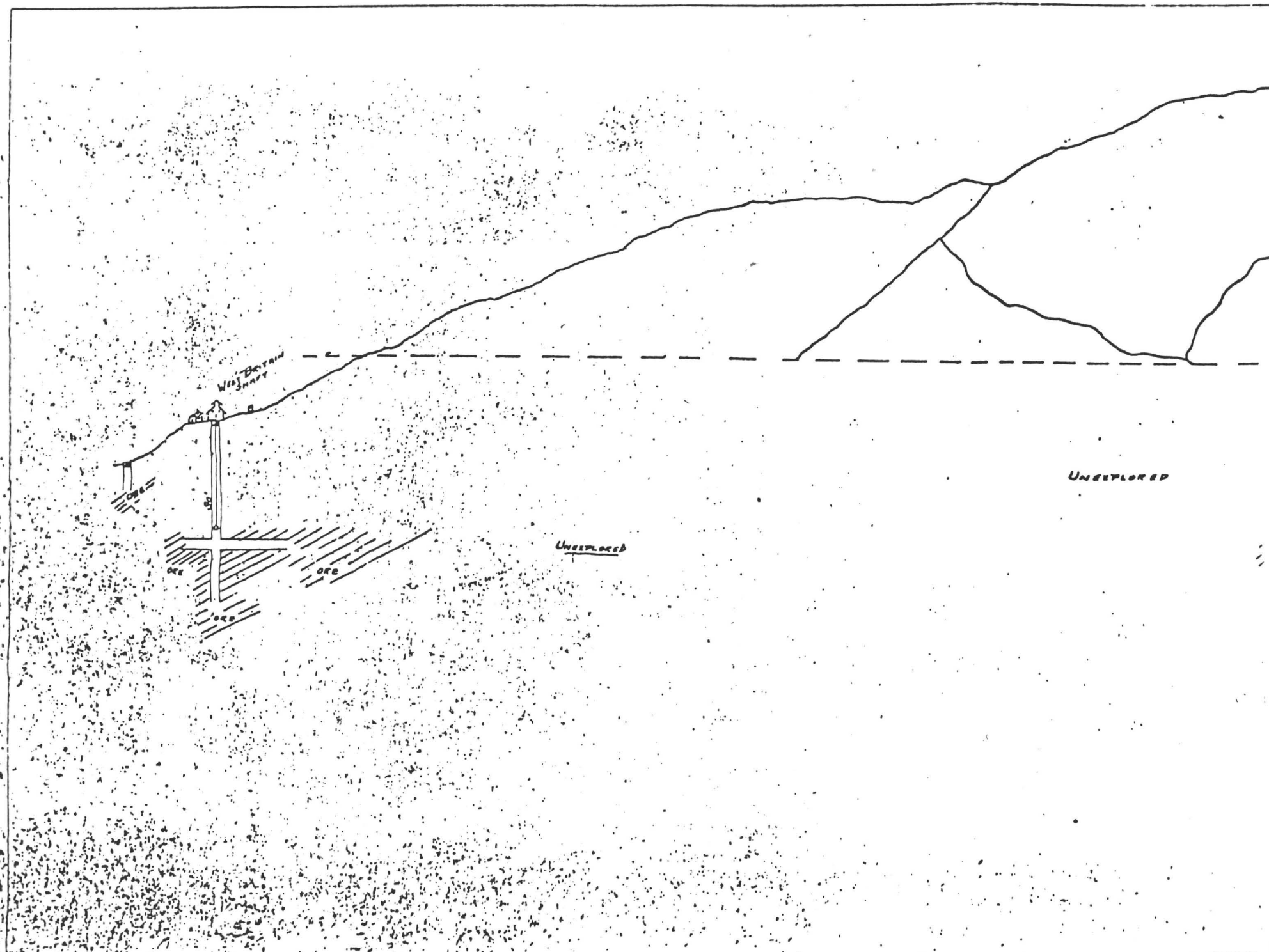
Reference is made to Development Plans.

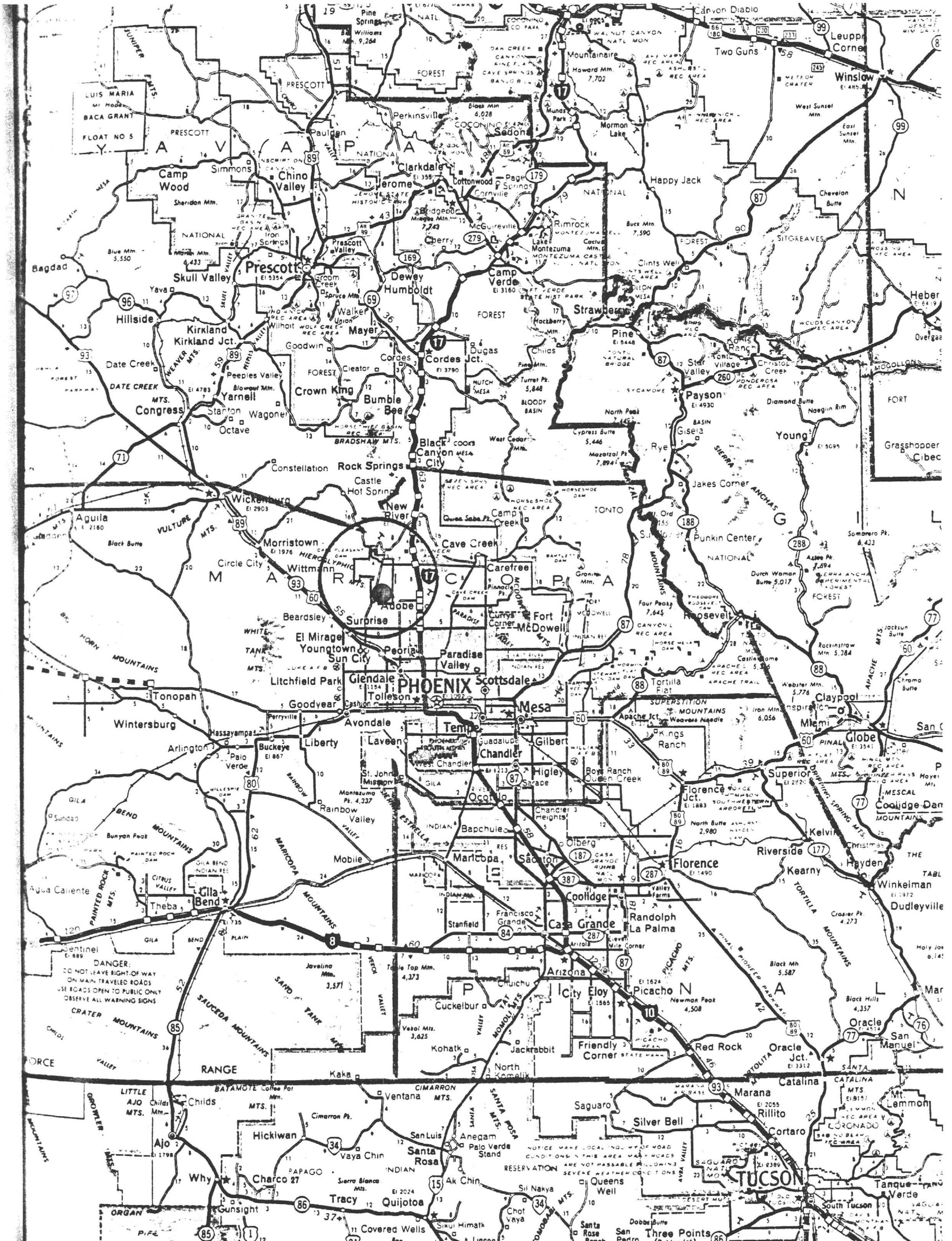
GENERAL

Values are disappointly low in many places where the ore looks good and where free gold was seen close by. Until adequate openings in new ore can be driven - underground and the entire mine - including the 400 level, properly sampled, no reliable estimates can be made of grade or amount of ore. In spite of low values encountered in this preliminary sampling, I feel that the mine can be made to pay if properly managed.

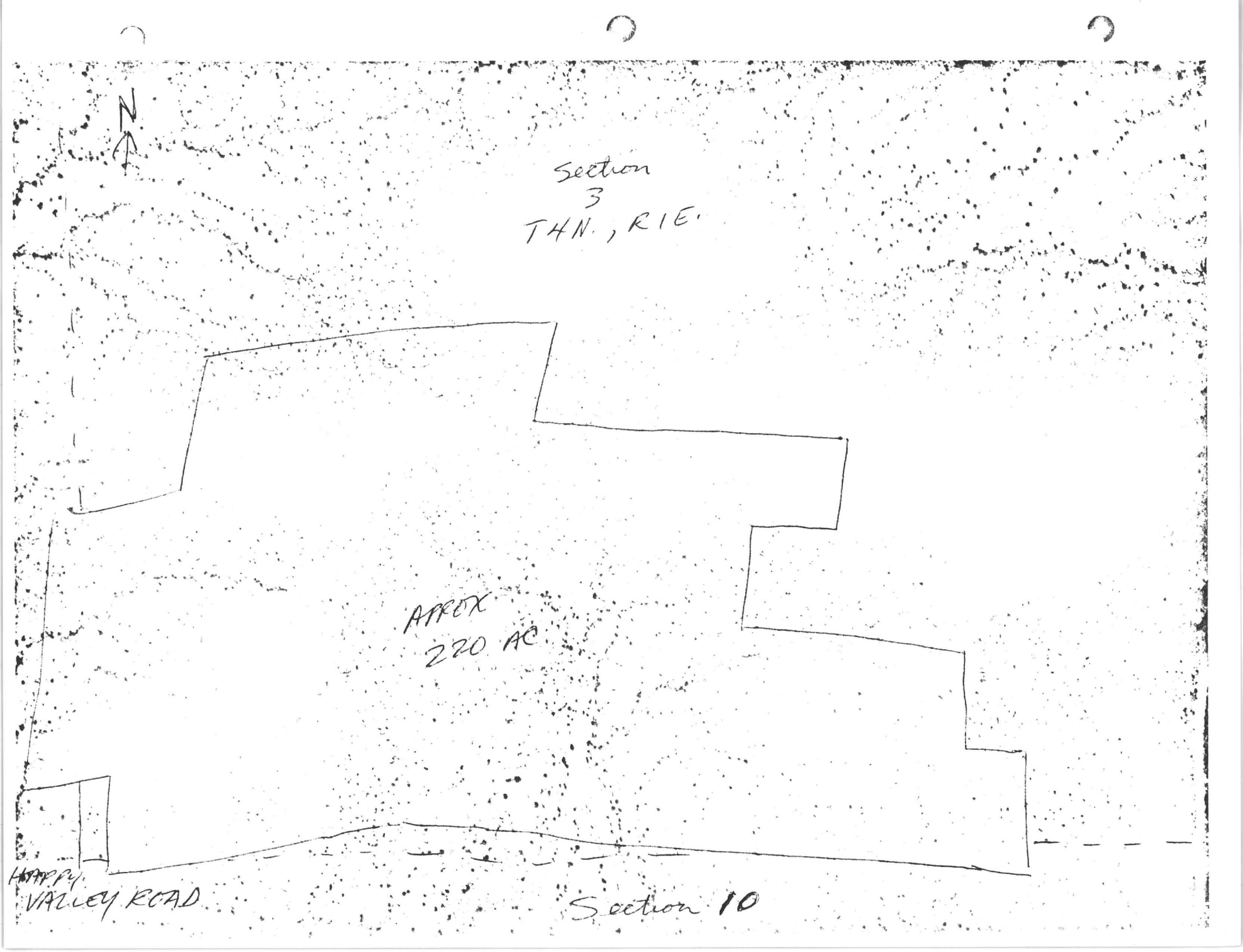


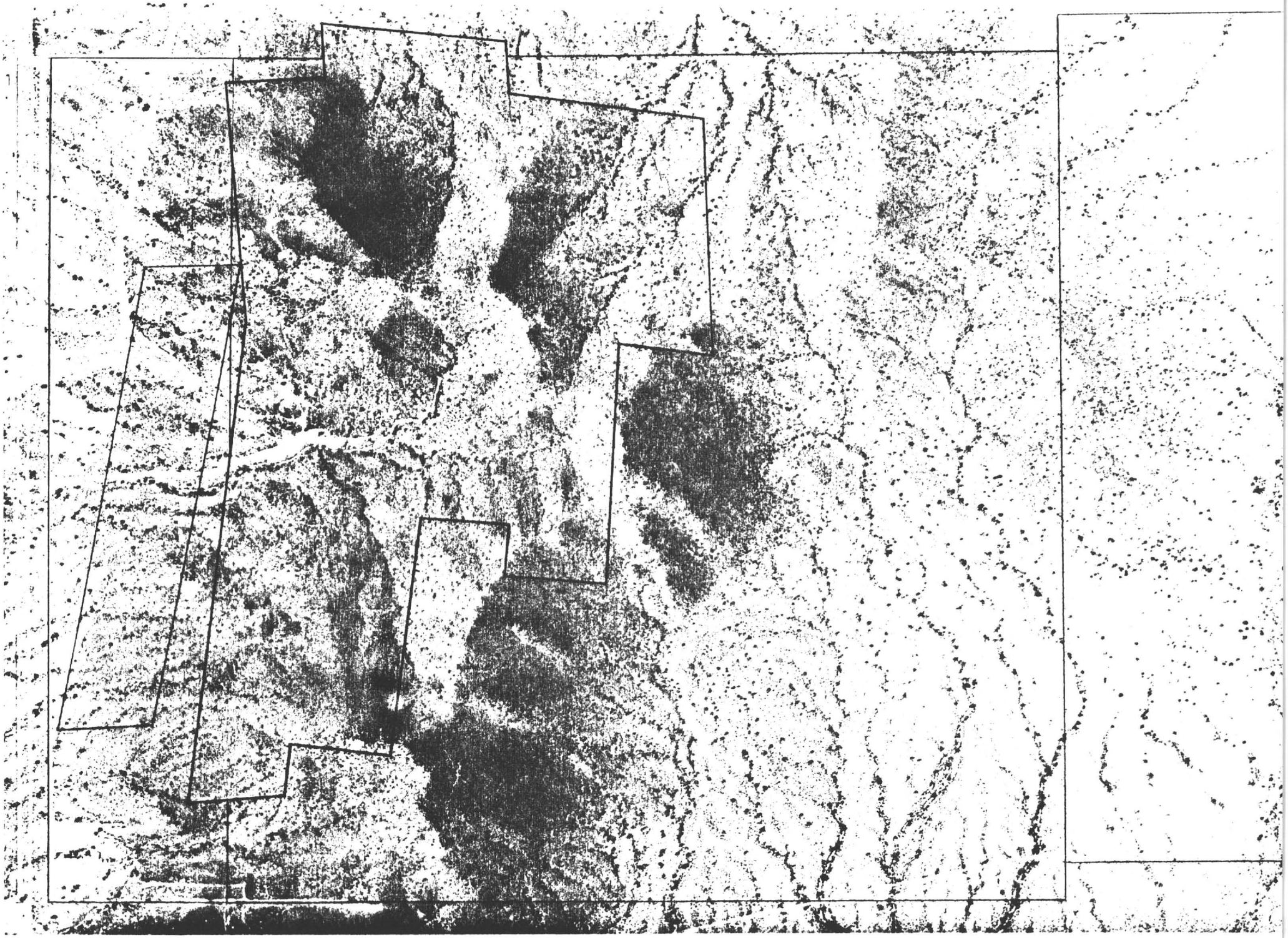
ISE RELIEF MINES INC.
SCALE 1"=50'
DAVID KILE
SHAFT COLLAR LEVEL
450'
ORE
UNEXPLORED
200' LEVEL
300' LEVEL
400' LEVEL
N

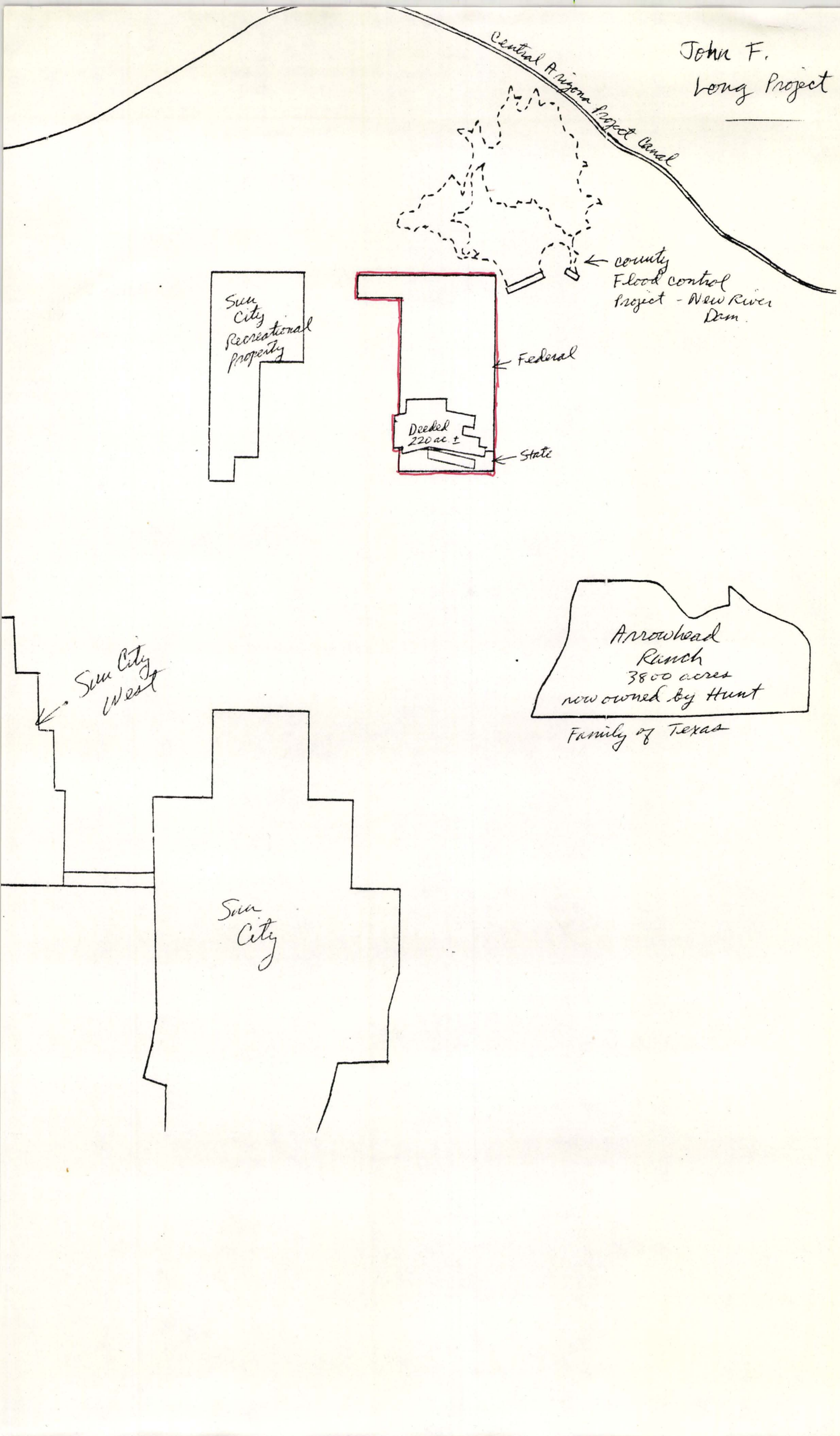

WEST BRITAIN SHAFT
ORE
ORE
ORE
ORE
UNEXPLORED
UNEXPLORED

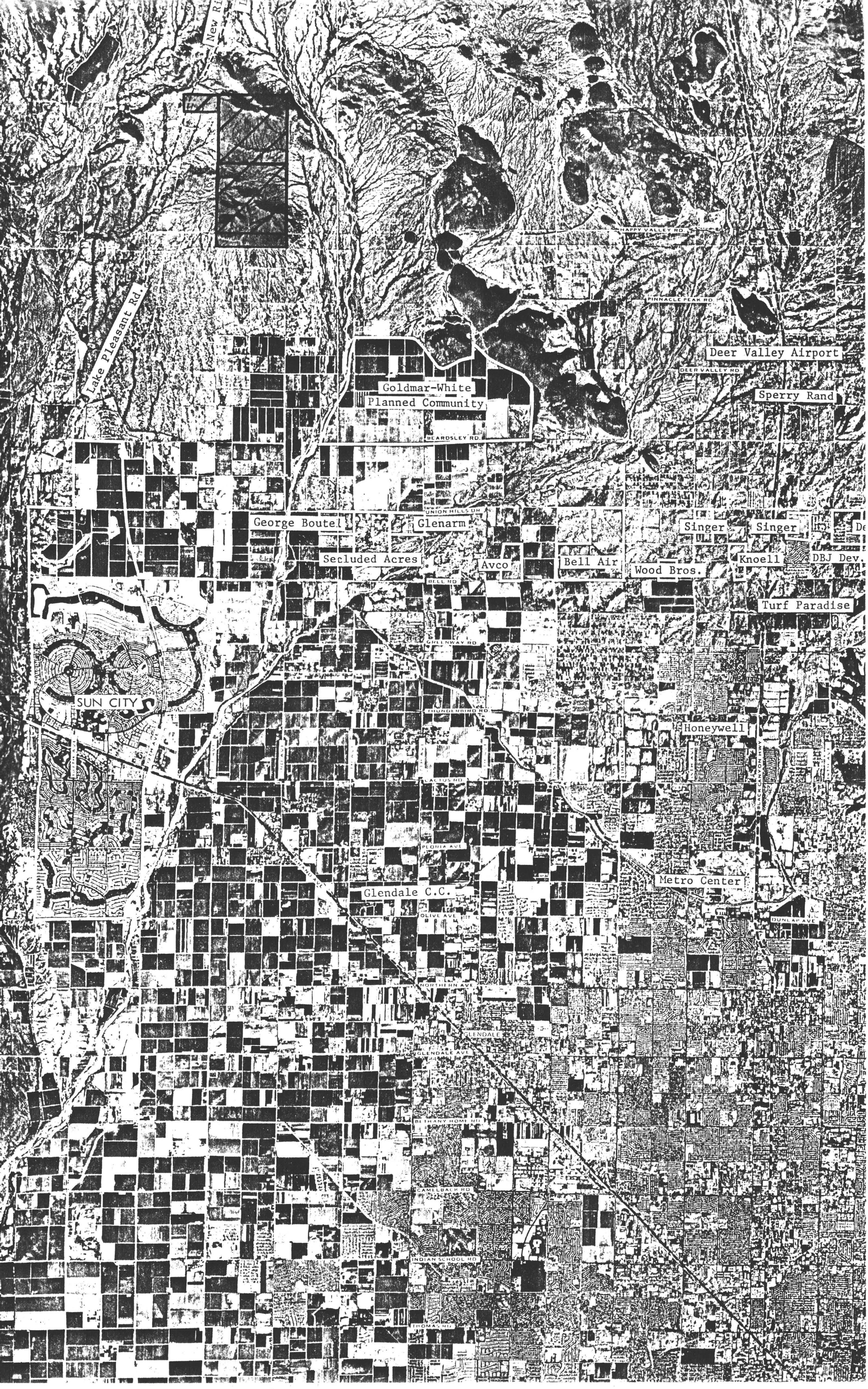


Canyon Diablo
Pine Springs
Bill Williams Mtn. 9,264
Walnut Canyon Natl Mon
Mountainaire
Howard Mtn. 7,702
Two Guns
Leupp Corner
Winslow
Meteor Crater
West Sunset Mtn.
East Sunset Mtn.
Luis Maria Baca Grant Float No 5
Juniper Mts.
Prescott
Forest
Perkinsville
Black Mtn 6,028
Coconino
Sedona
Munds Park
Mormon Lake
Paulden
Chino Valley
Simmons
Camp Wood
Sheridan Mtn.
Clarkdale
Jerome
Cottonwood
Page Springs
Cornville
Happy Jack
National
Chevelon Butte
Bridgeport
Mingus Mtn. 7,743
Cherry
McGuireville
Rimrock
Lake Montezuma
Buck Mtn. 7,590
Iron Springs
Prescott Valley
Sitgreaves
Blue Mtn. 5,550
Bagdad
Prescott
Skull Valley
Yava
Groom Creek
Spruce Mtn.
Dewey
Humboldt
Camp Verde
Clints Well
Hillside
Walker
Mayer
Strawberry
Heber
Kirkland
Kirkland Jct.
Wilhoit
Goodwin
Cordes
Cordes Jct.
Dugas
Pine
Kohls Ranch
Tonto Village
Christopher Creek
Overgaard
Date Creek
Peeples Valley
Cleator
Star Valley
Mogollon
Crown King
Bumble Bee
Turret Pk. 5,848
Bloody Basin
Payson
Diamond Butte
Fort
Yarnell
Congress
Stanton
Wagoner
Octave
Bradshaw Mts.
Black Canyon City
West Cedar Mtn.
North Peak 7,449
Gisela
Young
Grasshopper
Cibecue
Cypress Butte 5,446
Mazatzal Pk. 7,894
Rye
Constellation
Rock Springs
Castle Hot Springs
Jakes Corner
Tonto
Wickenburg
Aguila
Vulture Mts.
Black Butte
New River
Camp Creek
Morristown
Cave Creek
Circle City
Wittmann
Carefree
Punkin Center
Sombrero Pk. 6,433
Maricopa
Dutch Woman Butte 5,017
Adobe
Four Peaks 7,645
Roosevelt
Fort McDowell
Beardsley
Surprise
White Tank Mts.
El Mirage
Youngtown
Sun City
Peoria
Paradise Valley
Glendale
Phoenix
Scottsdale
Tortilla Flat
Rockinstraw Mtn. 5,384
Litchfield Park
Tolleson
Tonopah
Goodyear
Avondale
Mesa
Apache Jct.
Superstition Mountains
Iron Mtn. 6,056
Claypool
Miami
Globe
Wintersburg
Hassayampa
Tempe
Guadalupe
Gilbert
Kings Ranch
Arlington
Palo Verde
Buckeye
Liberty
Laveen
Chandler
West Chandler
Higley
Boyce Thompson Southwestern Arboretum
Queen Creek
Superior
St. John Mission
Sacaton
Florence Jct.
Montezuma Pk. 4,337
Rainbow Valley
Ocotillo
Chandler Heights
Gila Bend Mountains
Sundad
Bunyan Peak
Bapchule
North Butte 2,980
Kelvin
Riverside
Christmas
Hayden
Maricopa Mountains
Mobile
Maricopa
Sacaton
Olberg
Florence
Kearny
Winkelman
Dudleyville
Agua Caliente
Painted Rock Mts.
Theba
Gila Bend
Coolidge
Valley Farms
Stanfield
Francisco Grande
Casa Grande
Randolph
La Palma
Crozier Pk. 4,273
Sentinel
Eleven Mile Corner
Danger: Do not leave right-of-way on main traveled roads. Use roads open to public only. Observe all warning signs
Javelina Mtn. 3,571
Table Top Mtn. 4,373
Chuichu
Arizona City
Eloy
Picacho
Newman Peak 4,508
Black Mtn 5,587
Black Hills 4,357
Oracle
San Manuel
Crater Mountains
Sauceda Mountains
Sand Tank Mts.
Cuckelbur
Vekol Mts. 3,625
Kohatk
Jackrabbit
Friendly Corner
Red Rock
Oracle Jct.
Range
Kaka
North Komelik
Catalina
Catalina Mts.
Mt. Lemmon
Coronado
Little Ajo Mts.
Childs Mtn.
Childs
Batamote Coffee Pot Mtn.
Ventana
Cimarron Mts.
Saguaro
Marana
Rillito
Silver Bell
Cortaro
Hickiwan
Cimarron Pk.
San Luis
Santa Rosa
Anegam
Palo Verde Stand
Vaya Chin
Ajo
Why
Charco 27
Papago Indian Reservation
Sierra Blanca Mts.
Ak Chin
Sil Nakya
Queens Well
Notice: Make local inquiry of road conditions. In this area many roads are not passable following severe weather conditions
Tucson
Tanque Verde
South Tucson
Gunsight
Tracy
Quijotoa
Organ Pipe
Covered Wells
Sikul Himatk
Chot Vaya
Santa Rose Ranch
San Pedro
Three Points


N
Section
3
T4N., R1E.
APPROX
220 AC
HAPPY
VALLEY ROAD
Section 10




John F.
Long Project
Central Arizona Project Canal
county
Flood control
Project - New River
Dam
Sun
City
Recreational
property
Federal
Deeded
220 ac ±
State
Arrowhead
Ranch
3800 acres
now owned by Hunt
Family of Texas
Sun City
West
Sun
City



New Ri
Lake Pleasant Rd.
Happy Valley Rd
Pinnacle Peak Rd
Deer Valley Airport
Deer Valley Rd
Sperry Rand
Goldmar-White
Planned Community
Beardsley Rd
Union Hills Dr
George Boutel
Glenarm
Singer
Singer
Secluded Acres
Avco
Bell Air
Wood Bros.
Knoell
DBJ Dev.
Bell Rd
Turf Paradise
Greenway Rd
Thunderbird Rd
SUN CITY
Honeywell
Actus Rd
Black Canyon Hwy
Peoria Ave
Metro Center
Glendale C.C.
Olive Ave
Dunlap Ave
Northern Ave
Glendale
Glendale Ave
Bethany Home Rd
Camelback Rd
Indian School Rd
Thomas Rd

The enclosed material covers all available data on the past operations as well as recent sampling efforts:

I. Recent Studies: underground sampling - 1973; preliminary tailings/dump sampling - 1980.

II. Relief Gold Mining Company prospectus and survey report of 1908. Production estimated at approximately 2,500 ounces.

III. Glendale Mining & Milling Company offering prospectus of 1916. Provided the basis and operating structure which later evolved into the 1929 operations.

IV. Sunrise Relief Mines, Inc. workings and sampling, survey, and engineering reports, 1927 to 1929. Production estimated at approximately 3,000 ounces.

Engineer Richard Mieritz has estimated, subject to a thorough sampling program as outlined in his enclosed letter of July 15, 1980, that the present ore body ranges from 50,000 to 100,000 tons, with gold averaging from .2 to .3 ounces per ton. Glendale Mining's prospectus of 1916 confirms this general conclusion with reserves stated at 60,000 tons at an average of 1/3 of an ounce per ton.

REPLY TO:
2940 N. CASA TOMAS
PHOENIX, ARIZONA 85016
TELEPHONE (602) 277-6053

Richard E. Mieritz
MINING CONSULTANT
ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

July 15, 1980

Mr. Michael Tanner
2109 W. Campbell
Phoenix, Arizona, 85015

Re: Relief Gold or
Gold Rush Mining Property

Dear Mr. Tanner:

In response to your telephone request of a few days ago, herewith my estimate of cost to complete a geological examination, conduct a sampling program, complete ore reserve calculations where possible and evaluate the Relief Gold or Gold Rush underground mine located in Maricopa County, Arizona.

As you remember, some work was done on this mine for your father in 1972 but for an entirely diferent purpose. During that time I took seven samples, four of which showed fair to moderate values of gold at todays prices. I also surveyed some on the surface and the 200 Lv. No geological work was done nor was the 300 Lv. surveyed. Inother words, much of the basic work has been completed to move forward on an evaluation of the gold ore potential that may exist at the mine.

I really can not tell you exactly how long such work would consume in time, because I am not sure what problems we may encounter as to accessibility to some of the stopes. As I recall, some of the area was pretty wild-hairy.

My daily Fees are $300.00/ per day plus any expenses as meals, map printing, copying, etc. Assaying of samples would be for your account. If a month of working days (22) is consumed, my charge would be $5,000.- for those days. I mention this in the event that the project would require that much time. I anticipate something less than that, thus the cost would be less. On the other hand, if per chance, more time is required, than the rate per day would be 1/22nd of the monthly rate. I really anticipate 6 days in the field-underground- and about 10 days in the Office.

I must tell you that I am engaged for a project which could take me into the month of September of this year. You have indicated this is fine. Also, I would appreciate if you could obtain the services of John Thompson or somebody to assist me and accompany me.underground--safety reasons.

Sincerely yours,

R. E. Mieritz

REPLY TO:
11031 WHITE MOUNTAIN RD.
SUN CITY, ARIZONA 85351
TELEPHONE (602) 977-1711

Richard E. Mieritz

MINING CONSULTANT

ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

November 14, 1973

Mr. Stan Tanner
Phoenix, Arizona.

Gold Relief Mine Sampling

At your request, I completed a very limited sampling of the Gold Relief Mine stopes between the 300 level and the 200 level on November 10, 1973. The purpose of this sampling was merely to obtain a very general idea of the material which remains in the stope walls since this is where the early mining had been done.

The writer was limited in his sampling of the stope walls due to the steepness of the stopes and the "slick" footwall in some areas, consequently, walls were sampled only where they were accessible.

Six wall samples and one grab sample of stope muck were taken. The discriptions of these samples follows:

	Au-Oz	Ag-Oz	Cu-%
#1147 - 5 foot vertical length, Mod. red FeO_x, CuO_x as malachite, somewhat soft.	0.350	0.23	0.35
#1148 - 3.5 feet vert. length, granitic, siliceous, little FeO_x	0.275	0.33	0.14
#1149 - 6.0 feet, white material above red FeO_x zone. Blackish rock below FeO_x contains CuO_x	0.120	0.05	0.26
#1150 - 4.0 feet below fault gouge, fresh granite, broken, sparse CuO_x.	0.115	0.13	0.15
#1151 - 6.5 feet, siliceous, below fault, orange red FeO_x, altered granite, pebblely. (large sample also for Stan Tanner)	0.080	0.24	0.06
#1152 - 4.5 feet, siliceous granite, yellow-brown FeO_x, some red FeO_x, some CuO_x showing west of sample.	0.055	Tr.	0.06
#1153 - Grab sample of muck in stope, broken, more or less fines.	0.040	0.05	0.03

The location of the samples are shown on the included "Sample Location Map".

The observed geology of the stopes indicates that the gold was present in two or three rock types and that mining was done based on an assay wall and not necessarily on the presence of a particular geologic structure.

It is the writers opinion that the early miners pret[illegible] "[illegible]med" the "good stuff", at least in the present stopes. [illegible] sampling in detail might prove this opinion wrong. However, it is thought that enough material of 1/3 to 1/2 ounce could per[illegible] to satisfy the requirements for the "pilot mill" oper[illegible] day) you have in mind.

Respectfully [illegible]

Professional Engineer [illegible] CATE [illegible]

E.6600

E.6800

E.7000

N.5600

N.5400

Sample-Assay Data

No.	Width	Au-Oz.	Ag-Oz.	Copper %
1147	5.0'	0.35	0.23	0.85
1148	3.5'	0.275	0.33	0.14
1149	6.0'	0.12	0.05	0.26
1150	4.0'	0.115	0.13	0.15
1151	6.5'	0.08	0.24	0.06
1152	4.5'	0.055	Tr.	0.06
1153	grab	0.04	0.05	0.03

Stoped Area 1153

1152

1148 Stoped Area

1147

1151

1149

1150

Winze

Winze

Stoped Area

Black Shaft

400 Lv.

400 Lv. Xcut

200 Lv.

200 Lv.

I.P.1

I.P.2 1440.00

Main Shaft

Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
RICHARD E. MIERITZ
No. 31,
ARIZONA, U.S.A.

SAMPLE LOCATION MAP

RELIEF GOLD MINE

MARICOPA COUNTY, ARIZONA

SCALE: 1" = 40FT.

NOV. 1973

R. E. MIERITZ

Preliminary Sampling of Tailings/Dumps

A brief survey of the tailings and dump material remaining from past operations was conducted in January of 1980. The results are:

I. Tailings:

Mound #1 -	approx.	3,400	tons	X average	.0547	oz./ton	= 185.98 oz.
Mound #2 -	"	8,000	"	X "	.014	"	= 112.00 oz.
Mound #3 -	"	14,250	"	X "	.0351	"	= 500.18 oz.
Mound #4 -	"	5,000	"	X "	.0367	"	= 183.50 oz.
Totals		30,650	tons				981.66 oz.

Overall average ounces of gold per ton, .032

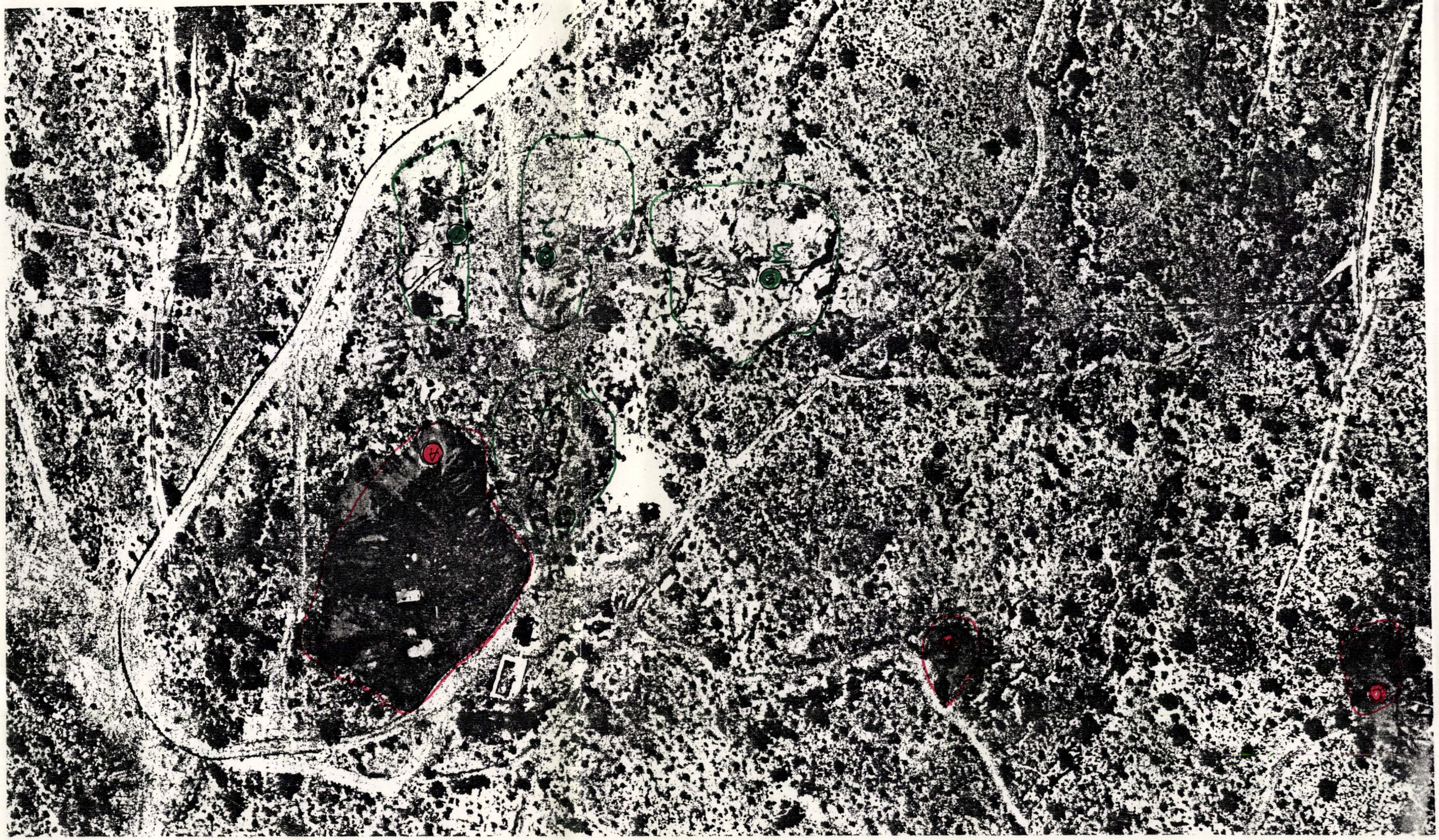
II. Dumps:

Mound A - (Samples R3 & R4)	approx.	40,000	tons	X average	.064	oz./ton	= 3,040.00 oz.
Mound B - (Sample R2)	approx.	100	"	X "	.072	"	= 7.20 oz.
Mound C (Sample R1)	"	2,500	"	X "	.004	"	= 10.00 oz.
Totals		42,600	tons				3,057.20 oz.

Overall average ounces of gold per ton, .072

Note: a later sampling of material screened at 3/8" minus from a trench cut in Mound A disclosed a range of a trace to .016 oz./ton. This indicates that a thorough sampling with various screen sizes is needed to determine reliable ore reserve figures.

The metallurgical tests necessary to determine the recoverability of the gold indicated in the tailings and dump material have not been conducted as of January, 1981.


A
B
C
D
E

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978, WALTER G. STALLER, Date Signed, ARIZONA, U.S.A.

ASSAY MADE FOR: John B Thompson
8013 E Palm Lane
Scottsdale, AZ

Jan. 14, 1982

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
01-5-1	R #1	.004						
2	R #2	.072						
3	R #3	.050	Nil					
4	R #4	.078						

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978, WALTER G. STALLER, Date Signed, ARIZONA, U.S.A.

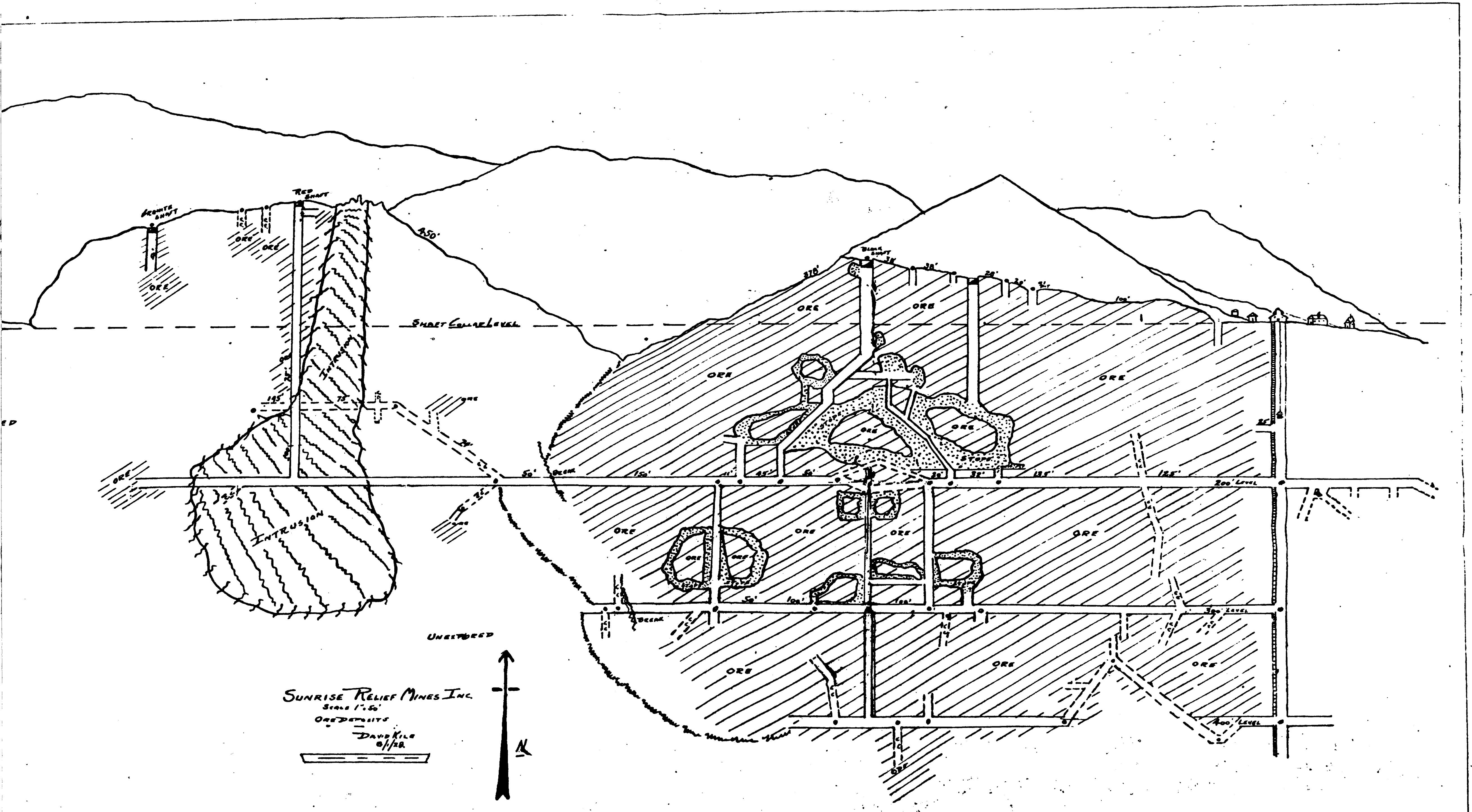
ASSAY MADE FOR: John B Thompson
8013 E. Palm Lane
Scottsdale, Ariz

Jan. 14, 1982

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
12-27-17	#I 0-2'	.032						
18	#I 2'-4'	.026						
19	#I 4'-6'	.106						
20	#4 0-4'	.040						
21	#4 4-8'	.028						
22	#4 8-11'	.042						
23	#2	.014						

CHARGES $33.25

ASSAYER


Granite Shaft
Red Shaft
Shaft Collar Level
450'
200' Level
300' Level
400' Level
Intrusion
Stope
Unexplored
ORE
Sunrise Relief Mines Inc
Scale 1" = 50'
Ore Deposits
David Kile
8/1/28

PLAN FOR REOPENING AND DEVELOPMENT

This type of deposit requires very careful mining with strict technical and economic control. Careless or inexperienced management will surely cause a quick loss. Present exposed values are so low that it will require nerve and a firm hand to force development at the proper points.

Investment must be kept as low as possible - providing only essential equipment with every item chosen for its known efficiency.

Development must be started at points of known ore or known "indicators" - which may be more important. A proper technical record must be kept to assist in intelligent planning of further development.

I recommend the following:-

REOPENING 1. Build and equip camp and cookhouse, with water supply - Desert tent houses for 10 men.

2. Install mine accounting system with proper cost analysis.

3. Build blacksmith shop and framing shed - wood frame and sheet iron.

4. Install complete set of hand tools - mine, blacksmith and carpenter.

5. Install sampling equipment - crusher, grinder, etc.

6. Trace and white print present mine map.

   Purchase necessary drafting equipment and supplies. Survey and map surface area 500' wide from a point 500' East of shaft to West end line of property, controlling by triangulation. On this map impose co-ordinates, show 10' contours, all openings, geologic structure, surface sampling, and prepare to tie to the underground survey.

7. Catch up Black shaft, stope and Chute 14, and make a safe and easy manway to the 200 level.

   At a point on this manway, above old stopes about 100' above the 200 level, cut a station, and open a chute to the 200 West.

8. At the Black shaft collar install a 5 oz., 12" Blower, with 6 H.P. engine, 4-way gates, and 12" air pipe. Extend this air pipe to face of 200 West.

9. Carry a line from new survey down the manway (7), check old survey and extend to all faces. Coincident with other work check survey [illegible]

mine on flat on crosscut, plotting all geologic structure and surveys.

10. Complete sampling of all surface openings and begin a systematic sampling of all workings as fast as opened, starting with cross cuts and drifts on 400 level.

11. Catch up Main shaft collar, install 15 H.P. hoist and adequate headframe. Straighten and retimber to 200 level.

12. Put 200 level West in good order and lay track to face of main drift.

The mine is then ready for actual development and the 200 level West should be the first point of attack, hoisting thru the main shaft and using the new Winch shaft manway.

DEVELOPMENT PLAN

1. With the new surface survey and the extended and verified underground survey as a guide extend the 200 level West into Area 3 W. Drift and crosscut to open the fracture zone found on surface. Develop this ore when found to its limits and sink a winze at the most favorable point.

2. Sink a winze from the 200 W on fracture zone at 277' West of Chute 15.

3. After sampling at 5' intervals for 150' West from Chute 15 on the 200 West, raise on the best ore found.

4. Extend crosscut 2 S on 200 West to cut fracture zone found in cut A on surface.

5. From new station at 100' West in new Winch shaft manway drift East and West, cross-cutting to limits of ore. Drop raise to 200 level. Handle tools and men thru manway.

6. During period of 2-3-4-5 clean out one of the raises between the 200 level West and the 100 West and put in a safe manway.

Straighten and retimber Main shaft from 200 to 300.

Put 300 level in order and lay track to face.

Sample 300 level and start development guided by the sampling and by the results of the 200 West work.

Sheet Seven.

D-7

7. Successively open the 400 and 500 levels as rapidly as possible consistent with justification found on the upper levels, following ore down with winzes. At first particular attention should be paid to the orebody in Area 1 W. The map indicates the possibility of very good ore on the 300 West and it is reported that good ore was opened but not followed on the 400 West. No work was done on the 300 where ore could be expected.

It is my impression that given proper funds the above plan will permit starting actual development on ore within 60 days from date of beginning work - and also that a few months work along this plan will expose really valuable ore and justify the hazard.

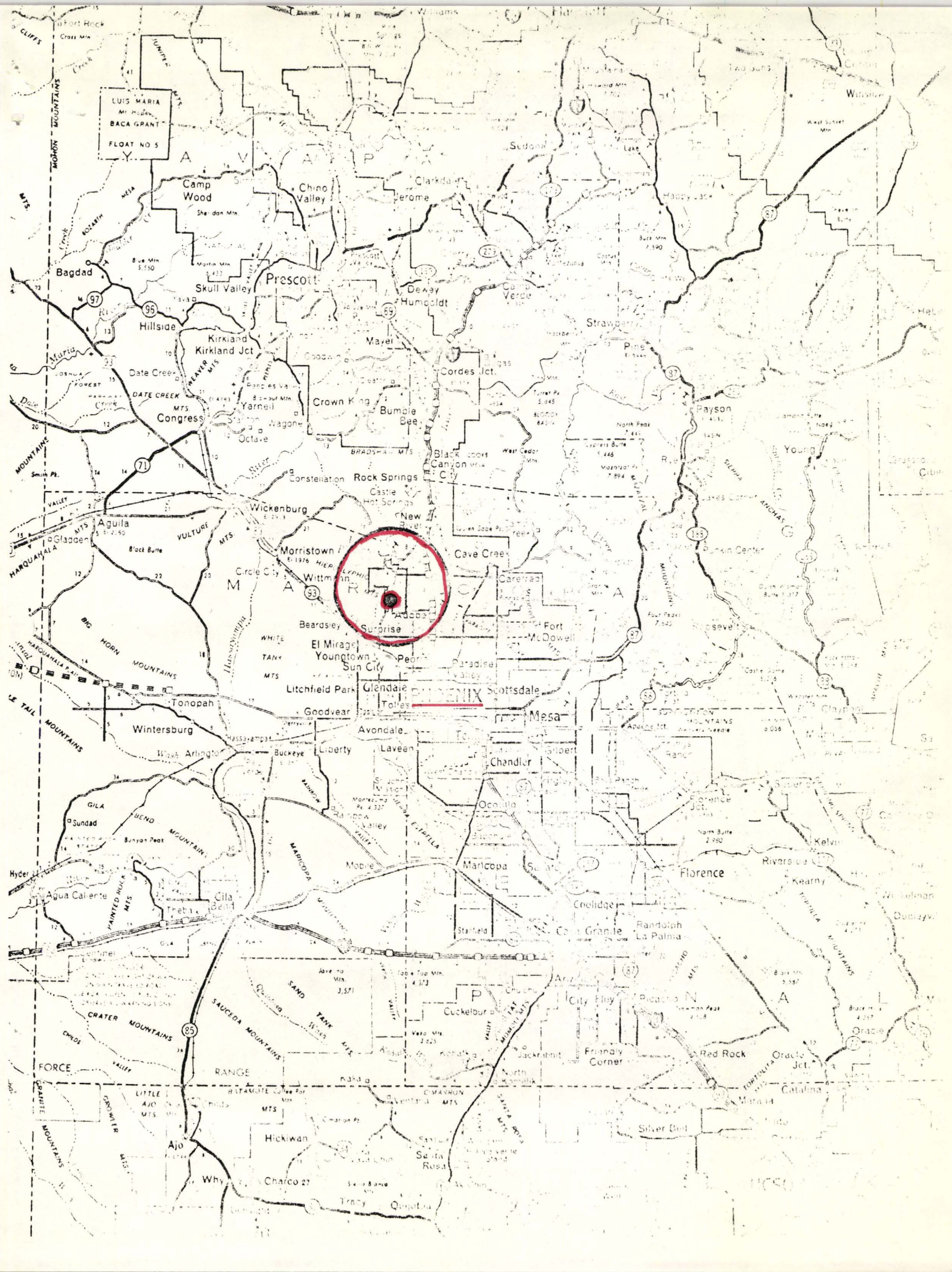
Very truly yours

R. L. Dickinson

THE SUNRISE RELIEF GOLD MINE PROPERTY

MINERAL STUDIES SUPPLEMENT

2109 West Campbell Avenue
Phoenix, Arizona 85015
(602) 279-3613



Fort Rock
CLIFFS
Cross Mtn
MOHON MOUNTAINS
JUNIPER MTS.
LUIS MARIA
BACA GRANT
FLOAT NO 5
Y A V A P A I
Camp Wood
Chino Valley
Clarkdale
Jerome
Sedona
Happy Jack
Two Guns
Winslow
Bagdad
Skull Valley
Prescott
Dewey
Humboldt
Camp Verde
Hillside
Kirkland
Kirkland Jct
Mayer
Strawberry
Pine
Date Creek
DATE CREEK
WEAVER MTS
Yarnell
Congress
Octave
Crown King
Bumble Bee
Cordes Jct.
Payson
Young
BRADSHAW MTS
Black Canyon City
Constellation
Rock Springs
Castle Hot Springs
Wickenburg
Aguila
Gladden
VULTURE MTS
HARQUAHALA MTS
New River
Morristown
Wittmann
Circle City
Cave Creek
Carefree
Punkin Center
M A R I C O P A
Beardsley
Surprise
Adobe
El Mirage
Youngtown
Sun City
Peoria
Paradise Valley
Fort McDowell
Roosevelt
BIG HORN MOUNTAINS
WHITE TANK MTS
Litchfield Park
Glendale
PHOENIX
Scottsdale
Tolleson
Goodyear
Mesa
Tonopah
Wintersburg
Avondale
Hassayampa
Arlington
Buckeye
Liberty
Laveen
Chandler
Gilbert
Apache Jct.
Claypool
Globe
Miami
Florence Jct.
Kelvin
GILA BEND MOUNTAINS
Sundad
Bunyan Peak
Ocotillo
Maricopa
Mobile
Rainbow Valley
Riverside
Florence
Kearny
Hyder
Agua Caliente
PAINTED ROCK MTS
Gila Bend
Theba
Coolidge
Casa Grande
Randolph
La Palma
Stanfield
Sand Tank Mts
SAUCEDA MOUNTAINS
CRATER MOUNTAINS
P
Eloy
Picacho
N
A
L
Oracle
Red Rock
Oracle Jct.
Friendly Corner
Jackrabbit
FORCE
RANGE
Catalina
LITTLE AJO MTS.
Ajo
Hickiwan
Santa Rosa
Silver Bell
Why
Charco 27
Quijotoa

The Sunrise Relief Gold Mine Property, Maricopa County, Arizona, is approximately 45 minutes by car from downtown Phoenix. The property has been operated on several occasions beginning in the late 1800s with two major efforts yielding the bulk of the gold recovered.

The first of those two major operations, the "Relief Gold Mining Company" began around the year 1900 and ended in about 1912. The second, "Sunrise Relief Mines, Inc." began in 1929 and ceased in about 1933 when the ore became unmarketable at the then-current price of gold at $22 per ounce. The property has not been in operation since that time.

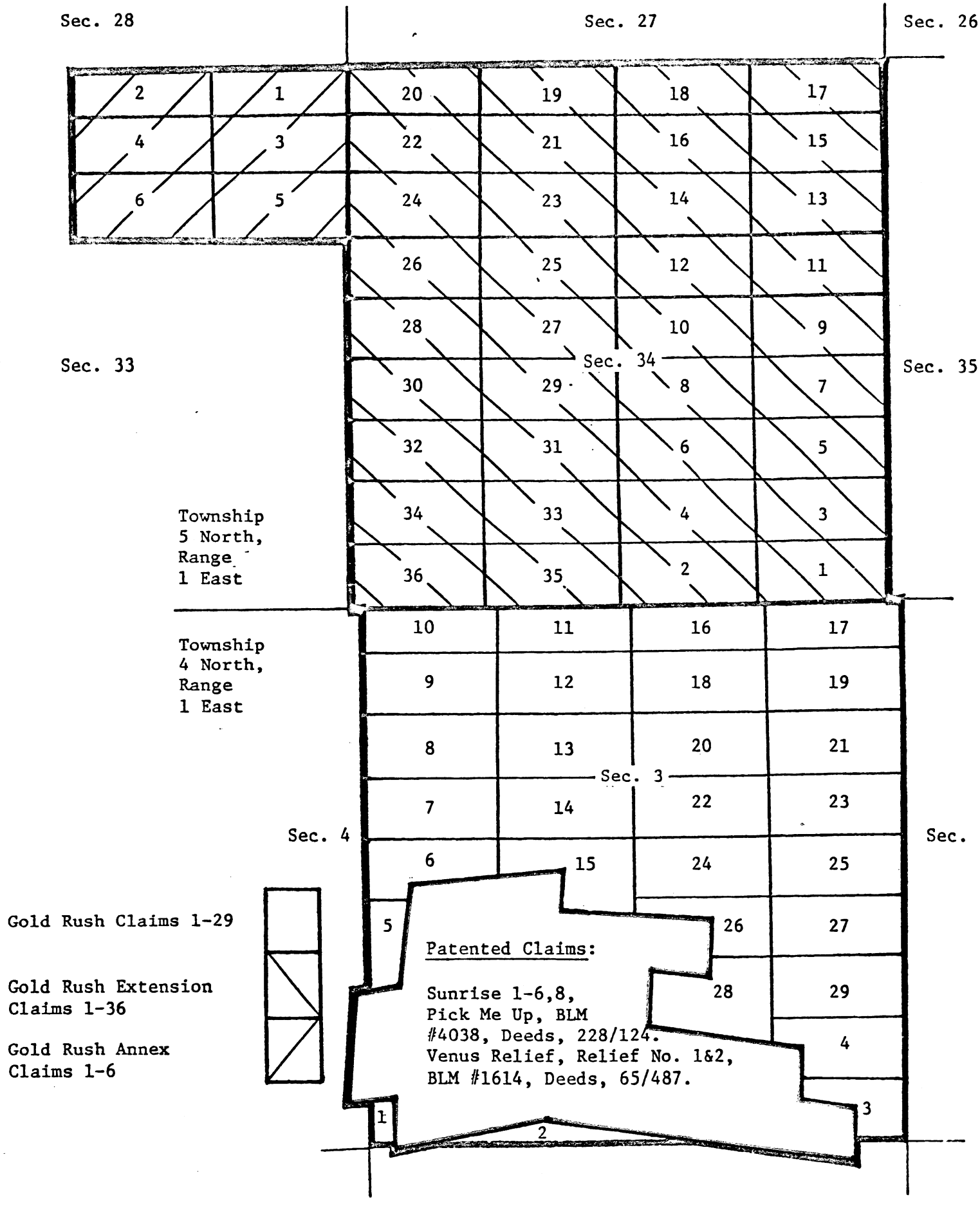
Purchased in 1970 as a real estate investment, the present owners, prompted by the recent upsurge in gold prices, have only in the past year begun to consider the mineral potential , hence this compilation of data.

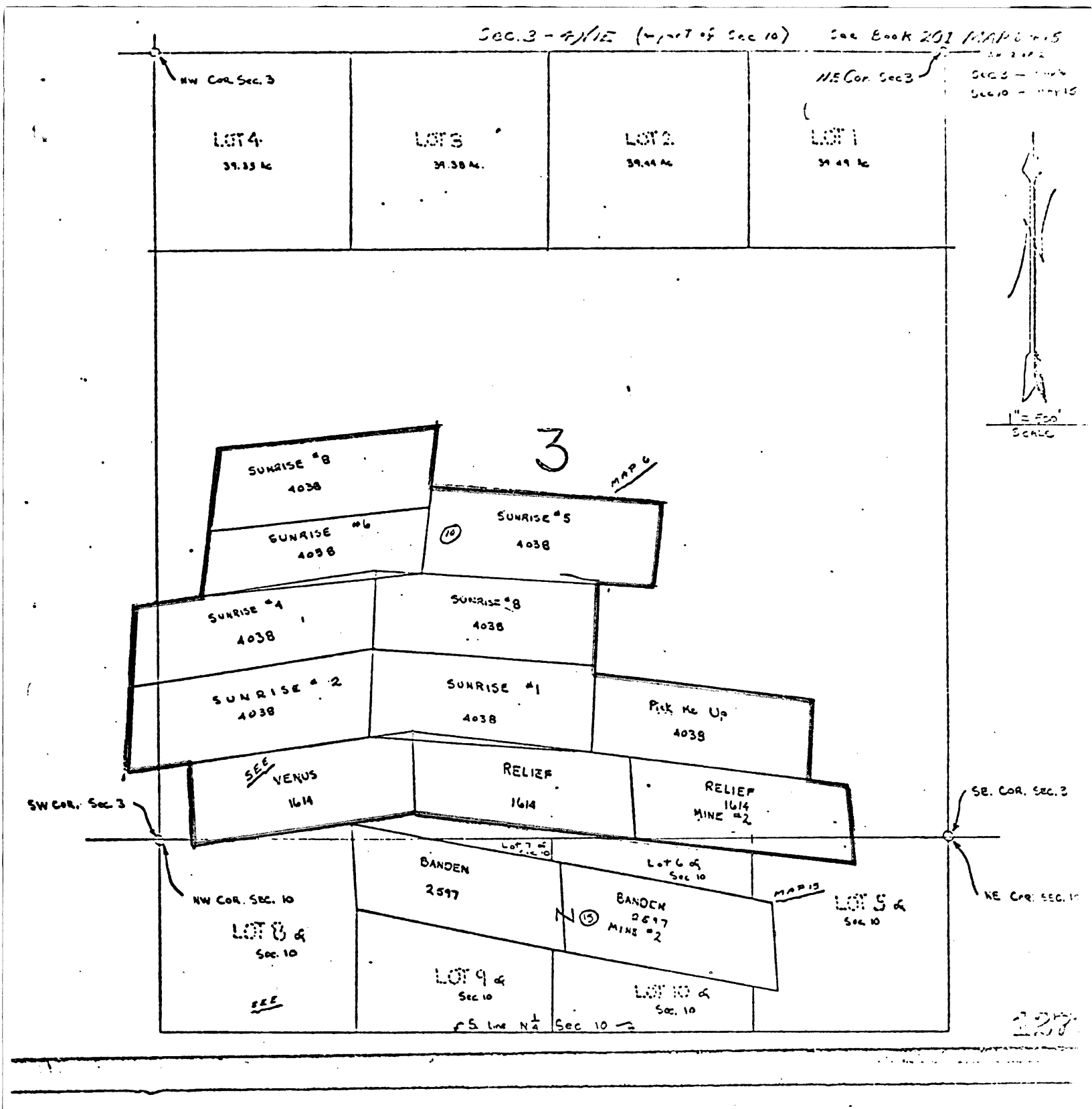
The Sunrise Relief Gold Mine Property consists of 220 acres of patented claims with 71 adjacent unpatented claims on Federal land totaling approximately 1150 acres.

In addition, an irregular parcel of State land adjacent to the South, totaling about 113 acres, is covered by a mineral prospecting permit now in process.

The following map is the official map of the property as recorded in 1980 with Maricopa County and the Bureau of Land Management.

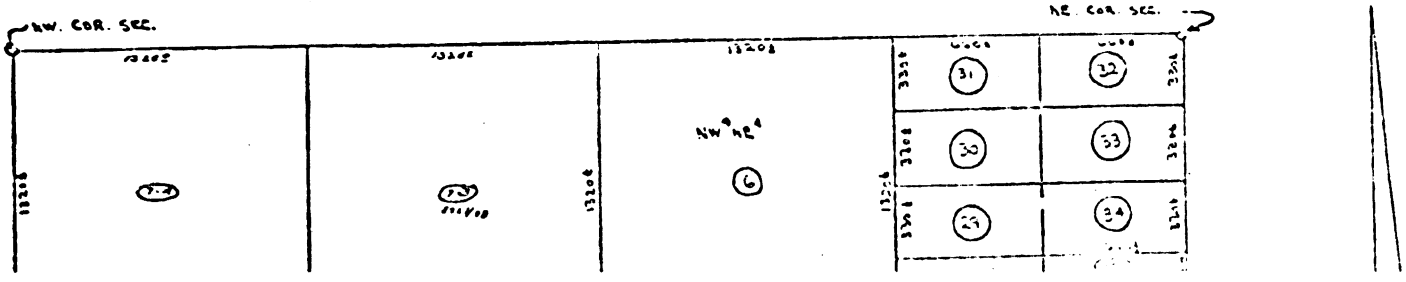
Exhibit "B"





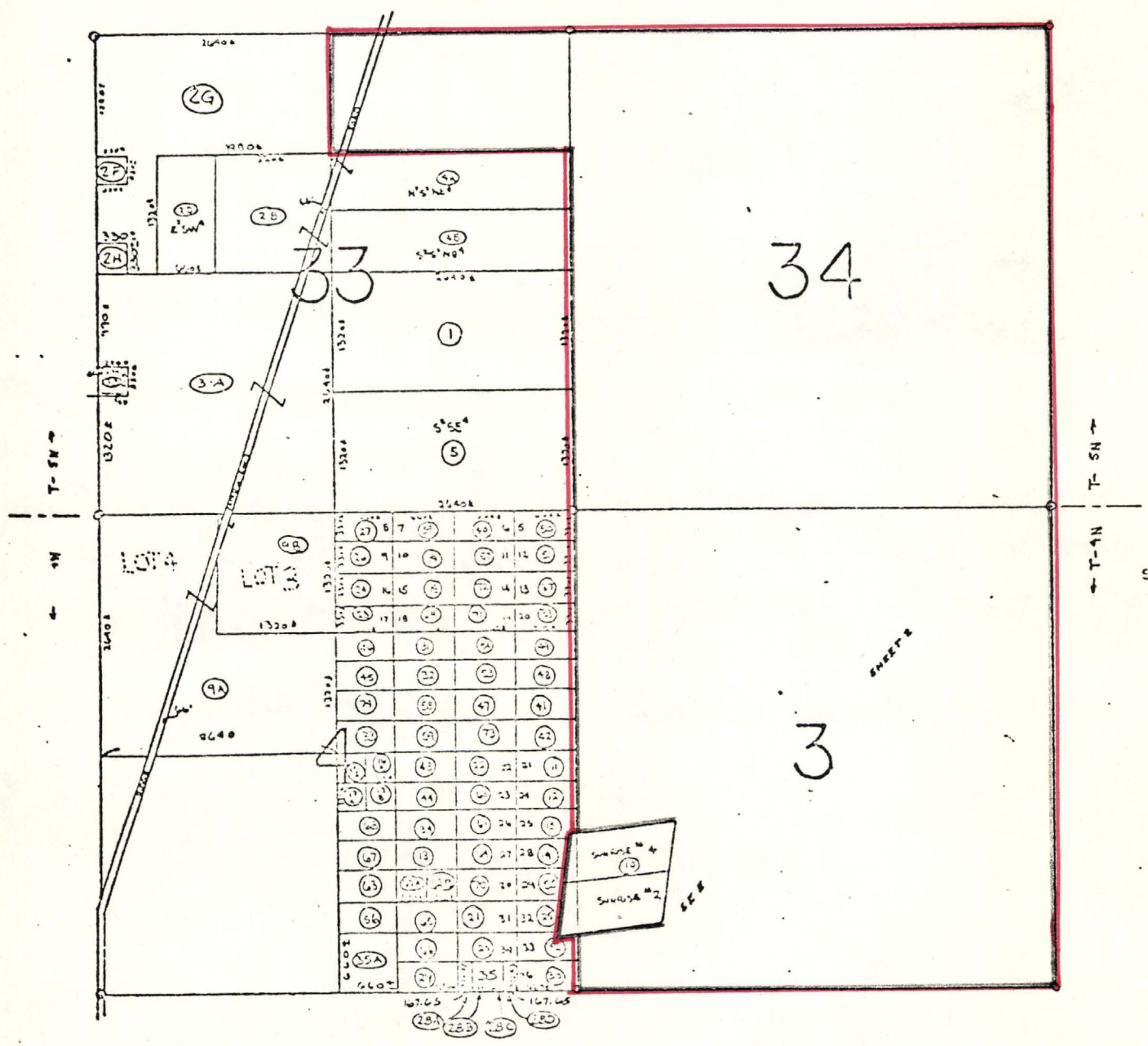
BOOK
MAP

SECTION 9, T-4N, R-1E



PART OF T-5N,R-1E; SECTIONS 33,34
PART OF T-4N,R-1E; SECTIONS 3,4

BOOK 20
MAP 6



BOOK 20
MAP 7

PART OF T-5N,R-2E
SECTIONS 31,32

The enclosed material covers all available data on the past operations as well as recent sampling efforts:

I. Recent Studies: underground sampling - 1973; preliminary tailings/dump sampling - 1980.

II. Relief Gold Mining Company prospectus and survey report of 1908. Production estimated at approximately 2,500 ounces.

III. Glendale Mining & Milling Company offering prospectus of 1916. Provided the basis and operating structure which later evolved into the 1929 operations.

IV. Sunrise Relief Mines, Inc. workings and sampling, survey, and engineering reports, 1927 to 1929. Production estimated at approximately 3,000 ounces.

Engineer Richard Mieritz has estimated, subject to a thorough sampling program as outlined in his enclosed letter of July 15, 1980, that the present ore body ranges from 50,000 to 100,000 tons, with gold averaging from .2 to .3 ounces per ton. Glendale Mining's prospectus of 1916 confirms this general conclusion with reserves stated at 60,000 tons at an average of 1/3 of an ounce per ton.

I.

RECENT STUDIES

REPLY TO:
2940 N. CASA TOMAS
PHOENIX, ARIZONA 85016
TELEPHONE (602) 277-6053

Richard E. Mieritz
MINING CONSULTANT
ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

July 15, 1980

Mr. Michael Tanner
2109 W. Campbell
Phoenix, Arizona, 85015

Re: Relief Gold or
Gold Rush Mining Property

Dear Mr. Tanner:

In response to your telephone request of a few days ago, herewith my estimate of cost to complete a geological examination, conduct a sampling program, complete ore reserve calculations where possible and evaluate the Relief Gold or Gold Rush underground mine located in Maricopa County, Arizona.

As you remember, some work was done on this mine for your father in 1972 but for an entirely diferent purpose. During that time I took seven samples, four of which showed fair to moderate values of gold at todays prices. I also surveyed some on the surface and the 200 Lv. No geological work was done nor was the 300 Lv. surveyed. Inother words, much of the basic work has been completed to move forward on an evaluation of the gold ore potential that may exist at the mine.

I really can not tell you exactly how long such work would consume in time, because I am not sure what problems we may encounter as to accessibility to some of the stopes. As I recall, some of the area was pretty wild-hairy.

My daily Fees are $300.00/ per day plus any expenses as meals, map printing, copying, etc. Assaying of samples would be for your account. If a month of working days (22) is consumed, my charge would be $5,000.- for those days. I mention this in the event that the project would require that much time. I anticipate something less than that, thus the cost would be less. On the other hand, if per chance, more time is required, than the rate per day would be 1/22nd of the monthly rate. I really anticipate 6 days in the field-underground- and about 10 days in the Office.

I must tell you that I am engaged for a project which could take me into the month of September of this year. You have indicated this is fine. Also, I would appreciate if you could obtain the services of John Thompson or somebody to assist me and accompany me underground--safety reasons.

Sincerely yours,

R. E. Mieritz

REPLY TO:
1634 W. HAZELWOOD STREET
PHOENIX, ARIZONA 85015
TELEPHONE (602) 277 6053

Richard E. Mieritz

MINING CONSULTANT

ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

May 2, 1974

Mr. Stan Tanner
Gold Rush Realty
1306 E. Nicolet
Phoenix, Arizona, 85020

Subject: Relief Gold Mine

Dear Mr. Tanner:

On May 1, 1974 you provided the writer some factual data on the Relief Gold Mine. As part of this data was a geologic and engineering report by a Mr. R. N. Dickinson prepared for Mr. Ezra Thayer. The report carries a date of December 30, 1927.

This report has been reviewed and studied by the writer. It is a good report being thorough, detailed and sensibly prepared. Mr. Dickinsons general theme is cautious exploration and development at minimal costs. The writer believes much of Mr. Dickinsons recommendations for exploration, development and operation were completed between the Main Shaft and the Black Shaft - some ore being produced because of present stope outline changes and some additional drifting and cross-cutting development on the 200 level. What the writer presently fears is that the present stope outlines now represent the limit of economical mineralization in the area between the Main and Black Shafts and from the surface to the 300 level.

Having reviewed the information and having some knowledge of the underground workings resulting from personally surveying and visiting the area, the writer is of the opinion that the future of the mine or the property as a producer lies in the discovery of new mineralized zones or vein structures in the general area and on the surface and (2) possible development of the main ore zone from the 300 level to the 400 level and possibly deeper.

The latter potential requires considerable underground "dead-work" -- thus expensive, even before exploration work could begin. Actually, part of this "dead-work" is a requirement to make the "MINE TOUR" facility a reality, therefor, that phase could bear some of the "ore exploration" "dead-work" cost.

A shaft on the west end of the property indicates some gold mineralization exists. Gold mineralization exists immediately west of the Red Shaft, thus, this area between the two shafts is potential ground. You yourself have mentioned to the writer that other likely occurances were observed during your mule rides over the area.

Probably, the best and most likely mineralization thus becomes the "discovery of new" potential areas -- in virgin ground and close to surface. Most generally, higher grade values could be found from surface to 150 feet in depth.

Any suggested exploration program should be supported by sound reasoning, justifications and suspected targets. The writer has these pre-requisites in mind but since the scope of this letter report is merely generalities, the ramifications of "why" would be space-filling and add nothing at this stage. Thus set aside, the writer believes the following progress should be initiated and completed in their respective order.

(1) complete a surveyed geological surface mapping of the area of interest.
(2) surface trench (dozer and/or blasting) where required to obtain additional geological information.
(3) sample the mineralized zones where exposed on the surface, in cuts and newly made trenchs and other areas where necessary.
(4) diamond drill from surface to explore down dip extensions of suspected targets or good surface showings.
(5) Sample and assay cores where required.
(6) Possibly diamond drill some holes from surface to intersect the "main ore zone" between the 300 and 400 levels in the main mine, and,
(7) sample and assay cores where required.

At the appropriate timing during the above program, completion of other items are necessary, these being, transit and tape survey of the 300 and 400 levels, tying same to the 200 level survey, geologically map the 300 and 400 levels, sample and assay the 400 level where advisable and sample anyplace where required.

Respectfully submitted,

R. E. Mieritz, P.E.
Mining Consultant
Kingman, Arizona.

REPLY TO:
11031 WHITE MOUNTAIN RD.
SUN CITY, ARIZONA 85351
TELEPHONE (602) 977-1711

Richard F. Mieritz

MINING CONSULTANT

ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

November 14, 1973

Mr. Stan Tanner
Phoenix, Arizona.

Gold Belief Mine Sampling

At your request, I completed a very limited sampling of the Gold Belief Mine stopes between the 300 level and the 200 level on November 10, 1973. The purpose of this sampling was merely to obtain a very general idea of the material which remains in the stope walls since this is where the early mining had been done.

The writer was limited in his sampling of the stope walls due to the steepness of the stopes and the "slick" footwall in some areas, consequently, walls were sampled only where they were accessible.

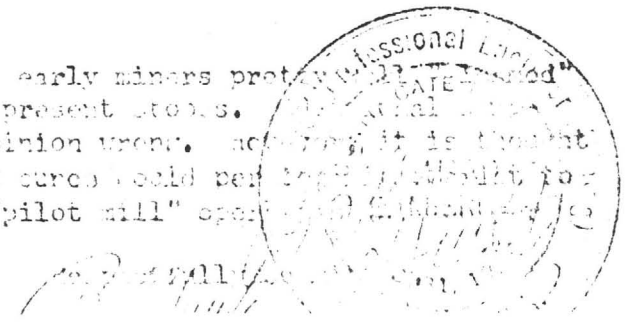
Six wall samples and one grab sample of stope muck were taken. The discriptions of these samples follows:

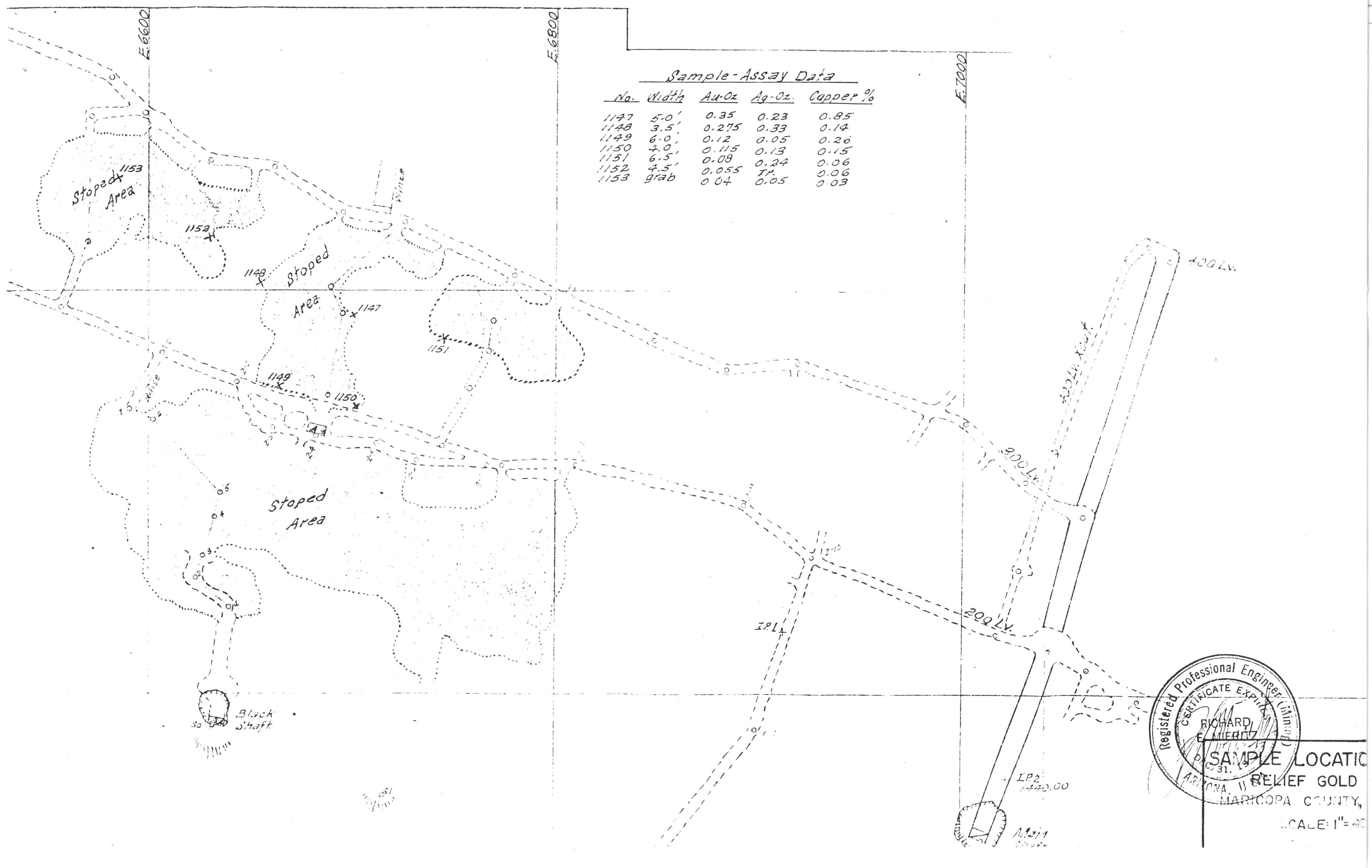
	Au-Oz	Ag-Oz	Cu-%
#1147 - 5 foot vertical length, Mod. red FeO_x, CuO_x as malachite, somewhat soft.	0.350	0.23	0.35
#1148 - 3.5 feet vert. length, granitic, siliceous, little FeO_x	0.275	0.33	0.14
#1149 - 6.0 feet, white material above red FeO_x zone. Blackish rock below FeO_x contains CuO_x	0.120	0.05	0.26
#1150 - 4.0 feet below fault gouge, fresh granite, broken, sparse CuO_x.	0.115	0.13	0.15
#1151 - 6.5 feet, siliceous, below fault, orange red FeO_x, altered granite, pebbely. (large sample also for Stan Tanner)	0.080	0.24	0.06
#1152 - 4.5 feet, siliceous granite, yellow-brown FeO_x, some red FeO_x, some CuO_x showing west of sample.	0.055	Tr.	0.06
#1153 - Grab sample of muck in stope, broken, more or less fines.	0.040	0.05	0.03

The location of the samples are shown on the included "Sample Location Map".

The observed geology of the stopes indicates that the gold was present in two or three rock types and that mining was done based on an assay wall and not necessarily on the presence of a particular geologic structure.

It is the writers opinion that the early miners prot[illegible]ed" the "good stuff", at least in the present stopes. [illegible] line in detail might prove this opinion wrong. [illegible] that enough material of 1/3 to 1/2 ounce gold per ton [illegible] satisfy the requirements for the "pilot mill" spec[illegible] day) you have in mind.





Sample-Assay Data

No.	Width	Au-Oz.	Ag-Oz.	Copper %
1147	5.0'	0.35	0.23	0.85
1148	3.5'	0.275	0.33	0.14
1149	6.0'	0.12	0.05	0.26
1150	4.0'	0.115	0.13	0.15
1151	6.5'	0.08	0.24	0.06
1152	4.5'	0.055	Tr.	0.06
1153	grab	0.04	0.05	0.03

Preliminary Sampling of Tailings/Dumps

A brief survey of the tailings and dump material remaining from past operations was conducted in January of 1980. The results are:

I. Tailings:

Mound #1 -	approx.	3,400	tons	X	average	.0547	oz./ton	= 185.98 oz.
Mound #2 -	"	8,000	"	X	"	.014	"	= 112.00 oz.
Mound #3 -	"	14,250	"	X	"	.0351	"	= 500.18 oz.
Mound #4 -	"	5,000	"	X	"	.0367	"	= 183.50 oz.
Totals		30,650	tons					981.66 oz.

Overall average ounces of gold per ton, .032

II. Dumps:

Mound A - (Samples R3 & R4)	approx.	40,000	tons	X	average	.064	oz./ton	= 3,040.00 oz.
Mound B - (Sample R2)	approx.	100	"	X	"	.072	"	= 7.20 oz.
Mound C (Sample R1)	"	2,500	"	X	"	.004	"	= 10.00 oz.
Totals		42,600	tons					3,057.20 oz.

Overall average ounces of gold per ton, .072

Note: a later sampling of material screened at 3/8" minus from a trench cut in Mound A disclosed a range of a trace to .016 oz./ton. This indicates that a thorough sampling with various screen sizes is needed to determine reliable ore reserve figures.

The metallurgical tests necessary to determine the recoverability of the gold indicated in the tailings and dump material have not been conducted as of January, 1981.

A
1
2
3

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978, WALTER G. STALER, Date Signed, ARIZONA, U.S.A.

ASSAY MADE FOR: John B Thompson, 8013 E Palm Lane, Scottsdale, AZ

Jan. 14, 1980

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
01-5-1	R #1	.004						
2	R #2	.072						
3	R #3	.050	Nil					
4	R #4	.078						

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978 WALTER G. STALER Date Signed ARIZONA, U.S.A.

ASSAY MADE FOR: John B Thompson, 8013 E. Palm Lane, Scottsdale, Ariz

Jan. 14, 1980

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
9i2-27-17	#I 0-2'	.032						
18	#I 2'-4'	.026						
19	#I 4'-6'	.106						
20	#4 0-4'	.040						
21	#4 4-8'	.028						
22	#4 8-11'	.042						
23	#2	.014						

CHARGES $3.25

ASSAYER

II.

RELIEF GOLD MINING COMPANY

circa 1900-1912

A PRODUCING MINE

RELIEF GOLD MINING COMPANY

Mines and Works : : ARIZONA

OFFICE :

20 BROAD STREET

ROOM 1401

NEW YORK CITY

CAPITAL STOCK, $400,000. 40,000 Shares, Par Value, $10.

30,000 Shares, Treasury Stock; with 20,000 Shares still in the Treasury for a Working Capital.

THE MINE IS WELL OPENED AND EQUIPPED WITH REDUCTION MACHINERY

PRESENT EARNING CAPACITY - - - - - $30,000 PER ANNUM

OFFICERS AND DIRECTORS :

Professor GEORGE A. TREADWELL, President, 27 William St., New York City.
WILLIAM G. LELAND, Vice-President, Glens Falls, N. Y.
SCHUYLER S. MOORE, Secretary and Treasurer, 20 Broad St., New York City.
GEORGE HAMLIN, Superintendent, Phoenix, Arizona.
Judge JOHN Q. THAYER, Meriden, Conn.
RICHARD N. SCHOTT, 1849 Eightieth St., Brooklyn, N. Y.
C. EBERHARDT, Madalin, N. Y.
GEORGE A. TWEED, Phoenix, Arizona.
WALTER R. BRISTOL, Meriden, Conn.

LOCATION : The Relief Gold Mining Company's property is located twenty-three miles north-west of Phoenix, Arizona, between the Agua Fria and New Rivers, and fourteen miles from Glendale, our nearest railroad station. Elevation, about 1,400 feet above sea level and about 300 feet higher than Phoenix. There are good wagon roads to the railroad and Phoenix.

MINE : The property consists of six claims—about 120 acres of mineral land. The mine proper is patented ground. The accompanying photograph offers a comprehensive idea of the property, including the surface improvements and underground workings. The surface improvements and development work shown in the picture are located in about the center of the property, as the mill and incline working shaft are but 500 feet east of the center line.

FORMATION : The hill in which this mine is located is composed of coarse granite with black specks of syenite, and the vein matter is quartz, black syenite and granite.

THE VEIN : The vein runs north-east and south-west, ten points north of east and south of west, and the dip varies from thirty-five degrees to forty-five degrees into the hill. The walls are coarse granite with black specks of syenite. The vein varies on the surface from 20 to 40 feet in width, while a crosscut in the 200 foot level is 60 feet long without having reached either of the walls, and in the 500 foot level a crosscut to the south is 328 feet long without having yet reached the footwall.

THE LEDGE : The ledge can be traced for nearly a mile on the surface and the ore taken from the various openings is all of the same general character and average values.

DEVELOPMENT WORK : In addition to breaking down ore in the stopes more than 3,000 feet of development work has been done, consisting of shafts, drifts, crosscuts, air levels, upraises for ventilation and two winzes, including an incline working shaft which is 500 feet in depth, and a crosscut at the bottom of the incline working shaft, 428 feet long.

The mine is well ventilated with two airshafts besides the incline working shaft. The drift in the 200 foot level is 700 feet long, running west from the working shaft, and 75 feet east; while the drift in the 500 foot level is about 500 feet long running west from the shaft.

LEDGES : The ledges in the levels vary from four to twelve feet in width. *In the 200 foot level is an aggregate of 18 feet of ore in five different ledges including one quartz ledge 4 feet in width.*

ORE: The ore is absolutely free milling and the values are found in quartz, black syenite and granite. Extremely high values sometimes are found in the two latter. The general average saving of the ore treated has been about $7.00 per ton.

WATER: Splendid water for domestic and milling purposes is available in the mine and an abundance can be developed for a large reduction plant.

FUEL: We have been using wood for fuel. The price varying from $2.50 to $3.25 per cord. From experiment, we find that coal can be delivered at the mine at a price that will make the expense of burning coal about the same as that of wood, and we shall probably use coal exclusively within a short time.

SURFACE IMPROVEMENTS: The improvements consist of a mill for the reduction of ore, house for hoist, steel water tank, 25,000 gallons capacity, blacksmith and machine shop, metallurgical house, bunk house, cook house and dining room, company's office, corral, etc. All in perfect condition.

MACHINERY: The machinery installed consists of Blake 8 x 10 rock breaker, Allis roughing rolls, Lane 7' mill, amalgamating plates 5 x 10 feet, 50 H. P. boiler, 30 H. P. engine, Cameron pump of 40 gallons per minute capacity, return water pump, etc., and Fairbanks & Morse 12 H. P. gasoline hoist. The Lane slow speed mill is an ideal method for treating our ore as the saving on the copper plates average fully 95 per cent. of the gross values.

EARNINGS OF THE MILL; *We have treated 6,277 tons of ore, from which the saving was $42,264.54, averaging to save about $7.00 per ton on the ore treated; while an average of only about 40 cts. per ton has gone into the tailings. With a 100-ton plant we could mine and treat our ore at an expense of something like $2.25 per ton.*

BULLION: Our bullion is exceedingly fine. The average on the ore treated is 974 fine, and the average received from the United States Mint for the bullion has been $20.20 per ounce out of a possible $20.67 for absolutely pure gold. There is no base metal in our ore.

With the proceeds received from the sale of 10,000 shares of treasury stock, together with the earnings of the mill, our company has developed and equipped a mine with an earning capacity of at least $30,000 per annum with the first unit of our proposed reduction machinery. The mine promises to be a big one and worthy of a larger expenditure of money.

In order to make more rapid progress in developing and equipping the mine so as to put the enterprise on a dividend paying basis as quickly as possible, the Company at the Annual Stockholders' Meeting, held on May 7th, 1907, increased the capitalization from 20,000 shares of the par value of $10.00 each, to 40,000 shares of the par value of $10.00 each, and placed the entire increase of 20,000 shares in the treasury for a working capital; and we now offer a series of convertible certificates for sale with a like amount of the Company's capital stock reserved in the treasury for conversion.

These certificates are to be known as the RELIEF GOLD MINING COMPANY'S CONVERTIBLE CERTIFICATES, registered in the office of the company, payable in gold coin of the United States at the office of the Company in the City of New York on the fifteenth day of January, 1917, and to pay interest in like gold coin semi-annually at said office at the rate of six per cent. per annum on the fifteenth days of January and July in each year, commencing with January, 1908.

These certificates may be called and retired at any time after the expiration of two years from date of issue and before maturity at the option of the Company, by payment in gold as aforesaid. Thirty days notice of the call having first been given to the registered holder thereof.

The certificate may at any time from its date at the option of the holder be converted into a like amount at par value of the capital stock of the Company on demand at the office of the Company upon the surrender of the certificate.

The certificate is transferable on the books of the Company the same as regular stock certificates are.

As said before, our present earning capacity, operating the mill twenty-four hours a day, is at least $30,000 per annum and probably more, and the interest on the convertible certificates can be legitimately paid out of the earnings of the Company.

This plan is undoubtedly an attractive one for it guarantees the investor interest on his money from the time he makes the investment, with the advantage of receiving the benefit of the increased value of the Company's capital stock as the property grows in value.

Only a limited amount of convertible certificates are offered for sale. Those wishing to make a safe investment that will pay handsome returns on the money invested should lose no time in sending in their applications. The investor has the privilege of paying in installments: 25 per cent. with subscription, 25 per cent. within thirty days, and the remaining 50 per cent. within sixty days from the date of subscription.

The money received through the sale of convertible certificates will be used to further develop the ore bodies, install power drills, enlarge the mill capacity to at least 100 tons a day, and for the general benefit of the Company.

For quotations on convertible certificates, address:

SCHUYLER S. MOORE, Secretary and Treasurer,

20 Broad Street, New York City.

RELIEF GOLD MINING COMPANY.

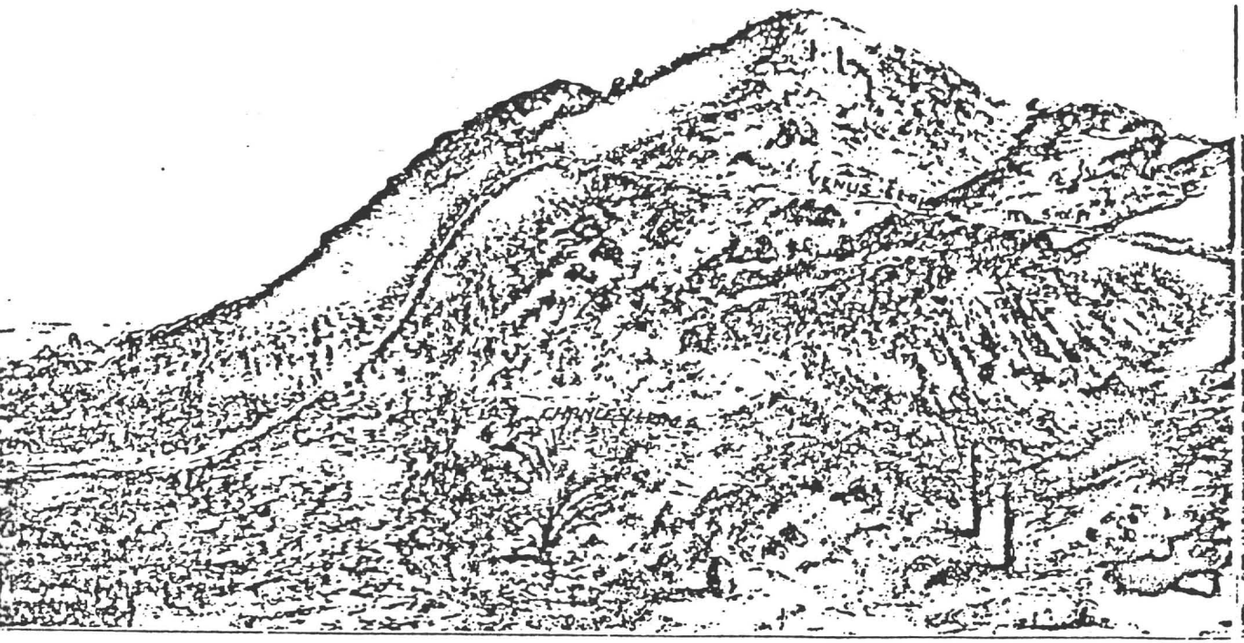
U.S. MINT SERVICE FORM NO. 42 A.

MEMORANDUM OF GOLD DEPOSITED AT THE U. S. MINT

WEIGHT Before Melting Ounces	After Melting Ounces	Fineness	Gold Value	Silver Value	Charges	Net Value
25.24	23.10	.755	361.00	1.23	1.96	360.27
44.70	44.67	$.991^2$	832.45	1.69	2.67	831.47
62.74	62.30	.911	1173.23	1.14	3.60	1170.77
42.92	42.85	.389	787.46	.39	2.79	785.06
35.80	35.71	$.871^2$	643.33	.06	2.49	640.90
77.60	77.45	.931	1490.55		4.25	1486.30
94.75	94.71	$.969^2$	1898.10	.04	4.98	1893.16
31.53	31.50	$.949^2$	618.27	.07	2.32	616.02
56.78	56.75	.989	1160.20		3.38	1156.82
64.14	64.08	.967	1280.93		3.69	1277.24
42.00	41.97	.985	854.57		2.76	851.81
68.55	68.52	.988	1396.60		3.88	1392.72
35.73	35.70	.992¼	732.26		1.07	731.19
50.10	50.07	.994½	1029.34		1.11	1028.23
50.80	50.75	.989	1037.54		3.13	1034.41
73.13	73.10	.993	1500.52		1.15	1499.37
63.92	63.89	$.994^3$	1313.79		1.13	1312.66
38.38	38.35	$.995^2$	789.19		1.08	788.11
47.22	47.19	.996	971.59		1.10	970.49
40.34	40.31	.992¼	826.81		1.08	825.73
43.97	43.94	.978½	888.78		2.85	885.93
46.35	46.32	.988	946.03		2.94	943.09
51.83	51.80	$.985^2$	1055.27		3.17	1052.10
22.72	22.67	.912	427.39		1.95	425.44
29.00	28.97	$.951^2$	569.80		2.22	567.58
43.57	43.54	.960	864.04		2.82	861.22
31.10	31.07	.976	626.85		2.30	624.55
28.74	28.73	.985	584.99		1.20	583.79
34.17	34.15	.979½	691.47		1.24	690.23
26.44	26.42	.983½	538.23		1.18	537.05
32.13	32.11	.920	610.67	.10	2.34	608.43
51.27	51.24	.976½	1034.33		1.36	1032.97
45.66	45.64	.986¼	930.96		1.32	929.64
35.74	35.71	.902½	666.21	1.70	2.50	665.41
46.98	46.96	.982½	953.76		1.32	952.44
56.32	56.28	.989½	1151.19		1.39	1149.80
48.22	48.20	.988½	984.92		1.34	983.58
41.80	41.79	.985	850.92		1.29	849.63
62.64	62.61	.989½	1254.79		1.43	1253.36
54.21	54.17	.983	1100.76		1.38	1099.38
36.51	36.48	.985½	728.07	.16	2.53	725.70
36.52	36.49	.966	728.65	.17	2.53	726.29
34.63	34.60	.971	694.49	.33	2.45	692.37
30.86	30.83	.968½	617.23	.32	2.30	615.25
76.00	75.97	.978½	1536.67	.66	4.21	1533.12
49.32	49.29	.983	1001.58	.31	3.08	998.81
40.63	40.60	.970	814.10	.09	2.70	811.49
50.23	50.20	.980	1016.97	.32	3.12	1014.17
37.91	37.85	.910	712.00	.31	2.59	709.72
52.88	52.85	.983½	1074.47	.24	3.23	1071.48
54.13	54.10	.970½	1085.34	.43	3.28	1082.49
50.33	50.30	.943	980.52	.57	3.12	977.97
74.15	74.12	.924½	1416.50	.52	4.11	1412.91
94.51	94.42	.864	1686.38	.77	4.96	1682.19
70.33	70.30	.973	1413.99		1.49	1412.50
70.40	70.38	.985	1433.06		1.49	1431.57
61.14	61.11	.993	1254.41		1.28	1253.13

2745.18 oz.

$55499.31
at old price
of gold.



PATENTED GROUND

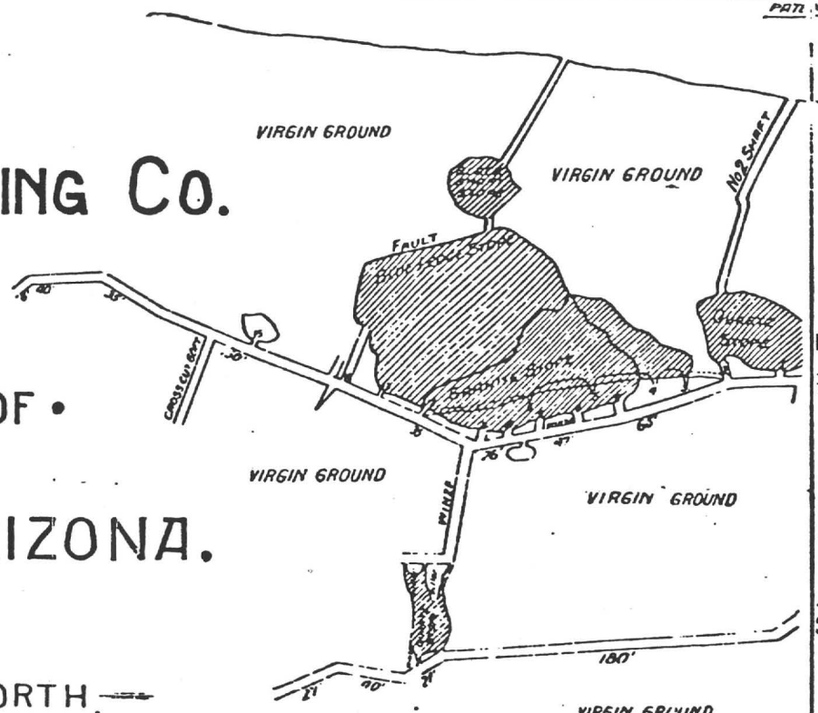
LIEF GOLD MINING CO.

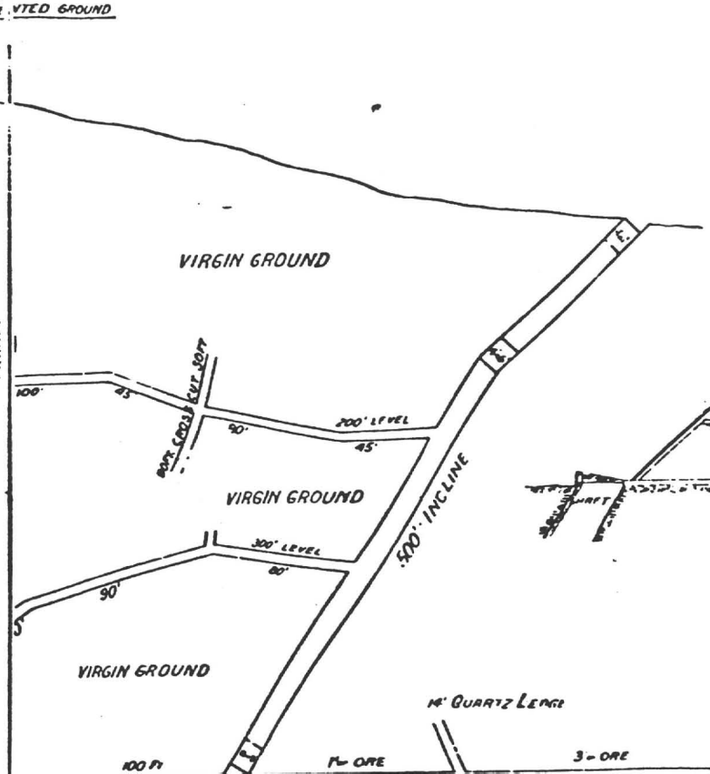
— 23 MILES —

• NORTH WEST OF •

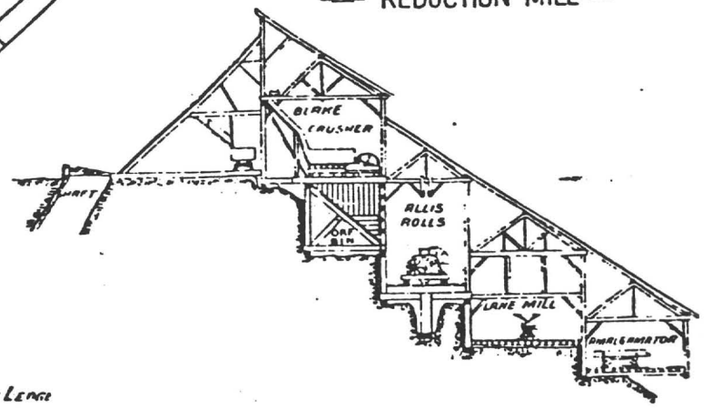
PHOENIX, ARIZONA.

—VIEW LOOKING NORTH—





— REDUCTION MILL —



9 a. [illegible]

Phoenix, Arizona,

December 1908.

Through an arrangement with Mr. Ezra W. Thayer, of Phoenix, Arizona Territory, the writer made a survey and map of the workings of The Relief Gold Mining Company's property, and, with a view of obtaining a general idea of the distribution and value of the ores secured a number of samples from the various levels and stopes.

By this means a certain degree of familiarity with the deposit was acquired, and, at Mr. Thayer's request I have written the following report on such features as appear to be of importance or interest.

The work referred to was done during September and October 1908.

In taking the samples, I was obliged to work entirely alone; the rock was broken with a small pick, and I depended more for accuracy to the selection of the place and material than upon the amount taken. My precautions were such that I have confidence in believing that the samples fairly represent the values in place. As the value of the ore in the stopes had been practically tested, I limited my work in these to sampling an occasional pillar and directed my attention more particularly to the margins of these openings and to such parts of the levels as had not been exploited for ore, with the object of getting at the value of those portions of the fissure that had been rejected.

In view of enlarging the output of the Mine and adopting a permanent method of treating the ore, it became essential to know whether large masses of vein stuff remaining in the stopes and in undeveloped portions of the vein, carried sufficient values to allow of their being removed with the richer portions, to furnish a tonnage such as was contemplated.

The samples taken by me therefore DO NOT represent the ore

bodies in the Mine, but of outside vein stuff, or rejected portions, excepting only the few samples taken from pillars.

The Mine is in a northerly direction from Phoenix, and something over twenty miles distant; the roads are good, and country traversed is interesting.

Peoria, a station on the Prescott & Phoenix branch of the Santa Fe Railway, is within eight miles of the property, with excellent transportation facilities to or from either.

The Company has made public the information regarding the organization and capitalization, the exact location of the property, its acreage and the number of patented claims, etc. in prospectus form, and I will therefore confine my writing to less familiar aspects of the Mine.

The elevation is only slightly above that of the surrounding country at the foot of a small group of low granite hills, which rise island-like from the sea of level, cactus covered plain, only to achieve an altitude of a few hundred feet, quite out of keeping with the massive character of the rock.

The group is composed of a type of Granite known locally as "Bradshaw" from the name of the neighboring mountain ranges; it is coarse in texture, light grey in color, and is characterized by prominent bunches of black mica (biotite); in the mass it contains numerous enclosures of mica schists or fine grained segregations of theoriginal magma. Extending across the south slope of the hills, in a nearly Eastward direction the Relief vein occupies a zone of shearing in this granite which conforms with more or less irregularity to areas of the enclosed schists.

Several hundred feet west of the main workings, a second distinct type of granite occurs as a dyke or elongated boss, rending the face of the hill from top to bottom with a strike approximately north-south; this rock is very hard and compact; pink in color, and shows large pink feldspars and scarce diminutive crystals of

mica (muscovite).

Where the dyke intersects the line of the fissure, the latter is much shattered and faulted locally; the vein, however, continues many hundred feet to the East of the dyke fault, and its values have been proved by two prospect shafts on that portion.

Some four hundred feet south of the working shaft, and at the foot of the hill's slope, there is a large mound of cinter, representing the site of a defunct geyser, or group of thermal springs, and is of interest, since the original waters were without doubt active in relation to the ore deposits.

The mound is of considerable extent, suggesting a long period of activity; the material has the appearance of being composed of silica and shows the fine banded structure and grotto-like cavities consequent to its origin.

The deposit I should classify as an unusually strong vein occupying a shearing zone in granite along enclosures of mica schist, mineralized by ascending hot solutions or pregnant magmatic waters.

The type is not an uncommon one, and is considered one of the most promising for producing large and continuous amounts of diffused ore. The vein stuff consists of/a quartzose gangue and impregnated portions of the "country" or wall rock.

Free gold occurs both in the schist and in the granite; considerable portions of each has been stoped, especially of the latter.

The mica schist forms with some irregularity the footwall of the stopes and leached portions of it compose a considerable portion of the vein, filling sometimes occuring as large "horses" and more rarely as patches replacing the hanging wall.

The quartz stopes hug this footwall and the adjacent portions is broken with the quartz and furnishes from eight to eighteen inches of rich ore and many beautiful specimens. The average combined width is about five feet. The granite ore lies above and parallels the quartz vein; it shows only slight alteration in texture, but is blocky and full of minute cracks or seams, on the face of which the gold

appears as little flakes. The metal is also found disseminated throughout the homogeneous rock itself, occasionally forming specimens of rare beauty. This granite ore rarely forms the immediate hanging wall of the quartz vein; there is a zone or partition of altered schist separating the two, unfortunately too low in values to permit of its being broken with the ores.

The absence of other metals than the gold in these ores is noteworthy. Except for a very low percentage of the usual iron oxides and an almost negligable appearance of copper carbonates there is only gold.

This condition furnishes a product unusually simple of treatment either by amalgamating or by cyanide treatment.

The recovered gold is of an unusual degree of purity.

I failed to discover any trace or indication of sulphides anywhere in the Mine.

The stopeing so far done extends from surface workings to a depth of two hundred and eighty feet measured on the dip which approximates to 45 degrees. Above the two hundred foot level (140 feet vertical) the double stopes of the parallel veins average about two hundred feet in length and about eighty feet on the dip; the combined width of the quartz and granite stopes averages not less than eight feet.

The size of these shoots promises much for the future possibilities of the Mine.

Stopeing is now being carried on from the three hundred foot level (240 feet vertical) in the quartz stope which averages here not less than fifte feet in width. From a small winze sunk in the foot wall six feet below the level floor in granite ore three and one-half feet wide to the west face of the working stope the distance along this drift isthree hundred feet.

Unfortunately this drift is irregular and does not run in ore throughout its length. The work has been prosecuted in the

softer portions of the fissure, thus making it impracticable under conditions to sample the sheet continuously. From the bottom of the inclined shaft at the water level a crosscut has been run to the south two hundred feet in length. Two veins of quartz are intersected by this drift. The smaller one is within a few feet of the south face and was not measured by me. The larger vein crosses the drift at 160 feet from the shaft and occupies a brecciated zone of considerable width. This portion of the drift has caved in to some extent and is very wet; the vein evidently connecting with the surface and forming a water course. A portion of the filling is composed of a prominent band of quartzose material of irregular width averaging about two feet. The connection of this vein with the one in the upper workings is a matter of some doubt. It possesses the same strike in an east-west direction but dips decidedly nearer to the perpendicular. No driftins has been done on this vein from this level.

Shortly after passing below the three hundred foot level, the working shaft, which is unfortunately several hundred feet east of the ore bodies, passes through the vein, and conditions below this level must remain a matter of speculation waiting further development. Throughout the workings, the fissure shows a tendency to minor faults across the dip and parallel with the strike. In view of this feature, I should condemn further exploitation by means of inclined shafts; a fault of any magnitude at right angles to the dip (across the dip) would cause great inconvenience in carrying on the work. I am furthermore convinced that the ores could be treated successfully by cyanidation at much less cost than by the present method of milling them.

Undoubtedly, however, the first step should be to exploit and block out sufficient ores below the present working levels, in order to justify the installation of a plant on a scale sufficiently large to handle the ores on an economic basis.

III.

G L E N D A L E M I N I N G & M I L L I N G C O M P A N Y

established 1916

Glendale Mining
and
Milling Company
of ARIZONA

A DESCRIPTIVE STATEMENT
With References and Photographs

Schuyler S. Moore
Authorised Fiscal Agent
Phone, Broad 4499 68 Broad Street
NEW YORK, N. Y.

References:

Hundreds of Phoenix, Arizona, people, first and last, have visited the *Relief mine*. The accompanying photographs show some of them. They include professional men, mining men, business men, miners and mechanics. Many of them are stockholders in the company and all of them have expressed their confidence in the mine. They believe in greater development and larger equipment of the mine. We refer you to a few of the most prominent, useful and reliable men of Phoenix and Glendale, Arizona. They know the "Relief mine" and we take pleasure in referring to them, viz.:

Geo. Hamlin, Superintendent of the Relief Company, 1139 East Monroe Street, Phoenix, Arizona.

Charles H. Akers, Gazette Publishing Co., Phoenix, Arizona.

Lloyd B. Christy, Banker, Phoenix, Arizona.

Ezra W. Thayer, Merchant and Mine Operator, Phoenix, Arizona.

Geo. H. Diehl, Assayer & Chemist, Phoenix, Arizona.

Clinton S. Scott, Arizona Magazine, Phoenix, Arizona.

David Kile, Miner, c/o Commercial Hotel, Phoenix, Arizona.

Alex Spear, Miner, P. O. General Delivery, Phoenix, Arizona.

Goldberg Bros. Co., Merchants and Mine Owners, Phoenix, Arizona.

Edward Eisele, Wholesale & Retail Bakery, Phoenix, Arizona.

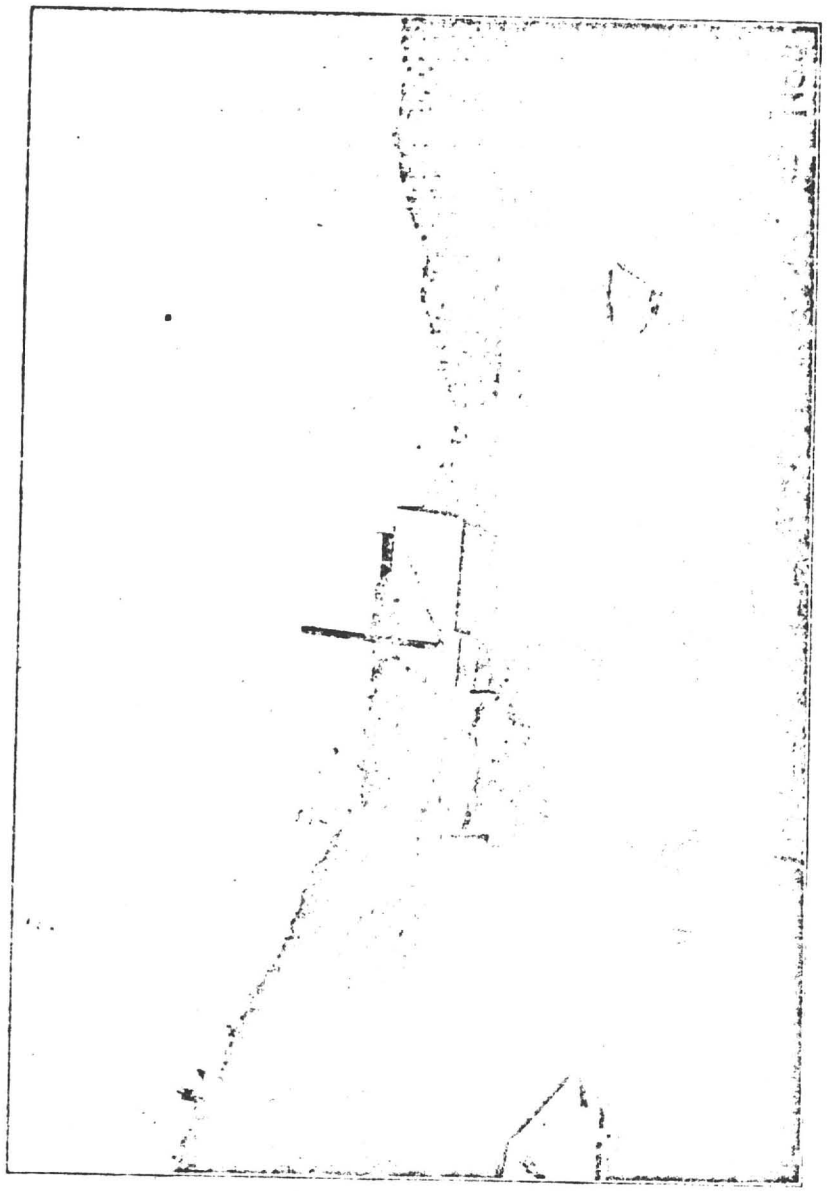
Henry W. Ryder, Lumber Dealer, Phoenix, Arizona.

Geo. H. N. Luhrs, Proprietor of Commercial Hotel, Phoenix, Arizona.

R. M. Luckey, Merchant, Glendale, Arizona.

Geo. W. Walters, Ranch, near the Mine, Glendale, Arizona.

Ray F. Stauffer, Merchant, Glendale, Arizona.



RELIEF MINE.

Automobile Party. Pile of Tailings to the right.

PROSPECTUS
of the
GLENDALE MINING AND MILLING COMPANY
OF ARIZONA

DIRECTORS

WILLIAM G. LELAND, c/o Hotel Imperial, New York, N. Y.
GEORGE E. FLINT, Meriden, Conn. JAMES H. FROST, Troy, N. Y.
RICHARD KNIGHT, Middletown, N. Y.
CHARLES N. FOSTER, Meriden, Conn PETER K. CLARK, Trenton, N. J.
C. THURMAN LELAND, Schroon Lake, N. Y.

OFFICIALS

WILLIAM C. LELAND, President JAMES H. FROST, Vice-President.
SCHUYLER S. MOORE, Secretary, 68 Broad Street, New York, N. Y.
RICHARD KNIGHT, Treasurer.

CHARLES S. DALEY, Attorney, 45 Broadway, New York, N. Y.

Fiscal Agent, SCHUYLER S. MOORE, 68 Broad Street, New York, N. Y.
Room 150. Telephone, 4499 Broad

CAPITALIZATION.

1,000,000 Shares of $1.00 each, par value.....$1,000,000
Full Paid and Non-Assessable.

Authorized Bond Issue..... 250,000

These are first mortgage bonds maturing June 15th, 1936, with 6% Cumulative interest payable from the net earnings of the Company

Stock allowed for the Relief Mine, approximately	280,000 Shares
Bonds issued for the Relief Mine, approximately	$86,000
Stock reserved for the purchase of the Advance Company's property.....	150,000 Shares
Stock in the Treasury for a working capital, approximately	570,000 Shares
Bonds in the Treasury unissued, approximately	$164,000

The original purchasers of treasury stock have the privilege of exchanging their stock certificates for first mortgage bonds carrying 6% interest, payable out of the earnings of the company, for amount of money invested, any time within eighteen months from date of purchase of certificates.

This method of financing the Company safeguards the investment and gives the investor all the stock speculative possibilities

The Glendale Mining and Milling Company issues this prospectus of its properties and plans for the purpose of interesting you in an opportunity to make a safe and profitable investment. The company is the sole owner of a rich mine, the Relief, and is about to absorb the Advance Company's property of as yet unestimated wealth. These properties and franchises will be combined by the Glendale Company with the Relief Mine and will be operated as one great enterprise under intelligent and economic management. *Development has made the Relief mine one of the most promising gold properties in Arizona*, and development, we believe, will make the other properties equally valuable, possibly more so.

The Relief mine is a gold mine. The Advance Mining Company's property consists not only in gold claims, but also copper claims, and water and irrigation rights all in Arizona, a state where both copper, gold and water have created enormous wealth. The facts which this prospectus will bring out and make clear to you about these properties are based on actual conditions which can be seen and felt and computed.

The "Tom Reed Gold Mine" is producing from $125,000 to $150,000 in gold bullion monthly. A few years ago their stock had no market value and the company was forced to reorganize to get money to develop the property, *now* no stockholder cares to sell his stock at any price.

The Magma Copper Company's stock advanced from $17.00 to $52.00 a share in four days and is now worth about $58.00 a share. The par value is $5.

Ex-Senator Clark is supposed to own ninety per cent., more or less, of United Verde stock. It was valued at about seventy-five cents a share when he first bought it and is now probably worth $300.00 or more a share. These are Arizona mines.

Remember the *speculative possibilities* of mining stock.

There is no promotion stock or bonds in this organization. Every drop of water has been squeezed out. Valuing the stock at the price it is now being offered for subscription, the amount of stock and bonds allowed for the Relief properties is substantially the same as the amount of cash actually expended for development, equipment and operation purposes; while the amount of stock to be allowed for the Advance properties—on the same basis—is considerably less than the amount of money actually expended for development and improvement of their properties.

The officers of the company have agreed that no salaries

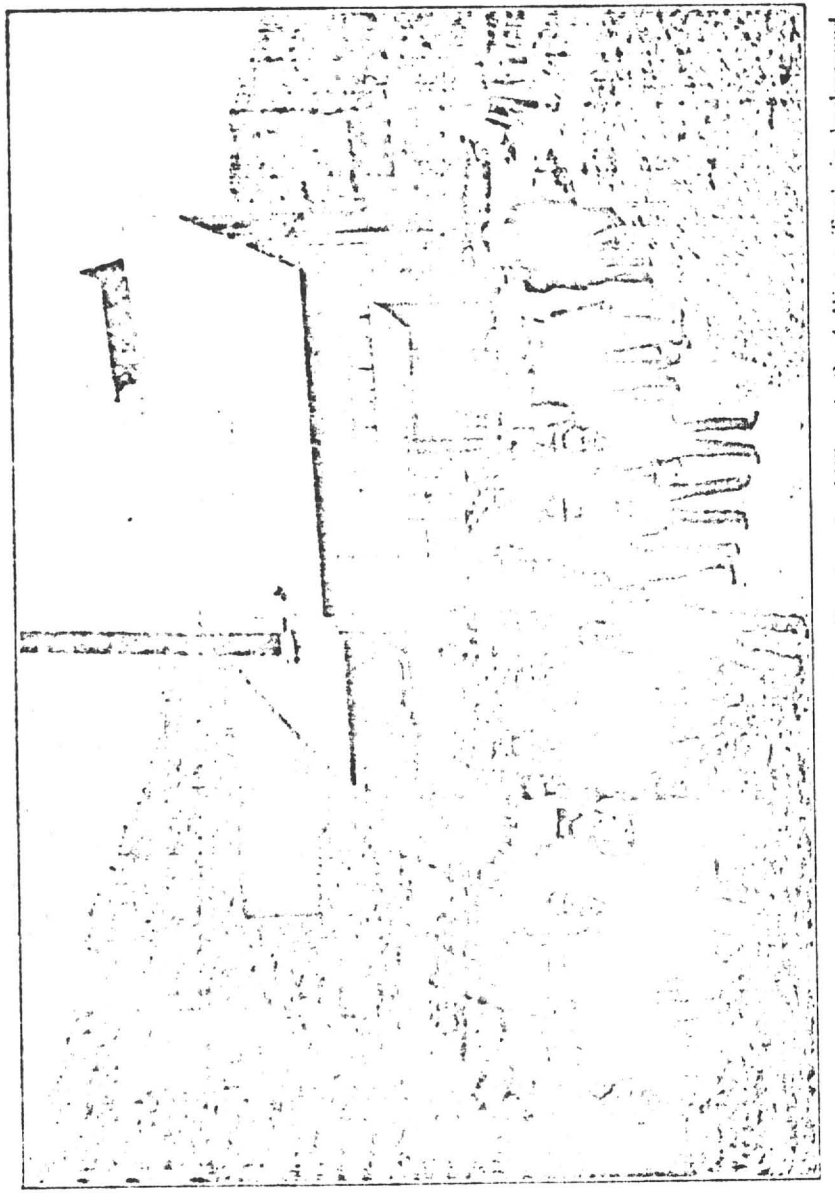
shall be paid, and have arranged that expenditures, including caretaker at the Relief Mine, office expenses, etc., shall be limited to $100.00 per month, until there is enough money in the treasury to justify going ahead with liberal and intelligent development and equipment of the Relief Mine.

The directors propose to exploit the ore bodies at greater depth, get under the ore shoots in the 400 foot level; create a large ore reserve, and increase the water supply as greater depth in the mine is acquired, harness the electric power and increase the milling and cyanide capacity. *The mine is worthy of it!*

Gold mining is to-day a business. Reckless waste, haphazard management and greedy haste have given place to economy, efficiency and clean sweep. This is due partly to the applying of scientific processes, such as amalgamating and cyaniding. These produce the maximum of gold at the minimum of cost and have saved and earned millions of dollars for modern mine owners that the early gold kings let go to waste. The scientific mining methods of 1910 have lessened enormously the cost of mining business. They, however, do not represent all the causes that have increased the investor's profits and reduced his risks from the mining of gold. One very important source of economy is the location of the mine. If you own a factory on the main line of a great railway system, your shipping costs are at once lowered and your dividends are proportionately greater—so with a mine. Many promising properties are unprofitable only because they are hidden in high mountains or deep canyons and are far from railroad lines. The Relief mine overlooks the Santa Fe Railroad, and one of the most perfect automobile roads in Arizona runs to its main shaft. Another safeguard is the integrity and character of the management. This is of as great importance in the success of a mining investment as the richness and purity of the ore, which is of vital value to the share holders. We ask you to bear this particularly in mind.

Arizona is a rich state even as the wealth of this country is estimated to-day in hundreds of billions of dollars. A great volume of this wealth is mineral and its extent no man knows. You have only to think of the enormous wealth which the unfailing resources of the United Verde Mine has given to one man to understand why Arizona is the richest copper producing state in the world. The wealth of the United Verde mine was for many years at the disposal of the public but [illegible] alone had the wisdom to take advantage of it. [illegible]

RELIEF MINE.



Members of Phoenix, Arizona, Board of Trade. Showing the Mill and Steel Water Tank in background
Cyanide Plant, installed since this picture was made, is on the grade about where this group stood

Both these famous mines are in Arizona and in 1914 the state produced one-third of all the copper mined in the United States. In the United States Geological Survey figures, Arizona delivered to the world 393,017,400 pounds of pure copper. When we think of gold we picture California, yet in 1914 Arizona produced 202,100.62 "fine" ounces of pure gold, valued at $4,179,155. In 1880 the Arizona gold output was 10,000 ounces. In thirty odd years the output has increased over 2000% and modern economic gold mining methods are just beginning to be used in the state.

The location of the Relief Mine is extraordinary. It is practically at the very door of the City of Phoenix, and the Advance properties are well situated for economical mining and development.

The Relief Mine is situated in the foothills of the Bradshaw Mountains, in the Agua Fria (Cold Water) district, Maricopa County, Arizona. It is about twenty-two miles northwest of Phoenix, the capital city of Arizona, thirteen miles from Glendale and seven miles from Marinette. Altitude 1400 feet—about 300 feet higher than Phoenix, and 200 feet higher than Marinette. The latter is the nearest railroad station.

The Prescott and Phoenix division of the Santa Fe Railroad system passes through both Glendale and Marinette. A fine wagon and automobile road runs through Glendale from Phoenix to the mine. The road across the desert from Marinette—seven miles—is an easy grade, no hills to climb, bridges to build, or fords to cross. It can be quickly and inexpensively made a first-class freight road when needed.

The accessibility to railroad facilities, markets for mine, mill and domestic supplies; located in a climate that knows no snow, frost but seldom, where the water pipes lie on top of the ground without danger of freezing, makes the Relief mine an exceptional mine for *economical mining and reduction of ore, especially for cyanide treatment*. The plant need not be housed except for protection from the sun, as there is no danger of bursting pipes or freezing tanks.

So much for the location as to shipping facilities, market supplies and economies of this important kind. Another essential feature, power for operating, remains to be thought of. It is here that nature was most completely in league with good fortune. As has been pointed out, the cost of doing business in mining is as serious a problem in a well conducted mining enterprise as in any other honestly managed business; and a vital factor in the power [illegible]

View of the Mill, showing Skip coming out of the working shaft.

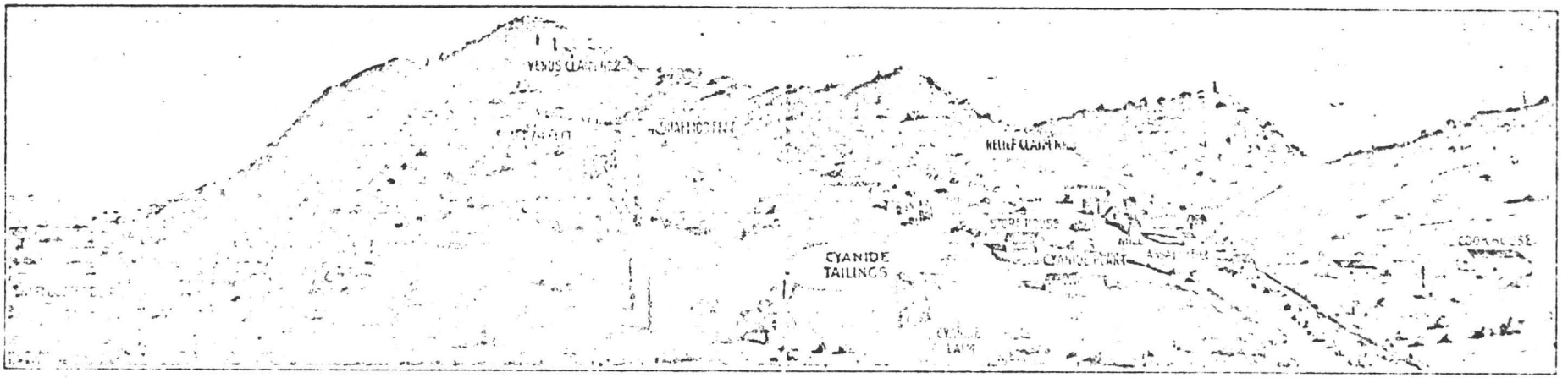
The ghost of this cost haunts the office of many a mining manager in these days of rising coal prices, and the mine owners whose machinery is harnessed to water power are among the fortunate ones of earth.

Both the Relief mine and the Advance properties are unusually well provided in this respect. The latter have the means to generate their own water power and enough left over to sell at a profit as we shall show you a little further on; while the Relief mine may be operated by the inexhaustible power stored up by the Grand Roosevelt Dam. You know already the story of that wonder working water storage system that has increased the wealth of Arizona by millions of dollars in irrigation and power and especially of that particular section. The electric transmission cables from that huge lofty artificial lake deliver unfailingly summer and winter a minimum of 125 horse power at the astonishingly low price of 1½ cent, perhaps less, a kilowatt, and furnishes the cheapest and most serviceable means of operating that mining management can ask. The transmission cables now deliver power to Marinette only seven miles away.

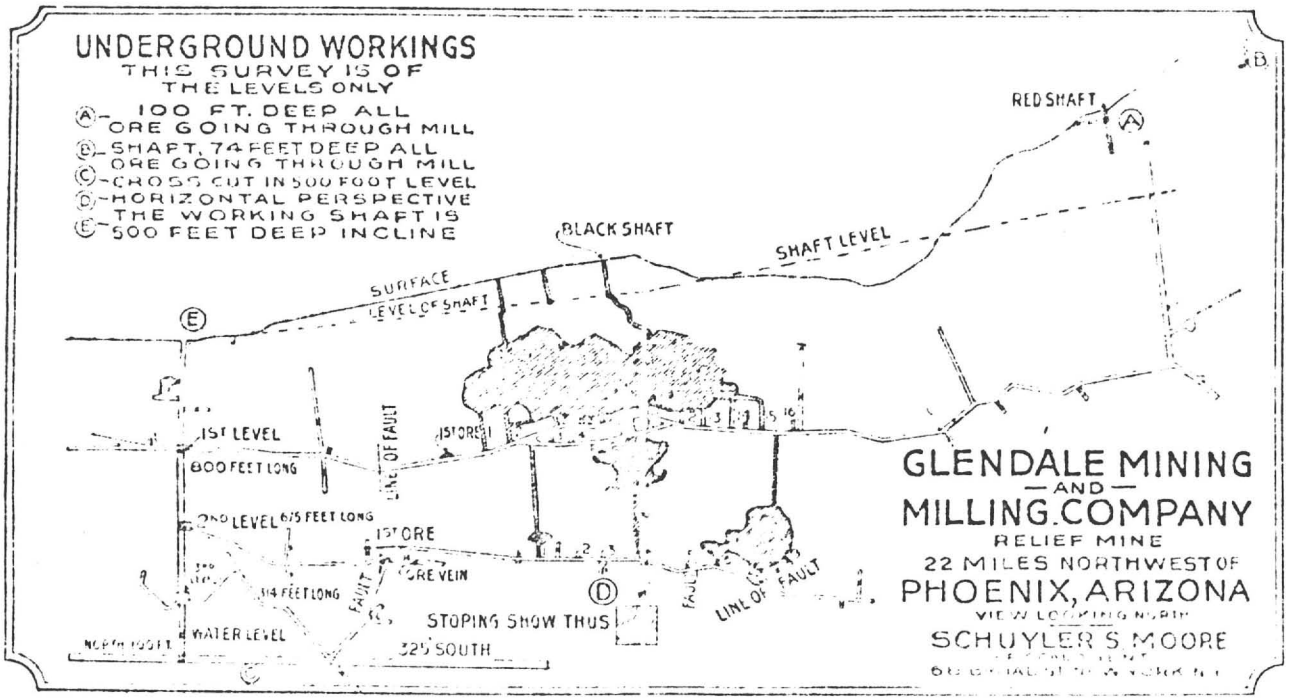
The Relief mine consists of nine claims, eight of which are full size, 1500x600 feet, and one claim 1500x163 feet—about 160 acres. Three claims, the Relief, Venus and Relief No. 2, where mining has been done, are patented; the remaining six claims are owned by right of discovery and are held in accordance with the United States mining laws, by doing the discovery work and the annual work on the claims.

The Relief mine has a story, like many of the great producing mines, that shines bright with the faith and endurance of men who saw its limitless possibilities and endured hardships and want in the strength of their belief. The name of George Hamlin of Phoenix is well known among mining men and he has stuck by the Relief mine and seen his confidence bear the fruit of success. Working with one assistant, Hamlin sank an incline shaft 200 feet deep with nothing but a home-made bucket and windless to hoist out the muck, *because he knew the wealth was there to be dug out.* Such faith bears its reward, and Hamlin will reap where he sowed just as Senator Clark became one of the world's finance kings, *because he had faith in a mine that others did not have the vision to appreciate*, and the United Verde is the monument to his foresightedness and wisdom.

The Relief mine is there on the low Arizona foothills, rich full of golden promise. It has already produced wealth. About four thousand five hundred feet of development work has been done. The work consists of shafts, drifts, upraises, air levels



RELIEF MINE.



Underground Workings

cross cuts and winzes, including an incline working shaft five hundred feet deep, the latter being the greatest depth attained on the property. The drifts in the 200, 300 and 400-foot levels are 800, 675 and 314 feet long respectively, running west from the working shaft; but little drifting has been done east of the shaft.

Most of the work in the 400 foot level was done in exploiting a fault,—the last sixty feet is in ore. By running this drift forty feet further it will be under the ore shoot where ore has been taken out in the upper levels.

Cross cutting only has been done at the bottom of the shaft, in the 500 foot level; the cut to the north is 100 feet long, and to the south 325 feet long. This work was done to create a reservoir for the storage of water. In the south cut a fourteen foot ledge of quartz ore was cut through, but because of the difficulty in handling the flow of water it was not drifted on and developed. Assays have shown the character and average gold value of this ore to be about the same as in the upper levels.

The strike or direction of the vein is nearly east and west, with an average dip of about forty-five degrees north into the hill. The ledge has been traced about a mile on the surface, and the ore taken from various shafts, crosscuts and other surface openings is of the same general character and average value. The width of the vein varies, in some places it is fully twenty feet wide.

In the stopes above the 300 foot level, where some twelve thousand tons of ore have been knocked down, taken out and milled, the pay ore was from four feet to nine feet wide, the ore all going through the mill, the average width of the stopes where the ore was taken out is approximately five feet, a large average width for the depth so far attained in the mine.

A shaft now sixty feet deep, located some two thousand feet west of working shaft, has five and a half feet of ore in the bottom; the last assay of a large sample taken across the vein showed values of $6.25 per ton. Various assays from this shaft, as sinking progressed, showed average gold values of from $6.00 to $10.00 per ton.

The vein has been pronounced by geologists and professional mining men to be a fissure vein,—indicating great depth. The formation is granite with enclosures of syenite, or mica schists as it is sometimes classified.

The vein matter consists of quartzose gangue or filling and portions of the wall rock. FREE GOLD OCCURS IN THE QUARTZ GRANITE AND SYENITE ROCK

The syenite forms with some irregularity the foot-wall and portions of it compose a considerable portion of the vein. The quartz hugs this footwall and the adjacent portions are broken with the quartz when taking out ore, and furnish some rich ore and handsome specimens.

The granite ore lies above and parallel with the quartz ledge. It shows slight alterations in texture and is *full of minute cracks on the face of which gold appears in little flakes.* Gold is also found disseminated throughout the rock itself, often forming specimens of rare beauty.

The ore shoots are large, the one where the most stoping—taking out ore—has been done being two hundred feet long. *The size of the shoots or ore chimneys is promising for the future of the mine.* The gold is absolutely free, most of it fine, but some coarse is found in the granite ore. There are no indications of sulphides in the mine, and except for a low percentage of iron oxides, a negligible appearance of silver, and 1 10 of one per cent. of copper carbonates, there is only gold in the mine. The bullion is of rare purity, and the ore is an ideal ore for cyanide treatment. The deposit has been classified as an *unusually strong vein*, mineralized by hot solution of magmatic waters. The type is not uncommon and is considered *one of the most promising for producing large and continuous amounts of diffused ore.*

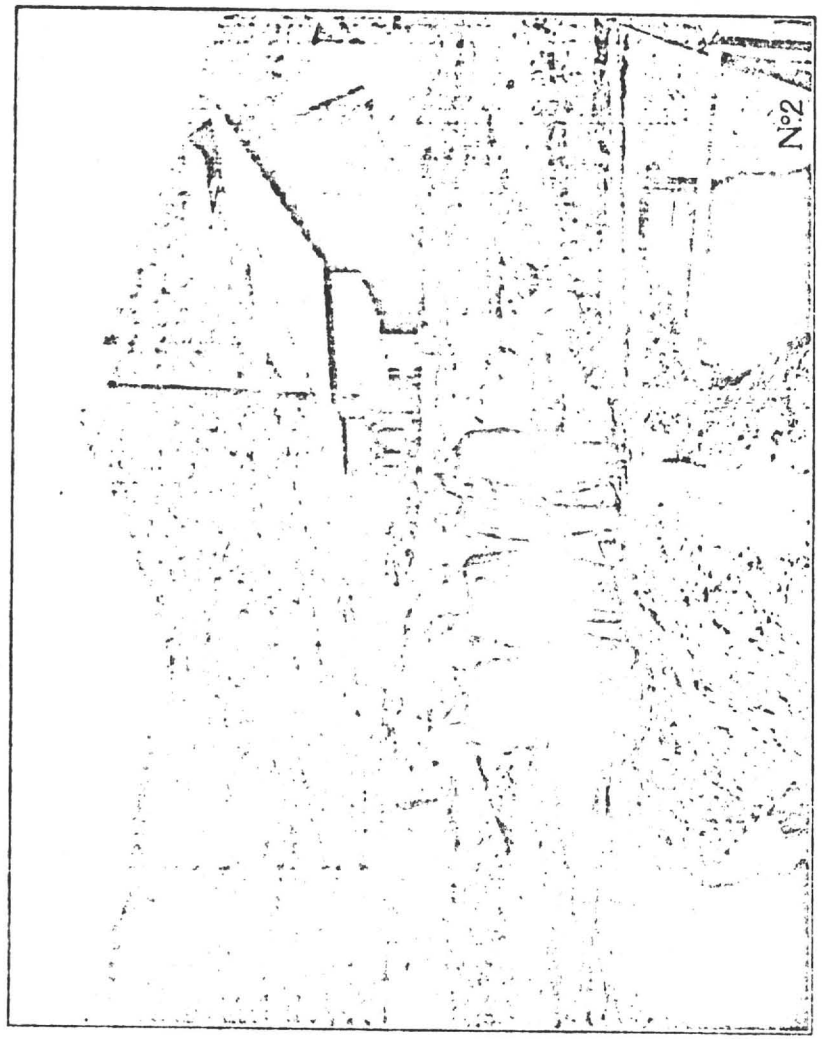
Approximately twelve thousand tons of ore have been stoped or mined out in the two and three hundred foot levels, and treated on the property.

The granite and syenite ore is often very rich, sometimes running as high as $100.00 or more a ton. The average value, however, of the twelve thousand tons treated was $6.60 per ton, and the recovery in bullion was $72,000, about 90% of the total average value. The last one hundred tons of granite and syenite ore run through the mill averaged $12.00 per ton in gold.

About three-quarters of the ore mined and treated was by simple amalgamation, cyaniding the tailings, and the remainder by straight cyanidation.

The experience gained through straight cyaniding this ore clearly demonstrates that with the mine properly developed, equipped with a crushing mill and cyanide plant of one hundred, or more, tons daily capacity, with electricity for power, etc., $4.00 ore would keep the ore reserve developed ahead and yield the company handsome profits. Compare the average of $6.60 per ton with ore of the great Homestake mine of South Dakota and the famous Treadwell mine of Alaska, whose average is $3.60 and $2.80 respectively

RELIEF MINE.



Phoenix people inspecting Tailing Pit below the Mill.

The great producing mines in Arizona are *deep mines*. It is there that the ore usually lies in its maximum of richness and volume. So far the Relief mine has been put down to a depth of 500 feet on the incline.

The ore now open and partially open in the mine is estimated at from forty to fifty thousand tons of $60.00 ore above the four hundred foot level. This estimate is conservative. To open this tonnage it is necessary to continue the drift in the four hundred foot level further under the ore and complete some drifting and dead work in the upper levels.

The reservoir developed at the bottom of the working shaft when completely open has a storing capacity of about 100,000 gallons. The daily flow of water is approximately seven thousand gallons. This water is excellent for milling, cyaniding and domestic purposes, and an abundance can be developed as sinking to open the ore bodies at greater depth progresses.

Surface improvements:

Consist of dining-room, cook house, bunk house, company office, store-house, etc. A small expenditure of money will enlarge and improve these buildings so as to make them commodious and comfortable for a large force of employees.

Equipment:

The equipment consists of One station pump—One sinking pump (both of 40 gallons per minute capacity)—One 12 h.p. Fairbanks and Morris hoist and house—One 14 inch iron water tank of 25,000 gallons capacity, with pipes carrying water to mill—cyanide plant and all the buildings—Blacksmith and machine shop with tools—Assay office with outfit, including smelting furnace, etc.—Crushing building and machinery, including fifty h.p. boiler, thirty h.p. engine, 8x10 inch Blake rock breaker, set Allis 14x26 inch rolls, set Joplin 14x24 inch rolls, conveyers, elevators, revolving screens, belting, shafting, pulleys, etc.

Substituting a fifty h.p. engine for the one now installed, together with minor alterations and mill improvements, this plant will have a dry crushing capacity of fifty tons every nine hours. A good first unit crushing capacity, and calls for the outlay of but little money.

Cyanide Plant

This plant is new and up to date, of fifty tons daily capacity. It consists of four iron tanks 5x18 feet, two iron tanks 4x22 feet, one iron standardizing tank 8x10 feet, one iron

distributing tank 3x9 feet—two iron sump tanks 6x8 feet—twenty iron zinc barrels 18x24 inches complete with centrifugal pump, gasoline engine, piping, tank bottoms, etc.

This completes the description of the physical and operative condition of the Relief mine which is already advanced in operation, and needs only the wise expenditure of comparatively little money to increase its output and in far greater proportion, its wealth-production. We now want you to become as well acquainted with the outlook that the *Advance Mining properties* offer. These are part and parcel of the Glendale Company's holdings, and ownership in the Relief mine embraces equal ownership in the 26 claims of the Advance Company's charter.

The Advance Mining Company's properties, about to be absorbed by the Glendale Mining & Milling Company, are located in the Clark and Black Rock districts, Graham County, Arizona. They consist of eighteen gold claims in the former, eight copper claims and reservoir and irrigation canal franchises in the latter district. *The claims in both districts are promising, and the power and water franchises are of great possible value.*

Camp Clara:

Is in the Clark District, twenty-seven miles southwest of Fort Thomas, a station on the Gila Valley, Globe and Northern R. R. and fifty miles Northwest of Willcox on the S. P. R. R.

Property:

The Advance Company holds eighteen promising claims in this district by virtue of discovery work, etc. With one exception they are full size 1500x600 feet—about 370 acres of land.

Formation:

The prevailing rock is felspathic granite, cut at intervals by a series of altered porphyry dikes. Numerous quartz veins cross the formation, the croppings in many places being easily followed.

Veins:

The walls are felspathic and are well defined. The veins are from three to ten feet wide. The gangue filling matter is quartz and porphyry. The quartz lode varies from 2½ to 5 feet wide. The ore is generally friable and easily crushed.

Development:

Upwards of 1500 feet of work has been done on these claims distributed in shafts, tunnels and cross cuts, including one eight 200 feet deep [illegible]

Values:

Many assays have been made from the different workings on this property, including one shipment of 1,593 pounds of ore to a smelter for treatment. The ore shipped averaged $25.96 per ton.

Leaving out the high assays as follows: $43.57, $48.00, $50.30, $64.00 and $100.00, which do not show the average values, and taking those which were made from five pounds or more, ore taken systematically across the veins, we find the values run from $5.00 to $25.00, giving a general average value of $12.32 per ton. We believe the ore on these claims will average from $10.00 to $12.00 per ton in gold and silver as it is mined, besides the copper which is prominent in some of the claims.

Experiments show that through amalgamation and concentration from 85 to 90 per cent. of the values can be saved, concentrating the sulphides and recovering the free gold and silver on the plates.

Water:

There is an abundance of artesian water in this district, which can be pumped into storage tanks at small expense.

Power:

Wood from $3.00 to $4.00 a cord will be obtainable for several years, and eventually electricity from the Black Rock district should be obtainable at a low figure.

The distance from one camp to the other is twenty-two miles by wagon road, and eighteen miles by trail.

Advance Camp—Black Rock District:

This camp is sixteen miles southwest of Fort Thomas.

The Company holds eight copper mining claims, 1500x600 feet each in this district, by right of discovery, etc., about one hundred and sixty acres of land, and through reservoir and irrigation canal franchises controls the water rights of from 30,000 to 40,000 *acres of rich and fertile farming land.*

Formation:

A series of eruption drifts crossed by mountain ranges occur in this district. The substratum is granite, intermediate slate, clay composition, capped by conglomerate rocks, porphyrytic in character. The conglomerate formation covering these claims is completely impregnated with small [illegible]

in gold and silver, while in some instances large bunches of high grade copper glance have been encountered which show high values in gold, silver and copper.

Property:

The property consists of eight claims held by virtue of discovery work, etc. They are adjacent, most of them contiguous. It is believed they cover a copper zone.

Development work on this group indicates that there is a *large deposit* of low grade copper ore lying on the contact between the slate and conglomerate formation, indicating that when the water level and granite contact have been reached, a large body of sulphides will be found.

Values:

The feeders, stringers and bunches of copper glance show high values, anywhere from $10 to $200 per ton, in gold, silver and copper. With depth we believe a copper mine will be found.

These briefly are the mineral and mining rights of the Advance property. Promising as they are, their wealth possibilities are but a fraction of the actual value of the development as a whole. In addition to them are the water rights and these are inestimable. *The storage basin is waiting to be flooded. The site is ready made by nature* for a dam that should cost not *more than $100,000.* Engineers have estimated the cost at $60,000, and below our rights extend thousands of acres to be irrigated into one of the richest agricultural sections of the New Southwest. So important is this feature of our possessions, that Deputy United States Surveyor Philip Contzen spent several weeks in surveying and analyzing this project. We quote the following from his report:

"The reclamation of the land by the waters from the Black Rock Power and Irrigation Reservoir will create wealth and many homes for settlers.

"The water power which can be transmitted by electricity some distance will be a great benefaction to the mining industry of Graham County. Taking both water power and reclamation from 30,000 to 40,000 acres of land by the construction of a 190 foot dam, pipe line, and some lower reservoirs, which are to receive the waters from the main reservoir, it is readily seen that it is a good legitimate proposition, and undoubtedly will be profitable to the investors of this enterprise."

Summing up the report we have made you on these two great properties, the Relief and the Advance, the problem is a very simple one:

The Relief Mine is already a proven mine of tested richness. The Advance offers a wide and varied opportunity, with water rights whose development at very limited cost will pay a high profit on the investment.

Deeper development, increased and new milling facilities, the addition of electrical power at low cost, represent the immediate needs of these properties. As in all businesses, money must be spent to bring money back. The history of this country's wealth proves that no more profitable means can be found to increase and insure an income than to enlist money in a *mining opportunity that combines the safety of a conservative investment*—The Relief Mine—*with the enormous profit chances of a high grade speculative proposition*—the Advance properties.

Schuyler S. Moore is transfer and fiscal agent of the Glendale Company. Mr. Moore is a substantial stockholder and has been in personal touch with both the Relief and Advance properties since those companies were organized. He knows the properties better than any one else, and is competent to answer all inquiries in detail.

GLENDALE MINING & MILLING COMPANY.

Signed, WM. G. LELAND, President.

Address all communications to

SCHUYLER S. MOORE, Fiscal Agent,

68 Broad Street, New York, N. Y.

Telephone, Broad—4499.

New York, December 1, 1916.

IV.

S U N R I S E R E L I E F M I N E S, I N C.

circa 1929-1933

SUNRISE RELIEF MINES, Inc. - Ezra W. Thayer, Pres. - PHOENIX, ARIZ.

26 miles northwest of Phoenix, the SUNRISE RELIEF MINES, Inc. are opening and developing a gold mine. The company has been operating steadily for over two years and much underground development can be seen by the visitor. Gold from this mine has run as high as .996 fine.

The property is only 50 minutes drive from Phoenix and is one of the many interesting sights in Arizona. Visitor permits can be procured from the office of Ezra W. Thayer, President, 179 East Adams St., Phoenix, Arizona.

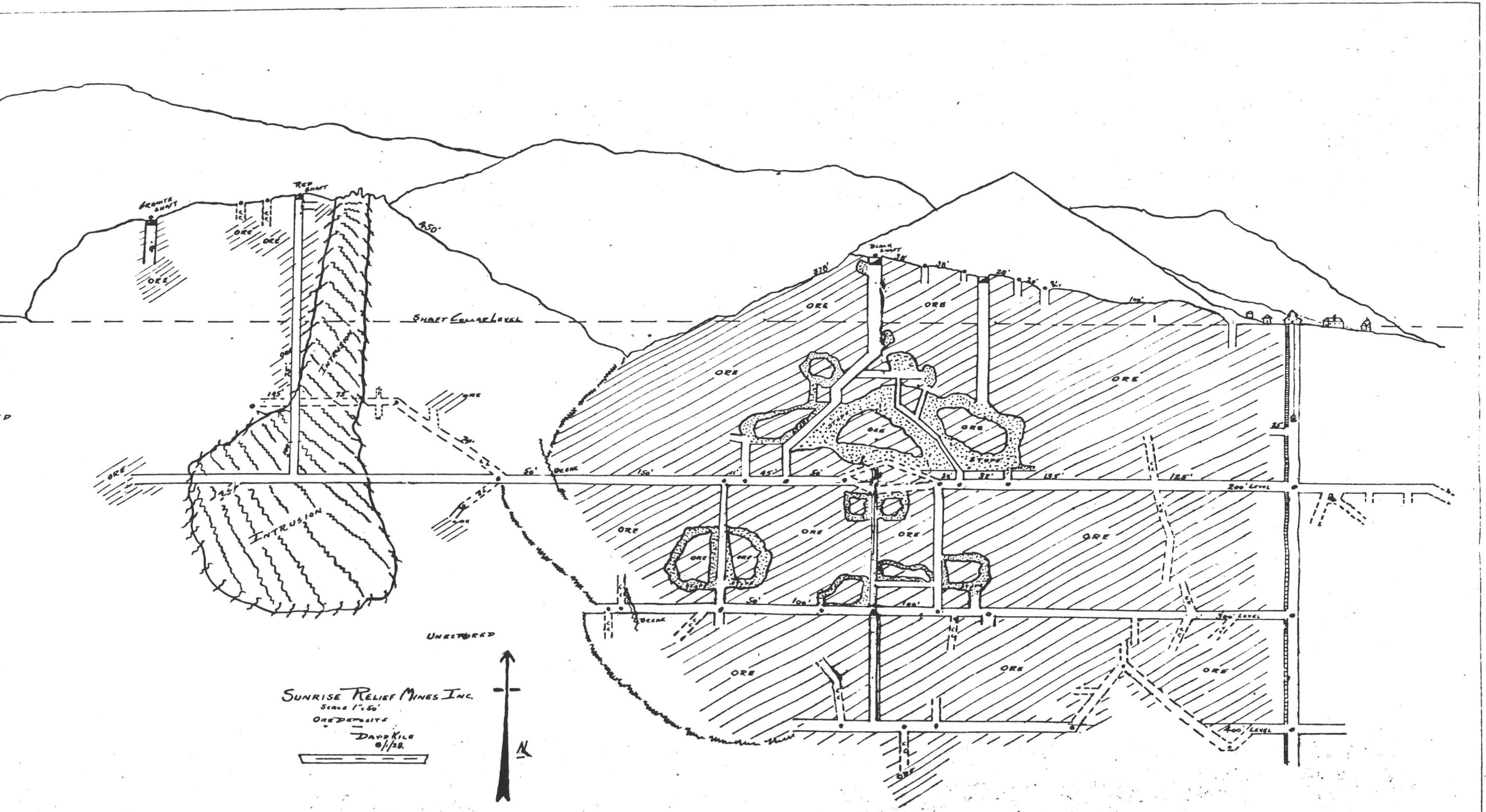
PUBLISHED BY HARRY HERZ, 794 E. CULVER ST., PHOENIX, ARIZONA

C. T. AMERICAN ART COLORED

POST CARD

THIS SPACE FOR ADDRESS ONLY

PLACE ONE CENT STAMP HERE


ADAMITE SHAFT
RED SHAFT
BLACK SHAFT
850'
378'
SHORT COLLAR LEVEL
ORE
INTRUSION
STOPE
100' LEVEL
200' LEVEL
300' LEVEL
400' LEVEL
UNEXPLORED
SUNRISE RELIEF MINES INC.
SCALE 1" = 50'
ORE DEPOSITS
DAVID KILE
6/1/28.
N

8-6

Phoenix, Arizona,
December 30th, 1927

Mr. Ezra Thayer, Sr.,
Phoenix, Arizona.

Dear Sir:

At your request I have made, December 14-29th, 1927, a reconnaisance of the Relief Mine. I went over the surface area, through the 200 level, and did such sampling as seemed justified. At this time it seemed unwise to recommend a detailed geological survey, withcomplete sampling. Such a procedure would cost nearly as much as the reopening of the mine.

I find a mineralized area of considerable extent probably at least 1500' long and in places 40' or more wide. In this area appear at least two ore zones, 1 W being at least 400' long, and 3 W being nearly 200' long, with a possibility of developing both to a greater length. Between these two is another zone 2 W, which may present some exploration possibilities.

There appears such a general distribution of low values, with occasional spots of good ore left from former operations, that development is justified. With the mine once reopened, and new development under way, all technical facts necessary to proper operation, can be systematically gathered, and the probable grade of ore determined.

On the present exposures it is impossible to even guess at the amount or value of ore which can be developed. My firm impression is that a considerable tonnage, low in average grade, but still profitable, can beddeveloped.

General conditions and the character of the ore body should permit low costs.

The property presents a good development chance, speculative in the early stages, but susceptible to a rapid reduction of investment hazard if ore is found.

I recommend that the mine be reopened and development prosecuted on the known ore bodies. The operation should be held under very strict financial and technical control. Every effort should be made to avoid dead investment - in either equipment or development.

P-1

There are attached - Observations-Subject to Rivision after further study.

Plan of Reopening and Development.

Assay Record.

Thin Section Record.

Very truly yours,

R M Dickinson

RND - CI

P-5

OBSERVATIONS -- Subject to Revision after Further Study.

The general country is granite, showing many phases. Along the mineralized zone the granite is generally coarse grained, dark, contains much biotite and is rather soft. To the North (on the N.W. side) appears a great mass of light colored, hard, very siliceous granite. Here and there small tongues of the softer, coarser granite, extend into this mass. In places, particularly west of the gulch, (about 900' W of the shaft) this siliceous phase cuts across the softer phase, appearing there as a N-S intrusive tongue. South of the Block shaft quite a mass of the siliceous phase is noted, showing, near its contact with the softer phase, included angular fragments of the latter. In the more siliceous phase some minor quartz and aplite segregations are found - in the coarser and softer phase, almost none.

In the mineralized zone are numerous dikes of fine grained dark rock (perhaps syenite or trachyte-syenite). These dikes vary in width from 2" to many feet, and cut the granite on every conceivable course and dip - the major ones, however, roughly paralleling the course of the mineralized zone or cutting it at nearly right angles. Angular fragments of the dark dike rock are frequently found included in the softer granite mass. Only seldom do the dark dikes intrude the harder, more siliceous granite.

At the extreme West end of the claims some rhyolite and Andesite were noted.

Thin sections, followed by proper classifications, should be made of all the rocks mentioned.

A structural survey is necessary.

The mineralized zone thus far known extends roughly perhaps 200' East and 1300' West from the Main shaft. This zone may eventually be limited only by the ultimate limits of the favorable softer granite.

On surface, fracture zones, showing low values across their entire width, with some free gold in narrow streaks, and good values over widths of several feet, have been found up to 40' wide. It is noteworthy that the wide fracture zones found on surface in area 1 W overlie the stopes and known wide underground orebody. Also is it noteworthy that, in area 2 W where the ore exposed on the 200 West is narrow and limited, no fracture zones or the same type have yet been seen on surface.

The principal values found at surface and shallow depths seem to occur in or near the dark dikes in the fracture zones - particularly near cross fractures or dikes. Values frequently here - and still more frequently at greater depths, where the dikes are harder and narrower - penetrate the softer granite

to a considerable distance. Free gold is frequently seen both in the dark dike rock and in the granite. The gold occurs occasionally as thin flakes along cleavage planes, but more frequently as fine particles in the hard rock. Quartz streaks, widely banded, are found in the fracture zones, and while not as a rule carrying the best values, can be considered excellent "indicators". Copper stain usually accompanies values. Silver thus far has been negligible. A trace of lead was found in Area 3 W, 150' West of the Intrusive Tongue. Other metallic minerals are suspected, and should be determined as work progresses. Phosphorus has been found at several points and Manganese stains wide-spread. There is some evidence of surface leaching of gold values at a number of points, in Areas 1 W and 2 W. Sulphide casts, pretty well oxidized, are found in the quarts. The values are very "spotty."

The gold is not freed from the rock except by fine grinding. The ore slimes readily, and some of the gold floats on water in panning.

Much cross fracturing and a good deal of minor faulting is noted at surface and shallow depths. There is some evidence of major faulting, particularly just West of the main shaft and again in Area 2 W about 300' West of the shaft.

It is noteworthy that at some points severe cross shattering has not particularly disturbed the main N-W fracture zone and that no vein material has entered the cross fractures, but yet free gold has penetrated the surrounding rock. On the 200 W about 300' West of the shaft is an illustration of this.

The orebody- at least in Area 1 W, does not occur as a vein, but as a series of irregular masses - more or less parallel - along one or more fracture zones within the main mineralised zone. Offhand I should call it an irregular replacement along a major line of weakness - with concentrations of values at favorable points extending at times into the adjacent favorable granite and dark fine grained dike rock. It may easily be that the hard siliceous intrusive phase of granite, and the dark dikes, have influenced deposition. An exact statement of the type and cause of the deposit is impossible until after considerable geological work has been done with thin sections and mineralogical studies by a geologist experienced in this typeof deposit. Such a determination may be safely left until development has opened new ground and furnished adequate technical data.

Careful gathering and co-ordinating of all possible technical data is essential.

Development must be kept as far as possible on ore - following it on its indicated line of favorable ground - and all exposures of vein material or country rock, must be carefully sampled.

I think that there can be developed a method of stope sampling

Sheet two.

and sorting this will be effective in eliminating waste and keeping hoisted ore up to a profitable grade. In places mining widths up to 40' at least will be encountered and I think rather cheap mining costs can be realized.

The ground encountered above the 200 level stands well. It will apparently drill and break easily.

AREA EAST OF MAIN SHAFT is pretty much covered by debris. I did not see any interesting exposures and think that surface discoveries would be accidental.

The 200 level East is apparently driven on a narrow fracture. It is questionable whether or not this is the principal ore zone. Development does not seem justified now, but this level should be sampled and later explored by extension of the drift and adequate crosscutting.

AREA 1 WEST - Main Shaft to Black Shaft, for a distance of about 400' on surface is very important. It shows parallel exposures (not continuous, but broken) of wide fracture zones, filled with crushed dark dike, quartz streaks, and favorable granite. Numerous cross dikes are seen. Several cuts, pits and shafts show widespread values, usually low, but good in places over substantial widths. Much copper stain and manganese is seen. Free Gold is frequently found in dike rock. Some evidence of leaching in granite is found. The main ore body of the old mine underlay this area. This body still contains much material in the old stopes that should make low grade sorting ore and above the stopes there remains about 100' of depth from surface that is virgin. Just above the old stopes - below the Black shaft, at about 120' deep a cave has exposed a very wide mineralized area, verifying the surface indications.

On the 200 level W cross cut 2 South was driven toward the fracture zone exposed in surface cut A but apparently not far enough. An extension of this cross cut and more N-S cross-cutting between the main shaft and a point 250' west may show segments of ore as yet undiscovered.

This area should be developed to the 500 level as quickly as possible. The main shaft can be cheaply repaired. Some cutting out to straighten both vertical and horizontal curves is needed. The shaft must be retimbered. Lagging is probably needed on the roof only. This shaft offers an excellent point of attack for immediate development (using it for hoisting only and using the later suggested Black shaft manway for air and escape). The Main shafts will later serve as a pumpway and escape.

Reference is made to assay sheet.

Reference is made to Plan of Reopening and Development.

AREA 2 WEST - Black Shaft to Intrusive Tongue shows little on surface except a great extent of favorable granite with many dark dikes, and at the head of gulch evidence of shattering and possible faulting. At the west end the hard siliceous granite appears as a N-S intrusive tongue cutting the mineralized zone.

On the 200 West a streak of quartz and silicified favorable granite 1' to 5' wide extends to a fault 150' West of Chute 15 accompanied by a parallel dark dike. Four samples were taken here at 25' intervals for 100' W of Chute 15. They showed low values.

Some parallel and some cross dikes are seen. For 30' or 40' about 200' West of Chute 15 the granite is badly shattered and a short cross cut North shows a narrow dark dike, reported to show free gold, in very favorable granite. This cross cut should be extended North.

At about 277' West from Chute 15 a shallow winze on North side of drift shows at least 5' of silicified and fractured favorable granite, adjoining a dark dike and showing copper stain. The dike rock showed free gold. Two samples, not including the dike rock, taken in this winze showed practically no value. It seems very important that this winze be deepened and the ore followed to its limits.

At a point just West of this winze the intrusive hard siliceous granite tongue (mentioned on surface) appears and all the level beyond is more or less in it. The main drift extends about 120' farther with the face in the Intrusive. A 200' drift (probably S W) is all in Intrusive. A short drift (probably N W) starting about 360' West of Chute 15 shows dark dike, some Intrusive, and some crushed favorable granite.

Not much can be said about this area underground until a survey tied into surface survey - gives a real orientation. The area may have possibilities with proper study and cross-cutting.

AREA 3 W - Intrusive Tongue Westerly is important. A fracture zone at least 40' wide and carrying low values, appears just west of the Intrusive. The Red shaft, sunk about 80' on a quartz seam in this fracture zone, shows, with a short adit level, low values, and a favorable dark dike. Just West of this shaft the fracture is apparently faulted, and is disclosed again in a cut West and South. A dike of hard fine grained, dark and very siliceous rock adjoins the fracture on the North. In this zone the quartz looks good, carries copper stain and occasionally fair values. Westerly about 350' from the Intrusion the granite shaft shows a fracture 4' - 6' wide. It is reported to have carried values. One sample at the collar and one at the dump were very low. Still farther West are three cuts which show narrow fractures in the granite. No values were found. Beyond the west end line is an old shaft, the dump from which shows low values and a little lead.

This area is practically unexplored. No underground work has been done. The granite is favorable. Faulting can be expected. It is my opinion that the quartz seen is an "indicator" and that adequate underground exploration - crosscutting the favorable granite as well as drifting - will show ore. It may be that such exploration, with proper surveys, will show the present exposures to be not the same, but parallel to, the fracture zone of Area 1 W.

Reference is made to Assay sheet.

Reference is made to Development Plans.

GENERAL

Values are disappointly low in many places where the ore looks good and where free gold was seen close by. Until adequate openings in new ore can be driven - underground and the entire mine - including the 400 level, properly sampled, no reliable estimates can be made of grade or amount of ore. In spite of low values encountered in this preliminary sampling, I feel that the mine can be made to pay if properly managed.

D-75

PLAN FOR INCREASED ORE DEVELOPMENT

This type of deposit requires very careful mining with strict technical and economic control. Careless or inexperienced management will surely cause a quick loss. Present exposed values are so low that it will require nerve and a firm hand to force development at the proper points.

Investment must be kept as low as possible - providing only essential equipment with every item chosen for its known efficiency.

Development must be started at points of known ore or known "indicators" - which may be more important. A proper technical record must be kept to assist in intelligent planning of further development.

I recommend the following:-

UNDERLINE 1. Build and equip camp and cookhouse, with water supply - Desert tent houses for 10 men.

2. Install mine accounting system with proper cost analysis.

3. Build blacksmith shop and framing shed - wood frame and sheet iron.

4. Install complete set of hand tools - mine, blacksmith and carpenter.

5. Install sampling equipment - crusher, grinder, etc.

6. Trace and white print present mine map.

Purchase necessary drafting equipment and supplies. Survey and map surface area 500' wide from a point 500' East of shaft to West end line of property, controlling by triangulation. On this map show co-ordinates, show 10' contours, all openings, geologic structure, surface sampling, and prepare to tie to the underground survey.

7. Catch up Black shaft, stope and Chute 14, and make a safe and easy manway to the 200 level.

At a point on this manway, above old stopes about 100' above the 200 level, cut a station, and open a chute to the 200 West.

8. At the Black shaft collar install a 5 cs., 18" Blower, with 6 H.P. engine, 4-way gates, and 12" air pipe. Extend this air pipe to face of 200 West.

9. Carry a line from new survey down the manway (7), check old survey and extend to all faces. Coincident with other work check survey throughout

Next Sh.

mine as fast as opened, plotting all geologic structure and surveys.

10. Complete sampling of all surface openings and begin a systematic sampling of all workings as fast as opened, starting with cross cuts and drifts on 200 level.

11. Catch up Main shaft collar, install 10 H.P. hoist and adequate headframe. Straighten and retimber to 200 level.

12. Put 200 level West in good order and lay track to face of main drift.

The mine is then ready for actual development and the 200 level West should be the first point of attack, hoisting thru the main shaft and using the new Black shaft manway.

DEVELOPMENT PLAN

1. With the new surface survey and the extended and verified underground survey as a guide extend the 200 level West into Area 3 W. Drift and crosscut to open the fracture zone found on surface. Develop this ore when found to its limits and sink a winze at the most favorable point.

2. Sink a winze from the 200 W on fracture seen at 277' West of Chute 15.

3. After sampling at 5' intervals for 150' West from Chute 15 on the 200 West, raise on the best ore found.

4. Extend crosscut 2 S on 200 West to cut fracture zone found in cut A on surface.

5. From new station at 130' West in new Black shaft manway drift East and West, cross-cutting to limits of ore. Drop muck to 200 level. Handle tools and men thru manway.

6. During period of 2-3-4-5 clean out one of the raises between the 200 level West and the 100 West and put in a safe manway.

Straighten and retimber Main shaft from 200 to 300.

Put 300 level in order and lay track to face.

Sample 300 level and start development guided by the sampling and by the results of the 200 West work.

Sheet Seven.

D-15

7. Successively open the 400 and 500 levels as rapidly as possible consistent with justification found on the upper levels, following ore down with winzes. At first particular attention should be paid to the orebody in Area 1 W. The map indicates the possibility of very good ore on the 300 West and it is reported that good ore was opened but not followed on the 400 West. No work was done on the 500 where ore could be expected.

It is my impression that given proper funds the above plan will permit starting actual development on ore within 60 days from date of beginning work - and also that a few months work along this plan will expose really valuable ore and justify the hazard.

Very truly yours

R H Dickinson

ESTIMATED COST OF REOPENING AND DEVELOPMENT

Camp and Equipment			
Not including water supply		$900.00	
Office Supplies		50.00	
Drafting equipment & Supplies		120.00	
Blacksmith Shop & Framing Shed		100.00	
Tools		650.00	
Miscellaneous Supplies		500.00	
Sampling equipment & Shelter		600.00	
1 Ton Truck		750.00	
Blower, engine and pipe		450.00	
Ore cars		130.00	
Track, ties for top & 200' level		450.00	
12 H.P. Hoist	$300.00		
Head Frame & Top Work	350.00		
Skip	120.00	1,270.00	$5,970.00
Surface survey & maps	300.00		
Underground " " "	350.00		650.00
Sampling & Assaying			500.00
Shaft Repair to 200 level			2,500.00
Repair & Track laying 200 level			350.00
Black Shaft Opening with manway & Chute to 200			500.00
Magazine			250.00
Contingincies			1,280.00
Total reopening on 200 level			12,000.00
700' drifts, crosscuts raises & winzes of 200 level			7,000.00
Shaft reopening to 300 level		$1250.00	
Manway " " "		250.00	
300 Level Repair		300.00	1,800.00
350' Drift, cross cuts, raises & winzes on 300 level			3,500.00
			$ 24, 300.00

This work should open considerable ore. If it is successful, then another $25,000.00 should be at once spent in development on the 500 and above, as guided by results of the first work.

Assay Number	Sample Taken	$ Gold	Remarks
	At Pit #1, 53' W. and 23' S. of Main Shaft		
8	Across 1.7' Quartzy streak in fracture W side, 15' down on dip. Footwallnof fracture not reached.	0.40	
9	Across 1.8' Granite on S. side of #8	0.40	
10	Across 1.5' Copper stained Granite on N side of #8.	0.20	P
	At Cut A, 108' W and 84' S of Main shaft.		
17	Across 2' Quartz vein material on hanging wall side of fracture zone.	1.60	Mn-3% Cu
18	Across 5' crushed Dike material on S side of #17	0.20	
19	Across 5' crushed Dike material on S side of #18	0.40	
20	Across 2' Granite on N side of #17	0.20	
	At Pit #2, 245' W of Main Shaft		
1	Across 1' Granite on S side of fracture, 5.5' down on W side of pit.	0.20	
2	Across 2.5' Quartzy material on N side of #1.	0.40	
3	Across 1.2' Granite on N side of #2.	0.80	
4.	Across 1' Dike rock on N side of #3. Free gold seen here but none seen in sample.	3.80	
5	Across 1' same streak as #4, but on E side of Pit. Free gold seen here but none seen in sample.	3.00	
6	Across 4' Dike on N side of #4.	0.40	
7	Across 3' of Granite on N side of #6.	Trace	

Number	Sample Taken	$ Gold	Remarks
	At Cut in Road about 300' W. of Main Shaft.		
97	Across 2' Soft Dike. Free Gold seen here but none seen in sample.	2.00	
98.	Across 6' mixed crushed quartz and Dike in fracture on S side of #97	1.20	
	At Pit #3, 284' W. of Main Shaft. This shaft connects to 200 West thru Chute #2.		
11.	Across 5' of crushed Dike on W. Side of shaft in cut above collar S of granite in fracture zone.	0.40	
13.	Across 5' same material on S side of #12. Free gold found here but not seen in sample	17.60	
12.	Across 5' same material on S side of #11.	0.20	
14.	Across 6' same material on S side of #13	3.40	
21.	Across 2' Granite on N side of fracture at E sides of cut-opposite #12.	0.20	
22.	Across 4.5' Dike on S side of #21 Free gold found here but none seen in sample.	1.80	
23.	Across 3.5' crushed mixed granite and Dike on S Side of #22. Check Assay.	0.20 0.40	
24.	Across 1.8' granite on S side of #23 - copper stain and manganese seen. Check Assay.	0.20 0.40	
75.	Across 3.' granite - same places as #24 for check on same.	0.80	
15.	Across 3' crushed quartz, granite and Dike in small cut 4' W of samples #11-14, and on S side of #14 Check Assay.	0.80	Discard error in assay
70.	Resample of #15 for check	0.40	
16.	Across 2.5' granite on S side of #15.	0.20	
71.	Across 1' Dike on N side of #15-70 free gold seen here-none seen in sample copper stained.	32.00	

Number	Sample Taken		
73.	Across 4,' crushed dike material in cut 6' W and 3' N of #15-70, free gold and copper stain seen here - but not seen in sample.	6.80	
74.	Across 2' Red Granite on S side of #73	0.20	
72.	Across 6' crushed dike in cut 15' W and 5' N of #15-70. Free gold and copper stain seen in cut-but not in sample	1.00	

At Shaft 325' W of Main Shaft.

25.	Across 4' crushed granite and Quartz on F.W. W side of shaft 20' down.	0.40	
26.	Across 3' Quartz of Footwall 16' down.	0.60	Mn
27.	Across 1' granite and dike on H. W. side of #26 - free gold seen in sample and in cut.	2.00	

At Black Shaft and F.W. Crosscut - 388' W of Main Shaft.

29.	Across 2' crushed dike on F.W. of shaft S of Black shaft on W side 8' down from surface or 18' down in Black shaft.	0.40	
30.	Across 3.5' crushed Dike N side of #29.	0.60	
31.	Across 1.8' quartz on N side #30/	0.80	No Mn
36.	Across 2.5' quartz and Dike in small stope 7' W of #31 - shows copper stain.	12.20	Mn
32.	Across 3.5' good looking granite in roof of cross cut on N side of #31.	15.20	
33.	Across 1.' quartz on N side of #32.	1.40	
34.	Across 2.5' crushed granite on N side of #33.	2.20	
35.	Across 6' granite on W side of cross cut on N side of 34.	0.20	
37.	Across 3.5 Red Dike on W side Black shft on N side #35.	Discarded Assay	

37.	Reassay	1.20
76.	Resample #37 for check	1.00
38.	Across 4.5' Dike on N side #37	trace
39.	Across 4.5' quartz on N side #38 Check Assay.	1.00 1.20
77.	Resample #39 for check	1.00
28.	Picked sample dike each piece showing free gold. W side Black shaft N side #39.	62.60
40.	Across 3' hard dike in sheared zone 0.5' E of #28. Taken parallel to shear but a cross main fracture.	2.20
41.	Across 2.5' Dike on E side of Black shaft opposite #40 - Free gold seen here but not seen in sample.	7.60
42.	Across 2' granite W side Black shaft N from #40 and 12' below.	4.60
43.	Across 1.8' dike on N side #42 still in fracture.	1.00

AREA 2 W.

On 200 Level West of Chute 15.

91.	Across 3.5' quartzy vein material in roof of drift 25' West of Chute 15.	1.80
92.	Across 2.5' same material 50' West of Chute 15.	0.40
93.	Across 3.5' same material 75' W of chute 15.	9.80
94.	Across 5' silicified granite 100'. West of chute 15.	1.80
89.	Across 5' sheared granite 2' down on W side winze on 200 West level 277' W of chute 15 - free gold seen in dike - but not in sample.	0.20
90.	Across 4' same material same place as #89 but 2' deeper.	0.40

Assay Number	Sample Taken	$ Gold	Remarks
	In Surface Cut 43' W. of Intrusive Tongue.		
61.	Across 2' Black Granite at S end of cut.	1.00	
62.	Across 6.4' fractured Dike on N side of 61.	0.60	
59.	Across 6.5' fractured Dike on N side of 60.	0.40	
62.	Across 6' Iron stained Dike on N side of 59.	0.20	
63.	Across 1.3 crushed quartz on N side of 62. Same streak as in Red shaft and adit.	0.20	
	Check Assay	0.40	
79.	Resample of #63 for check.	0.80	
64.	Across 7' crushed Dike and granite on N side of #63-79.	0.60	
64.	Check Assay.	Trace	
80.	Resample of #64 for check.	Trace	
65.	Across 7' Dike on N side of 64.	Trace	
	Check Assay.	0.20	
81.	Resample of #64 for check.	Trace.	
	Red Shaft Portal, Adit, and Shaft.		
44.	Across 4' shattered Dike on S side Portal.	Trace.	
45.	Across 1.2' Quartz on N side of #44	6.80	Mn
46.	Across 3.5 crushed granite, quartz and Dike on N side of #45.	1.60	
47.	Across 4' quartzy material in roof of adit 5' W of #44-46.	3.20	
48.	Across 3.5' same material 5' W of #47.	3.00	
49.	Across 2.5' same material 5' W of #47.	4.80	
50.	Across 3.0' Dike on F.W. side of adit at face - 14' W of #49.	1.20	

Number	Sample Taken	% Gold	
51.	Across 0.9' quartz, granite on H.W. side of #80.	2.20	
57.	Across 2' quartz and Dike in shaft below adit on W side on F.W.	1.20	
58.	Across 2.2' Quartz and Granite on H.W. side of #57.	0.40	Mn
56.	Across 2' Quartzy material on H W of shaft, W side, 10' below Adit.	4.20	
	Check Assay.	3.60	
52.	Across 1.6' Dike material on F W of shaft W side, 15' below adit.	0.80	
	Check Assay.	0.20	
73.	Resample of #52 for check.	0.60	
53.	Across 2' quartz and granite on H.W. side of #52.	4.20	
54.	Across 2' quartz, 20' below adit.	15.00	
	Check Assay.	16.20	
55.	Across 1' Quartz 25' below adit.	2.00	

Cuts Immediately West of Red Shaft on Same Fracture.

83.	Portions sampled found to be not inplace.	discarded	Pb No Mn
84.	Portions sampled found to be not in place.	discarded	
95.	Across 3.5crushed quartz in cut about 30' West of Red shaft.	2.20	
96.	Across 6' Dike on S side of #95.	0.20	
66.	Across 3' quartz in E side of cut about 67' W and 19' S of Red Shaft	11.20	Mn
67.	Across 4.5' crushed Dike on S side of #66.	0.80	
82.	Resample of #67 for check.	0.40	

Cuts, Etc. on West Portion of Property.

68.	Across 3' of fracture in granite. at collar of granite shaft - E side.	0.20
69.	Grab sample E dump at Granite shaft.	0.40
85.	Across 8' crushed quartz and Dike in cut about 200' W of granite shaft.	Trace.

Assay Number	Sample Taken	$ Gold	Remarks.
86.	Across 5' Iron stained quartz and Dike in cut about 400' West of Granite Shaft.	Trace	
87.	Across 1' siliceous Dike in cut near W end line.	Trace.	
88.	Picked sample from dump of old shaft on property adjoining at W end.	2.40	Pb Mn No Bi

Notes:

Distance and locations are approximate. Pegs mark the exact locations, which should be properly plotted on survey.

P and Mn were found. Copper stain showed in nearly all cupels.

RND #1 T.S. Hard siliceous Granite from Intrusive Tongue on surface West of Gulch and just East of Red Shaft.

RND #2.T.S. Hard fine grained dark dike rock from W side Black Shaft about 20' deep - near sample #28.

RND #3 T.S. Softer, metamorphosed fine grained dark dike rock s owing free gold from near RND #2 T.S.

RND #4 T.S. Hard fine grained dark dike rock from H.W. side of cut 20' W of Red Shaft. Same dike appears on H. W. side of cut next W. It is apparently similar to RND #2 T.S.

RND #5 T.S. Metamorphosed dark fine grained dike rock from surface 90' S of Pit #3 - probably a phase of RND #2 - #3 - #4 T.S.

RND #6 T.S. Sheared granite between Black Shaft and Chute #14 at about 100' deep in productive zone.

RND #7 T.S. Hard granite from Winze on 200 level about 280' West of Chute #15 in productive zone.

SUNRISE-ROSEBUD - THIN SECTION RECORD

R.N. Dickinson 3/7/23

RND-TS-27 Diorite showing free gold on surface, about 35' E of Black Shaft on hanging wall side of fracture zone.

RND-TS-28 Diorite showing free gold from back of 300 West Level, 10' E of Chute 1.

RND-TS-29 Granite (?) showing free gold, from N side of 300 West Level, 10' E of Chute 1.

RND-TS-30 Diorite, showing free gold, the diorite frozen to granite, 300 West Level, 10' E of Chute 1.

RND-TS-31 Granite (?) showing free gold, from 300 West Level, 20' E of Chute 7.

RND-TS-32 Granite (?) altered and iron stained, from 300 West Level, 20' E of Chute 7. This specimen was taken from narrow streak adjoining # 31.

NOTE: Specimens #28, #29 and #30 were taken from the same point in the drift on the 300 West Level.

Specimens #31 and #32 were both taken from another point in the drift on the same level.

D-26

RELIEF MINE

CLASSIFICATION OF THIN SECTION SPECIMENS #1 - #7
By W. H. Tomlinson

	PRIMARY MINERALS	SECONDARY MINERALS
RND-T.S. #1	Microline	
	Quartz	
Intrusive Mass.	Muscovite	
	Biotite	
	Hornblend	
	Magnetite	

Texture - Holocrystalline, Granitoid
Structive - Massive Intrusive
Origin - Igneous
Metamorphosis - None
Rock Species - Granite (normal)

RND-T.S. #2 also #3	Oligoclase	
	Granular Quartz and Feldspar	
Fine grained, dark dikes,	Hornblend	
frequently making ore.	Biotite	
	Magnetite	Epidote

Texture - Holocrystalline, Porphyritic
Structure - Massive
Origin - Igneous
Metamorphosis - See Note
Rock Species - Diorite

Note: The phenocrysts of Oligoclase Feldspar are broken down around the edges and replaced by Quartz and Feldspar - also by hemimorphic Hornblend and Biotite, Part of the finer grained Feldspar is Automorphic.

RND NOTE

Kemp's Tables would place this rock as a Diorite-Porphyry, or if the Quartz is purely a later replacement, as a Syenite-Porphyry.

8-27

	PRIMARY MINERALS	SECONDARY MINERALS
RMD-T.S.-#4		
Dike adjacent to ore body in Area 3 W	Feldspar Quartz	Muscovite Calcite

Texture - Porphyritic
Structure - Intrusive
Origin - Igneous
Metamorphosis - Granulated
Rock Species - Porphyry

Note: Tomlinson states "This is an ancient porphyry showing phenocrysts of Feldspar which are altering to patches of Muscovite or Muscovite and Calcite. The base is fine granular Feldspar and Quartz."

RMD NOTE

This is important, as it undoubtedly has a bearing on the ore deposit in Area 3 W. It may be older that the Granite Intrusive.

RMD-T.S. #5		
A phase of fine grained, dark dike.	Granular Quartz and Feldspar Hornblend Biotite Magnetite Apatite	Epidote

Texture - Holocrystalline
Structure - Massive
Origin - Igneous
Metamorphosis-Slight Hydration
Rock Species - Dbrite

Note: This is same as #2-3 but does not show the phenocrysts. (Probably some metamorphism has occured.)

	PRIMARY MINERALS	SECONDARY MINERALS
RHD-T.S. #6	Orthoclase Quartz	
Granite Ore from Area 1 W about 120' deep	Biotite	Epidote

Texture - Holocrystalline - Granatid
Structure - Massive, Gneissic
Origin - Igneous
Metamorphosis - Dynamic
Rock Species - Granite Gneiss

RHD NOTE: The gneissic structure is due to shearing stress - perhaps from the intrusion of the later granite. This rock is a favorable ore gangue.

RHD-T.S. #7

From 200 level West Near Ore	Orthoclase Oligoclase Quartz Hornblend Biotite Magnetite	Epidote

Texture - Coarse Holocrystalline
Structure - Massive Intrusive
Origin - Igneous
Metamorphosis - Slight Hydration
Rock Structure - Monzonite

Note: "Another massive Intrusive and probably a large body."

RHD NOTE: This is a possibly doubtful classification, without quartz it would be unquestioned, the name "Monzonite" marking a transition between a syenite and a diorite. With Quartz, as reported, I should rather call it a transition phase between a Granite and a Quartz Diorite.

It is important as it may mark another intrusion - having a secondary shattering action on the ore bodies, without accompanying mineralization - thus clearing up an interesting question.

8-27

SUNRISE-[illegible]

CLASSIFICATION OF THIN SECTIONS

4/2/28

By W.H. Tomlinson

RMD-T.S.-#27	PRIMARY MINERALS	SECONDARY MINERALS
Diorite from surface, about 35' E of Black Shaft, on N.W. side of fracture zone.	Plagioclase	
	Hornblend	
	Biotite	
	Quartz	
	Magnetite	Epidote
	Gold	

Texture - Holocrystalline
Structure - Dike
Origin - Igneous
Rock Species - Diorite

NOTE: "Sample 27 is a fine grained Diorite and has the appearance of being a dike rock. Section shows crystalline idiomorphic Plagioclase, Hornblend and Biotite with accessory Magnetite and a slight development of Epidote. In this sample much of the Gold is in extremely finely divided form and even occurs as inclusions within Feldspar crystals. This sample is probably more closely connected with the source of the Gold."

RMD-T.S.-#23	PRIMARY MINERALS	SECONDARY MINERALS
Diorite (?) showing free gold. From back of 300 West Level, 10' E of Chute #1	Magnetite	Quartz
		Biotite
		Epidote
		Gold

Texture - Crystalline granular
Structure - Gneissic
Origin - Probably igneous
Rock Species - Biotite Gneiss

NOTE: "Samples 23 and 31 (b) show a biotitic Gneiss which may be a phase of the Diorite. Sections show abundance of the iron-rich Biotite in a base of crystalline granular Quartz and Feldspar with a little Epidote and oxidized Pyrite. The structure is gneissic. This formation has been intruded by the Granite. Section of sample 31 shows the contact. The Gold in these samples occurs in form similar to that in the Granite."

2-30

SUMMIT-MINING

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RMD-T.S.-#29	PRIMARY MINERALS	SECONDARY MINERALS
Granite (?) showing free gold - From N side of 300 West Level 10' E of Chute #1	Orthoclase and Microcline Oligoclase Quartz Biotite (iron)	Epidote Hematite Gold

Texture - Coarse holocrystalline. Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

NOTE: "Samples 29, 30 and part of 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase, and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather coarse size and always between grains or cracks.

RMD-T.S.-#30	PRIMARY MINERALS	SECONDARY MINERALS
Diorite (?) showing free gold, the diorite(?) frozen to Granite. 300 West Level, 10' E of Chute #1. (Granite also shows free gold)	Orthoclase Oligoclase Quartz Biotite Hornblend Apatite	Epidote Gold

Texture - Coarse holocrystalline. Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

NOTE: "Samples 29, 30 and 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather coarse size and always between grains or cracks."

SUNRISE-MALLEE

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RUF-T.S.-#31	PRIMARY MINERALS	SECONDARY MINERALS
Granite(?) showing free gold. From 300 West Level 20' E of Chute #7. Shows contact with Diorite (?) which also shows free gold. To the eye this specimen is almost a duplicate of T.S. #30	(31 a)	(31 a)
	Orthoclase	
	Oligoclase	
	Quartz	Epidote
	Biotite	Gold

(31 a)

Texture - Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

	(31 b)	(31 b)
		Quartz
		Feldspar
		Biotite
		Epidote

(31 b)

Texture - Crystalline granular
Structure - Gneissic
Origin - Probably igneous
Metamorphosis - By hydrothermal waters
Rock Species - Biotite Gneiss

NOTE: "Samples 29, 30 and part of 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase, and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather course size and always between grains or cracks."

NOTE: "Samples 28 and 31 (b) show a biotitic Gneiss which may be a phase of the Diorite. Sections show abundance of the iron-rich Biotite in a base of crystalline granular Quartz and Feldspar with a little Epidote and oxidised Pyrite. The structure is gneissic. This formation has been intruded by the Granite. Section of sample 31 shows the contact. The Gold in these samples occurs in form similar to that in the Granite.

SUBJECT:-

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RND-T.S.-#32	PRIMARY MINERALS	SECONDARY MINERALS
Granite (?) altered and iron stained, showing free gold. From 300 West Level, 20' E of Chute #7, a narrow streak adjoining T.S. #31	Hornblend Biotite Plagioclase Orthoclase Quartz	Epidote Sericite Gold

Texture - Crystalline granular
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Diorite

NOTE: "Sample 32 shows a basic phase of Diorite with abundant Hornblend as well as Biotite in the granular Quartz and Feldspar base. Part of the Feldspar is idiomorphic."

RND Note: This is the rock locally known as "Red Granite".

Sheet here

SUMMIT-RELIEF

COMMENTS ON MINERALIZATION

R.H. Dickinson - 4/2/26

Thin section specimens RHD-T.S.-#27-32 throw some light on the mineralization of the Relief.

Tomlinson classifies the gold in T.S. #27 as primary - in the other specimens, as secondary. In #27 the gold is in "extremely finely divided form and even occurs as inclusions within Feldspar crystals. This sample is probably more closely connected with the source of the gold." In the other specimens the gold occurs "in stringers or plates of rather coarse size and always between grains or cracks."

Tomlinson states that "all these rocks have been profoundly altered by mineralizing vapors x x x x The same characteristic minerals (iron-rich biotite and Epidote) have developed in different degree in all the various types of rocks."

Also Tomlinson expresses this opinion: "I would suppose that the Gold present had been brought in by thermal waters which penetrated adjacent formations depositing the Gold in the small cracks and interstices between minerals. With the exception of sample 27 the type of deposition is not one that I would expect to continue below water level. The finely divided Gold in sample 27 however may persist or veins may be found that will carry values to lower depths."

My own opinion - based on field observation and on Tomlinson's detailed notes - is that the mineralization is primary, having as its source hot solutions under fairly high pressure and rising from below - probably accompanying the intrusion of either the Normal Granite or the Diorite.

In any event, taking all evidence into consideration, a deposit of magnitude is almost certain. If the gold should prove to be secondary I agree that the ore values would decidedly decrease at some unknown point below permanent water level, but in that case also I feel that the vertical zone from the 400 level to the unknown point below water level might be greatly enriched - perhaps of far greater value than at any point thus far opened in the mine.

If the gold should prove to be primary, as I think, values should continue, about as at present, to any unknown depth.

(Signed) R.H. DICKINSON

-79

Phoenix, Arizona,
January 6th, 1928.

Mr. Ezra W. Thayer, Sr.,
Phoenix, Arizona.

Dear Sir:

December 30th, 1927 to January 4th, 1928, I made a reconnaissance of the area immediately adjacent to the Relief Mine. The following preliminary observations - subject to revision after further study - are submitted.

Immediately South of the Relief Claim, near a corner common to this claim, the Lulu's Patent, and the Moore claim, there are wide fracture zones, showing favorable dike material and favorable granite, adjoining the N-S Intrusive Tongue which extends from just East of the Red Shaft (area 3 W). This point shows a condition favorable to an orebody and is worthy of study.

The Moore Claim West of the Venus shows a fracture carrying some gold and lead values (evidenced by dump sample). The shaft here should be sampled. Some faulting is apparent.

Sunrise #7, #9, #10, #11, lie on the desert and are pretty much covered by debris. They seem important chiefly for their protection to future discoveries.

Sunrise #2 shows favorable granite, cut by frequent fine grained dark dikes and by a few light colored more nearly porphyritic dikes. In places the granite is sheared and stained with Mn.

Sunrise #4 shows a considerable area of favorable granite, cut by numerous favorable dikes and by some more nearly porphyritic light colored dikes. The Discovery Pit, near the West end of the claim, is sunk on a granite - dike contact and shows some shearing, with a little quartz. East and North of this Pit there is a mass of the Intrusive Phase.

Sample #101	Across 5' (1' Granite, 1' Quartz Stringers, 3' sheared Dike) on E end (12' down) of Discovery Pit on Sunrise #4, about 300' East of West End Center.	Au -$0.20 Ag -0.3 oz Cu -Trace

Sheet One.

Sunrise #3 shows irregular occurrence of all formations previously noted except the Intrusive Phase. Near the West end of the claim a shallow pit exposes as strong E - W fracture, dipping N, with favorable granite on the Footwall side, and porphyry on the Hanging Wall. This fracture - over 18' wide - shows much iron, some lead stain, a great deal of spar, and some "lively" quartz. Some distance up the hill there are two more pits on this same fracture, showing similar characteristics. In the most easterly of these pits the fracture is cut off by a fault.

While this fracture is very attractive, it is quite different in appearance from the main Relief fractures. It carries more mica, spar, and Iron than seen elsewhere. Surface values on this fracture are very low. It is quite possible that gold values have been leached on surface. From a pit near the lower shaft at the West end an adit could be driven on the fracture, gaining some depth. This should be given thought as study progresses and perhaps should be later executed.

Sample #102	Across 5' crushed quartz and Dike, Fe stained, 5' down on E side of Pit 25' E of W end of Sunrise #6.	Au - Trace Ag - 0.1 oz Pb - 0.7 %
Sample #103	Across 2.5' crushed quartz, Granite and dike, adjoining #102 toward S.	Au - Trace Ag - Trace Pb - 0.5 %
Sample #104	Across 5' crushed granite and Dike, adjoining #103 toward S .	Au - Trace Ag - Trace Pb - 1.3 %
Sample #112	Across 6' crushed Fe stained Quartz and Dike E side of pit on fracture zone near top of hill 60' W of Discovery, Sunrise #6.	Au - $0.20 Ag - 0.1 oz Cu - - Mn Yes
Sample #113	Across 4' Dike and quartz, W side of Pit at Discovery, Sunrise #6.	Au - $0.20 Ag 0 0.1 oz Cu - Trace

Sunrise #3 At about 400' East of West end there is a large mass of the Intrusive. Just West of this pronounced E-W fractures in favorable dike rock and favorable granite, are exposed in several shafts (inaccessible). The material on dumps is shistose. South of the most westerly shaft a pit discloses a fault in granite. The condition here is interesting but hardly worthy of work at present. After further study of the whole property it would be wise to retimber the collar of deepest shaft and study and sample the underground exposures - cross-cutting enough to get all the pertinent data.

Sample #114	Quartz taken at random from cut dump just E of most westerly shaft on Sunrise #3.	Au - Trace Ag - 0.1 oz Cu - Trace Mn - No

Sunrise #1 These shallow shafts (inaccessible) have been sunk on a narrow E-W spar stringer. The Intrusive apparently covers most of the surface, although a little favorable granite is exposed in the upper shaft. A pit at the Discovery shows a fault fracture with included dark dike material.
The present exposures do not seem important. Some low gold values are reported as having been found in the middle shaft.

Sample #115	Picked quartz from dump at lower shaft near W side of Gulch - Sunrise #1 .	Au - $0.20 Ag - 0.3 oz Cu - Trace

Sunrise #3 Here nothing particularly interesting was seen. There are some dikes and one or two narrow fractures.

Sunrise #5 In the Gulch, about 1500' North of the Relief Camp, and about 600' E of the West end of this claim, at Discovery, there is an important E-W fracture zone showing favorable granite, crushed dike, and a copper-stained quartz stringer. There has been severe shattering here, and the effects are visible for 75' South and 150' North. The Intrusive Phase, and various light and dark colored dikes cut this area. Directly East, on top of the hill, an 85' shaft (inaccessible) shows a copper-stained quartz stringer in favorable granite. Some copper-stain is reported as extending easterly along the top of the ridge.
It is possible that this shattered zone bears some relation to the fractures seen on Sunrise #6, #3 and #16. An adit driven East, from the Gulch at #5 Discovery, on the fracture, might, with proper cross-cutting, throw some light on this situation. The area may become important as study and development progress.
The values found are disappointingly low, but do not necessarily condemn the area.

Sample #99	Picked Quartz on Dump at Shaft, top of hill, on Sunrise #5 East of Discovery, shows Cu stain.	Au - $1.00 Cu - 4.88 %
Sample #105	Across 2' Dike (calcified) on South side of cut at Sunrise #5 Discovery.	Au - Trace
Sample #106	Across 5' crushed light colored Granite adjoining #105 toward North.	Au - Trace
Sample #107	Across 1.6' Brown fine grained dike, crushed, adjoining #106 toward North.	Au - $0.20
Sample #108	Across 5' crushed greenish fine grained dike with copper-stained quartz stringer, adjoining #107 toward North.	Au - Trace Ag - 0.2 oz Cu - Trace
Sample #109	Across 0.8' Copper-stained Quartz in Center of #108	Au - Trace Ag - 0.1 oz

Sample #110	Across 2' calcitized and silicified granite at contact with Dike about 75' South of Sunrise #5 Discovery, on W side of Gulch.	Au - $0.20
Sample #111	Across 4' Calcitised Dike adjoining #110 toward South	Au - $0.20

Sunrise #14 or "Pick-Me-Up". This claim is extremely interesting and may prove very important. From about 200' East of the West end, lying easterly and northerly there is a large well silicified mass of the Intrusive Phase. At one place northerly it is almost entirely quartz. A shaft, about 200' East of the west end shows a strong fracture, dipping South. Near here are a number of fine grained dark dikes and some slightly coarser dikes similar to R.N.D.-T.S. #5. The dikes show a shistose structure and frequent quartz segregations. In the shaft there are copper-stained quartz stringers. To the south lies a large mass of favorable granite. The rocks seen present many phases and show considerable metamorphism.

Easterly there are massive dark dikes. About 800' East of the Shaft there is a massive "blowout" or gossan of quartz and Fe Oxide - some of it showing a shistose structure. Here some copper-stained quartz float was found. R.N.D. - T.S. #9 and T.S. #10 were taken at this point. A short distance farther East a pit discloses a strong fracture showing crushed dike material and bunches of quartz, with an adjoining great mass of favorable granite.

At first thought the exposures on this claim present the possibility of a faulted continuation of the main Relief Mineralized Zone. There certainly are present favorable conditions for ore, and I consider the area very important in spite of the lack of values in surface samples.
A U. S. Bench mark is reported to be on top of hill on the eastern part of this claim, and it should be made the datum for the Relief Survey.

See Recommendations.

Sample #116	Picked quartz from shaft Dump at Discovery on Sunrise #14. Shows heavy Cu stain.	Au - $0.40 Ag - 0.1 oz Cu - 0.53 % Mn - Yes
Sample #117	Random pieces Iron Oxide and quartz at Blowout about 1000' E of West end of Sunrise #14.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #118	Copper-stained Quartz float found at #117	Au - $0.20 Ag - Trace Cu - 0.25 %

Sample #119	Random sample, Bunch of Quartz in most easterly pit on Sunrise #14, about 200' East of #117 - #110.	Au - Trace Ag - Trace Cu - Trace

Sunrise #10 This claim is important. South - on other property - considerable copper stain is reported to have been found. On the claim, about 900' East of the West end, and near the Discovery is a condition worthy of very careful study.

A great mass of fine grained, light-colored rock, trending roughly NW-SE, appears here. The rock, in places over considerable widths, is silicified and mineralised. In spots it is metamorphosed and fractured, and is apparently leached. A good deal of iron and manganese stain is noted. R.N. D. - T.S. #11 is a fresh unaltered specimen of this rock from its easterly margin. East of this mass is favorable granite and West and North appears a great mass of the Intrusive Phase.
A shaft (inaccessible), a short distance NW of Discovery shows copper stained favorable dike material on the dump. NW of this shaft is favorable dike material altered to a gneissic structure, and immediately S E is a belt (at least 20' wide) of the same rock showing a shistose structure, considerable quartz and abundant iron. This latter is well fractured. About 100' East of the shaft is an E - W fracture zone, badly leached. A pit, now partly filled, is reported to have carried gold values at its bottom.

The area is extremely interesting - presenting the possibilities of a considerable ore body. Real conclusions cannot be reached until more trenching is done and a structural study made.

See Recommendations.

Sample #100	Picked Dike rock on Dump at shaft, Sunrise #16 shows copper stain.	Au - $0.20 Cu - 0.3 %
Sample #120	Across 6' Dike (same as R.N.D. - T.S. #11) in cut near Discovery - Sunrise #16.	Au - $0.20 Ag - Trace Cu - 0.05 Mn - Yes
Sample #121	Across 3' crushed iron stained Dike about 75' S and 50' E of shaft on Sunrise #16.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #122	Across 4' NS, on crushed Quartz and dike material on E-W fracture about 100' E of shaft on Sunrise #16.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #123	Picked Shist from Dump at Cut just SE of shaft on Sunrise #16 shows heavy Fe and Quartz.	Au - Trace Ag - Trace Cu - Trace Mn - Yes

29

General I understand that Sunrise #12, #13 and #15 are not located.

The area seen is of strategic importance in protecting the main Relief Mine. As study of the mine and general area progresses certain portions of this group may assure real economic importance - particularly Sunrise #5, #6, #3, #14 and #16.

While values shown by present surface sampling are negligible, they are important as "Indicators". Leaching may have been extensive - both as to gold and copper - and must be studied. Sunrise #14 may have an immediate important bearing on the East extension of the Relief orebody. Sunrise #16 may easily become important as a large low grade copper-gold ore body below the leached zoned

I recommend -

E. General study of Gold and Copper Leaching in fractures on Sunrise #5, #6, #14 and #16.

2. Trenching of areas on Sunrise #14
   a. Near Shaft
   b. On Blowout.

3. Extension of Relief Surface Survey to cover areas 2a and 2b, plotting all geologic structure.

4. Trenching of all fractures and dikes in mineralized area discussed on Sunrise #16.

5. Surface survey of area #4 (about 300' x 400') plotting all geologic structure and tying into Patent Plot Survey.

6. Use U. S. Bench mark on East end of Sunrise #14 as datum for Relief Survey.

Very truly yours,

RM Dickinson

RND
CMI

/o

THIN SECTION RECORD - SUNRISE GROUP

R.N.D. #8 T.S.	Fine Grained, Light Colored dike rock from near discovery Monument at East end of Sunrise #10.
R.N.D. #9 T.S.	Heavy Iron stained Rock - showing Shistose structure - from Blowout about 1000' East of West end of Sunrise #14.
R. N.D. #10 T.S.	Heavy Iron stained quartz from Blowout about 1000' East of West end of Sunrise #14 near R.N.D.-T.S. #9.
R.N.D. #11 T.S.	Fine grained light colored dike rock - fresh, unaltered - from large mass discussed on Sunrise #16. Taken about 100' E and 200' S of shaft.

RELIEF MINE

SUNRISE GROUP - SURFACE

CLASSIFICATION OF THIN SECTION SPECIMENS #1 - #11
By W. H. Tomlinson

	PRIMARY MINERALS	SECONDARY MINERALS
RMD-T.S.-#8		
Fine grained, light colored Dike on Sunrise #10		Epidote Quartz

Texture - Crystalline, granular, fine
Structure - Probably contact zone
Origin - Probably altered Sediment
Metamorphosis - Contact silicification
Rock Species - Silicated Limestone

Note: "These are secondary minerals and there is nothing to definitely indicate their origin."

RMD-T.S.-#9		Hornblend Anorthite
Iron capping on East end of Sunrise #14		Quartz Biotite

Texture - Crystalline, granular
Structure - Gneissic
Origin - Igneous, metamorphic
Metamorphosis - Dynamic recrystallization
Rock Species - Hornblend Gneiss

Note: "Ancient igneous rock altered by recrystallization under dynamic conditions to a Gneiss. The original rock was probably a gabbro."

RMD-T.S.-#10	Quartz Pyrite	Quartz Limonite
Same as #9 but showing quartz.		

Texture - Crystalline
Structure -)Replacement Zone
Origin -)
Metamorphosis - Leached
Rock Species - Quartz Replacement

Note: "A quartz replacement or capping, the section shows two stages of Crystalline Quartz. The first or older is the coarser grained. The second or younger is finer grained and penetrates in between the older crystals, and carries oxidized material (Limonite)"

RMD Note: In my opinion #9 and #10 overlie an important situation as regards ore.

-42-

	PRIMARY MINERALS	SECONDARY MINERALS
RHD-T.S.-#11		
Fine grained light colored dike on Sunrise #16	Feldspar Quartz Biotite	Chlorite

Texture - Crystalline, granular, fine.
Structure,- Gneissic
Origin - Probably Igneous
Metamorphosis - Dynamic recrystallisation
Rock Species - Acid Gneiss

Note: "There is no clue to the origin but the mineralogical composition suggests an acid Igneous rock that has recrystallized under dynamic conditions.

-4-3

ASSAY RECORD — Samples taken by Dr. Hyla

SUNRISE GROUP, KELLY HILL — Jan. 1, 1928.

Sample Number	Where Taken	Ag oz	Au $	Pb %	Cu %
A	Sunrise #4, 250' East of West End Line	Tr	Tr	--	--
B	Sunrise #6, 120' East of West End Line	0.2	Tr	Tr	--
B2	Sunrise #6, From Pit on Apex 600' East of West End Line	0.1	0.40	Tr	--
C	Sunrise #5, From Open Cut	0.2	0.60	--	0.5
C2	Sunrise #5, From Deep Shaft on Hill	Tr	0.20	--	5.0
D	Sunrise #8, 400' East of West End Line, Howdy Claim	0.2	1.80	--	0.3
E	Sunrise #1, 250' West of East End Line	0.1	2.80	--	--
F	Sunrise #14 or "Pick Me Up" - Shaft	Tr	0.40	--	1.62
G	Sunrise #16 From red croppings.	0.1	0.20	--	0.3

BELLEVUE MINE ADDENDA JANUARY 24, 1928

The 300 level and the area exposed by raises and stopes between the 300 and 200 levels seems on inspection to be the most attractive portion of the mine, yet seen underground. The formation is very favorable to ore deposition and I expect wide ore bodies in places. A good deal of iron, well oxidized, is seen. The quartz is "lively" but is apparently well bleached. Free gold was found near chute #1. I think the ore body will prove, on proper development, to be fully as large as that indicated on the 200 level.

The 400 level , east of the shaft, and west of the shaft for nearly all its present length, is driven in an unfavorable and unproductive zone; probably well out nay the hanging wall country. Much fault breccia and much of the normal granite intrusive is seen. The early work here was apparently done without proper knowledge or care.

The westerly end of the drift is in granite schist, favorable to ore and already showing some values. The schist here should, when the real ore zone is entered, show very good values.

The shaft below the 300, and both the 300 and 400 levels are open and in good shape. The 400 level may require timbering in the schist ore.

The 300 level should be properly sampled thruout. The 400 level should be sampled for the most westerly 60'. A structural survey, with a number of thin sections samples- to verify the various formations is imperative.

Extension of both the 300 and 400 levels should be guided by exploratory winzes in ore from the levels above.

The Barclay survey will not be adequate for active development as very few reference points are found.

I see nothing disquieting on the 400 level. Conditions there are just what is to be expected, considering the location of the openings.

Costs of reopening the entire mine will probably be lower than previously estimated.

Inspection of the lower levels makes me feel even more certain of profitable development results if the recommendations made are strictly adhered to. I expect a somewhat better grade of ore around water level.

Prompt opening of the mine is recommended.

R.J. Dickinson

[illegible] by Kirk on 400 West – 400 [illegible]

-45

August 1, 1928

Mr. Ferm W. Thayer
179 East Adams Street,
Phoenix,
Arizona.

Dear Mr. Thayer:

I beg to report the samplings of the Sunrise Relief Mine.

All shafts, drifts, raises, crosscuts, and winzes were carefully examined and a sample was cut from across the ledge in these many different openings.

These samples so taken were broken down to about three-quarter inch fine. Each sample was worked down properly and placed on a canvas, where the 200 pounds was thoroughly mixed and divided into two equal parts of 100 pounds each.

I am sending 100 pounds of this 200 pound sample to your office for your disposition. I am also sending a small sample cut out of the 200 pound lot. This small sample was ground to a 40 mesh fine. About one ounce was taken from this small sample and panned down to a gold residue, which gave an estimate valuation of at least $10.00 per ton. Being an average of ore in place at the mine. However it is difficult to estimate the value of this ore by panning.

In a careful manner of examining and sampling I was unable to find any trace of any other metal, base or otherwise, than gold. Thus with the rich yellow color of the gold, it would indicate the gold to be of a very high grade and near 1000 fine.

I would suggest having the small sample assayed to determine the correct value of the ore in place at the mine.

Development work is progressing in a most satisfactory manner on the 2,3, and 400 foot levels, and as this work progresses more ore of the same grade above stated, is being added to the 110,000 tons blocked out above the 400 foot level.

Sincerely,

David Hile.

-46

EZRA W. THAYER

PHOENIX, ARIZONA
August 17, 1929.

Southwestern Engineering Corp.
606 So. Hill St.,
Los Angeles,
California.

Dear Mr. Shimmin:

Regarding yours of 14th inst. and bulletin #250A.

I am shipping you a sack of ore (94 lbs) from the Sunrise Relief Mines Inc., a gold mine nine miles north of Peobia, Arizona, a station on the Santa Fe R.R.) by prepaid express to # 4800 Santa Fe Ave. ($5.75)

I am enclosing a list of 57 shipments made from this property to the U. S. Mint, taken from about seven thousand tons of ore. I have slides and microscopic analyses of the sundry ores and rock from this property, made by W. Harold Tomlinson, of Swarthmore Pa., if of any value to you in determination.

My foreman tells me the sack represents a fair average of (150000) tons blocked out and pans around $10.00. My sampling of the sack runs higher.

It is my desire that you work this as promptly as possible, and to have no hesitancy in advising me. Kindly know that this is practically a close corporation, and as its backer I do not wish anything but facts.

Kindly advise me if you need further information. Reference--Any bank in town.

Yours very truly,

Ezra W. Thayer

EZRA W. THAYER

For gold--
Have check assay--
Receipt if any returned--

CHAS. A. DIEHL

Phoenix, Arizona,
Aug 9 1920

ARIZONA ASSAY OFFICE

Phone 4447 · 315 North First Street · P. O. Box 1148

This Certifies That the samples submitted for assay by Mr. Vern T. Thayer contain as follows per ton of 2000 lbs. Avoir.:

SAMPLE MARKED	SILVER OUNCES PER TON	VALUE AT PER OZ.	GOLD OUNCES PER TON	VALUE AT $20 PER OZ.	PERCENTAGE
1			.99	$17.80	
2			.67	$13.40	
3			1.25	$25.00	
4			.53	$10.60	
5			.86	$17.20	
6			.68	$13.60	
7			1.16	$23.20	
8			.70	$14.00	
9			1.19	$23.80	
10			1.37	$27.40	

Charges $ 10.00

Assayer Chas. A. Diehl

1-57

SOUTHWESTERN ENGINEERING CORP.

METALLURGICAL TESTING DEPARTMENT

SEPTEMBER 19, 1929

Results of metallurgical tests conducted on a sample of ore from the Sunrise Relief Mines, Inc., submitted by Mr. Ezra W. Thayer, 179 E. Adams St., Phoenix, Arizona.

SOUTHWESTERN ENGINEERING CORP.

1221 HOLLINGSWORTH BLDG.

LOS ANGELES, CAL.

TEST NO. 2258

1-53

SOUTHWESTERN ENGINEERING CORP.

METALLURGICAL TESTING DEPARTMENT

SEPTEMBER 19, 1929

Results of metallurgical tests conducted on a sample of ore from the Sunrise Relief Mines, Inc., submitted by Mr. Ezra W. Thayer, 179 E. Adams St., Phoenix, Arizona.

SAMPLE NO. 2258

A sample of about 100 pounds of ore was submitted for testing. Examination of the sample showed the ore to be considerably oxidized with a small percentage of sulphides and oxidized copper minerals. It was observed that the gold was finely disseminated through the gangue and flaky in form.

The sample was crushed to pass a 4-mesh sieve, carefully sampled, assaying as follows:

Gold	1.02 oz. per ton
Silver	.20 oz. per ton
Copper	.33 per cent

TEST #1

A charge of 700 grams of ore previously crushed to pass a 10-mesh sieve was ground in a laboratory ball mill with 700 grams of water for 15 minutes, then transferred to a bottle, the pulp diluted to 4 parts of water to 1 of ore and amalgamated with 100 grams of mercury by rolling for one hour.

The amalgam and free mercury were recovered by panning the charge.

The amalgamation tailing was then transferred to a laboratory flotation machine and floated after first conditioning the pulp for five minutes with sodium sulphide and P. E. oil.

Reagents used for flotation per ton of ore were as follows:

At conditioning	-	2.85# sodium sulphide
		.5# P. E. oil
At flotation	-	.15# Yarmor pine oil

Results of this test indicate that 71.50 per cent of the gold was recovered by amalgamation; that from every 100 tons of similar amalgamation tailing there would be produced:

4.57 tons of Rougher Flotation Concentrate

	Assaying	Containing
Gold	4.56 oz. per ton	20.86 per cent of the gold
Copper	.72 per cent	---

There would be recovered by amalgamation and flotation 92.36 per cent of the gold.

The ratio of concentration was 21.88 tons into one ton.

TEST #2

In this test a 700 gram charge of minus 10 mesh ore was ground for 15 minutes, then transferred to a laboratory flotation machine and floated in two roughing stages of 5 and 12 minutes each. The rougher flotation concentrate was not cleaned.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# soda ash
.5# P. E. oil

At flotation, 1st series - 1.42# sodium sulphide
.1# Yarmor pine oil

2nd series - .08# potassium ethyl xanthate
.26# P. E. oil
2.85# sodium sulphide
.15# Yarmor pine oil

Results of this test indicate that the ratio of concentration was 18.87 tons into one ton; that from every 100 tons of similar ore there would be produced:

5.30 tons of Rougher Flotation Concentrate

	Assaying	Containing
Gold	18.22 oz. per ton	91.89 per cent of the gold

TEST #3

In this test 3 700 gram charges of minus 10 mesh ore were each ground and floated separately; the rougher flotation concentrate combined and the flotation tailings were combined. The combined flotation tailings were tabled.

In this test the sodium sulphide was added to the charge at the ball mill.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# sodium sulphide
.53# P. E. oil

At flotation, 1st series - .08# potassium ethyl xanthate
.20# Yarmor pine oil

2nd series - .34# P. E. oil
.08# potassium ethyl xanthate
.10# Yarmor pine oil

Results of this test indicate that the ratio of concentration by flotation was 16.78 tons into one ton; that the ratio of concentration by tabling was 227.36 tons into one ton; that from every 100 tons of similar ore there would be produced:

5.96 tons of Rougher Flotation Concentrate

Assaying		Containing	
Gold	13.44 oz. per ton	82.14 per cent of the	gold
Silver	.80 oz. per ton	32.88 " " " "	silver

.44 tons of Table Concentrate

Assaying		Containing	
Gold	22.56 oz. per ton	10.18 per cent of the	gold
Silver	.90 oz. per ton	2.59 " " " "	silver

Combined recovery by flotation and tabling would be:

92.32 per cent of the gold
35.47 " " " " silver

TESTS #4, #5, #6 and #7

For these tests about 2000 grams of the minus 10 mesh ore was ground dry in a pulverizer to pass a 65 mesh sieve.

Test #4 was a preliminary test conducted to determine the amenability of this ore to treatment by cyanidation by agitation.

After the results of Test #4 had been received, Tests #5, #6 and #7 were made to determine the effect of a stronger cyanide solution with 16 hours of agitation and also 24 and 48 hour agitation periods with a weaker cyanide solution than used in Test #4. Following is the tabulated data of Cyanidation Tests: #4, #5, #6 and #7:

Number of Test	4	5	6	7
Hours of Agitation	16	16	24	48
Grams of ore in charge	400	400	400	400
Ratio of solution to ore	3:1	3:1	3:1	3:1

-56-

Number of Test	4	5	6	7
Pounds of lime added per ton of ore	5.00	5.50	6.50	7.50
Alkalinity of cyanide solution in pounds of CaO per ton of solution at finish	tr	tr	tr	.10
Strength of cyanide solution in pounds of sodium cyanide per ton of solution at start	1.75	2.95	1.03	1.03
Strength of cyanide solution in pounds of sodium cyanide per ton of solution at finish	1.10	2.10	.75	.75
Consumption of sodium cyanide in pounds per ton of ore	1.95	2.55	.84	.84
	Gold	Gold	Gold	Gold
Assay of Heads	1.02	1.02	1.02	1.02
" " cyanide tailing	.06	.05	.05	.015
Indicated extraction	94.21	94.21	95.10	98.53

Results of these tests indicate that for the 16 hour agitation period the indicated extractions are the same, but that the consumption of sodium cyanide was higher when using a 2.55 pound cyanide solution than when the 1.95 pound cyanide solution was used.

Results of Tests #6 and #7 indicate an extraction of 95.10 per cent of the gold with a 24 hour agitation and an extraction of 98.53 per cent of the gold with a 48 hour agitation.

TEST #3

In this test 6-700 gram charges of the minus 10 mesh ore were each ground for 20 minutes and floated separately. The rougher flotation concentrates were combined as were the flotation tailings. The flotation tailings were then tabled.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# soda ash
.5# P. E. oil

At flotation, 1st series - 1.42# sodium sulphide
.1# Yarmore pine oil
2nd series - 2.85# sodium sulphide
.08# potassium ethyl xanthate
.26# P. E. oil
.15# Yarmor pine oil

Results of this test indicate that the ratio of concentration by flotation was 23.2 tons into one ton; that the ratio of concentration by tabling was 714.28 tons into one ton; that from every 100 tons of similar ore there would be produced:

-57

4.31 tons of Rougher Flotation Concentrate

Assaying		Containing
Gold	20.83 oz. per ton	94.77 per cent of the gold
Silver	1.60 oz. per ton	41.80 " " " " silver

.14 tons of Table Concentrate

Assaying		Containing
Gold	13.50 oz. per ton	0.20 per cent of the gold
Silver	.35 oz. per ton	0.30 " " " " silver

TEST #9

This test was conducted the same as Test #8 but with a 10 minute grind for each charge instead of a 20 minute grind.

Reagents used in this test were the same as in the previous test.

Results of this test indicate that the ratio of concentration by flotation was 38.91 tons into one ton; that the ratio of concentration by tabling was 294.12 tons into one ton; that from every 100 tons of similar ore there would be produced:

2.57 tons of Rougher Flotation Concentrate

Assaying		Containing
Gold	35.20 oz. per ton	84.90 per cent of the gold

.34 tons of Table Concentrate

Assaying		Containing
Gold	24.48 oz. per ton	7.81 per cent of the gold

The combined recovery by flotation and tabling would be 92.71 per cent of the gold.

A 700 gram charge of the ore prepared in the same way as the pulp was prepared for the tests for cyanidation, has been submitted to the Dorr Company for tests relative to the settling properties of this ore.

The reagents added per ton of ore to this charge of 700 grams before submitting to the Dorr Company were as follows:

1.00# of sodium cyanide
6.00# of hydrated lime

-55

CONCLUSION - SAMPLE #2258

Results of the metallurgical tests conducted on the sample of ore submitted, indicate that the ore is amenable to treatment with a high recovery of the gold by several methods, namely:

By amalgamation and flotation
By flotation
By flotation and tabling
By cyanidation by agitation

Results of tests relative to the settling properties of the ore when ground to pass a 65 mesh sieve, will determine the feasibility of cyanidation by agitation, using a counter-current system.

It is to be noted that the consumption of cyanide was lower when using a weak cyanide solution.

Considerable difficulty was encountered when filtering and washing the cyanidation tailings due to the slimes forming on the surface of the cake and thus preventing the passage of the solution wash.

The rougher flotation concentrates were not cleaned in any of the flotation tests for the reason that it was thought impossible to keep coarse gold, that had once been floated, from settling out in the highly diluted pulp which would result when cleaning the rougher concentrate. In practice a considerably higher grade concentrate and a higher ratio of concentration can be expected than the results of the flotation tests show.

SOUTHWESTERN ENGINEERING CORP.

By Otis D. Welsch.

GJ
9-20-29

63

TELEPHONE TR 3404

FORM 8 10-M 2-29

METALLURGICAL DEPARTMENT

Southwestern Engineering Corporation

LOS ANGELES, CALIFORNIA

METALLURGICAL TEST

20 Min. Grind

Date Sample Received August 21, 1929 Test by Flotation & Tabling

Ore from Sunrise Relief Mines, Inc. Date Sept. 17, 1929

Description of Sample Gold Ore Weight Ore Tested 4200 Grams

Lot 2253 Test 8 Mesh 1 + 65 Time of Test 5 - 12 MINUTES Ratio of Liquid to Solids 4:1

91.3% - 200

PRODUCTS	Weight per Cent	ASSAYS							
		oz. Gold	oz. Silver	% Copper	% Lead	% Zinc	% Iron	% Insol.	
Assayed Head		1.02	.20	.33					
Calculated Head	100.00	.95	.17						
Flotation Concts	4.31	20.38	1.60						
Table "	.14	13.50	0.35						
" Tailing	95.55	.05	.10						

DISTRIBUTION—Showing per cent of total metal contained in different products.

	Weight per Cent.	Gold	Silver	Copper	Lead	Zinc	Iron	Insol.	
Calculated Head	100.00	100.00	100.00						
Flotation Concts	4.31	94.77	41.80						
Table "	.14	.20	.30						
" Tailing	95.55	5.03	57.90						

Reagents used pounds per ton of ore: As ball mill — 2.35# soda ash, .5# P.E. oil.

1st series — 1.42# sodium sulphide, .1# Yarmor pine oil.

2nd series — 2.05# " " , .06# xanthate, .20# P.E. oil, .1# Yarmor Pine Oil

Remarks:

Did not clean concts. Tabled flotation tailing

Assayer Ross & Co. Signed

64

TELEPHONE TR 3404

FORM G 10-M 2-29

METALLURGICAL DEPARTMENT

Southwestern Engineering Corporation

LOS ANGELES, CALIFORNIA

METALLURGICAL TEST

10 Min. Grind

Date Sample Received Aug. 21, 1929 Test by Flotation and Tabling

Ore from Sunrise Reli of Mines, Inc. Date Sept. 17, 1929

Description of Sample Gold ore Weight Ore Tested 4200 grams

Lot 2253 Test 9 Mesh 15% + 48 Time of Test 5 - 12 MINUTES Ratio of Liquid to Solids 4:1
84.1% - 200

PRODUCTS	Weight per Cent	ASSAYS							
		oz. Gold	oz. Silver	% Copper	% Lead	% Zinc	% Iron	% Insol.	
Assayed Head		1.02	.2	.33					
Calculated Head	100.00	1.065							
Flotation Concts	2.57	35.20							
Table "	.34	24.48							
" Tailing	97.09	.03							

DISTRIBUTION—Showing per cent of total metal contained in different products.

	Weight per Cent	Gold	Silver	Copper	Lead	Zinc	Iron	Insol.	
Calculated Head	100.00	100.00							
Flotation Concts	2.57	84.90							
Table "	.34	7.83							
" Tailing	97.09	7.27							

Reagents used pounds per ton of ore: No ball mill - 2.05# soda ash, .5# P.E. oil
1st series - 1.42# sodium sulphide, .1# Yarmor pine oil
2nd series - 2.33# " " , .08# xanthate, .26# P.E. oil, .18# Yarmor pine oil

Remarks:

Did not clean concts. Tabled flotation tailing

Assayer Peroni & Co. Signed

65

SIZING TESTS - SAMPLE #2250

Mesh	Flotation Tailing Test #1	Flotation Tailing Test #2	Table Tailing Test #5	Cyanide Tailings Tests 4,5,6 & 7	Table Tailing Test #8	Table Tailing Test #9
+48	0.0	0.0	0.0	0.2	0.0	0.1
-48+65	0.5	0.6	0.2	0.5	0.1	0.9
-65+100	2.0	1.9	2.7	12.6	1.0	2.8
-100+150	4.7	4.8	4.5	16.8	2.6	3.0
-150+200	7.0	7.0	7.0	12.6	5.0	9.1
-200	85.8	85.7	86.5	57.3	91.3	84.1