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REPORT

YOUNG MINES CO. LTD.

MAMMOTH MINES, SUPERSTITION MINING DISTRICT, PINAL AND MARICOPA COUNTIES, GOLDFIELD, ARIZONA.

Compiled.

BY

B. A. Picard, E. M.

and

GEO. U. YOUNG,

PHOENIX, ARIZONA.

TO WHOM IT MAY CONCERN:

The following report on the Mammoth Mines is assembled from several reports furnished me; those worthy of especial mention being by E. O. Kennedy E. M., and Edgar W. Smith E. M.

Mr. Smith was in charge of the property for several years and is to be credited with the major portion of the details, viz. maps, sampling, assays, geology, etc.

To the information and deduction furnished me, I have added in a general way, such knowledge and ideas of the property as I have acquired through intimate association, work, and ownership during the past several years.

The report is written primarily to assemble under one cover the most of the details at hand and to place before you such facts and opinions as might be of interest to an engineer.

COMPANY

The Young Mines Co., Ltd. is an Arizona Corporation, incorporated for ~~seven hundred~~ one million five hundred ~~and fifty thousand~~ dollars ($1,500,000.00) with ~~seventy-five thousand (75,000)~~ one million five hundred thousand shares, of a par value of ~~ten~~ one dollars ($1.00). The stock is held in a close corporation; George U. Young being the principal owner.

The mines owned by the company are known as the Mammoth Gold Mines, at Goldfield, Arizona.

LOCATION.

The Mammoth group of mines are situated on the Phoenix-Roosevelt Dam Highway, twenty miles East of Mesa, Arizona, and thirty-eight miles East of Phoenix. Mesa, on the Arizona and Eastern Railroad, is the nearest railroad station and the present shipping

point.

Phoenix, the capital and metropolis of Arizona, is the base of supplies. Daily auto stages between Phoenix and Globe over the Roosevelt-Dam Highway, pass the camp within one hundred yards. The road is well constructed, and as there is but a slight rise from Mesa, and there are no abrupt grades, conditions are ideal for heavy motor truck freighting in all kinds of weather.

The forty-five thousand volt electric transmission line from Roosevelt Dam to Phoenix, crosses the property within one thousand five hundred feet of the main workings and will furnish all the power required for any sized plant.

CLAIMS AND TITLES

The group comprises nine full sized claims (600' X 1500') and five fractional claims all unpatented, contiguous lode claims.

In addition an isolated claim one and one half miles south of the main group, called the Eclipse, has been located for water purposes. Survey for patent has been made and approved, but the application has not been filed. The total area is about two hundred and thirty acres.

The names of the claims are shown on the plot herewith and are known as the Mammoth Group in the Superstition Mining District in the Counties of Maricopa and Pinal and are duly recorded in the offices of the County Recorders at Phoenix and Florence, Arizona.

The title is perfect and beyond dispute, the owners having been in quiet possession for many years. There is sufficient development work to acquire patent

and as before mentioned the claims have been officially surveyed for patent.

The property has been held by the Young Mines Co., Ltd. since March 25, 1910, pursuant to contract or option to purchase, and under deed since March 27, 1917.

HISTORY

Probably no district or mine in the southwest is better known than the Superstition Mining District and the Mammoth Mine. Producing mines were known in the district twenty-five years ago.

This property was discovered in 1890 and worked two years on high grade ore. Bullion receipts at hand show a production of over four hundred thousand dollars ($400,000.00). No doubt much ore was taken out, of which no record is to be had. The property was without doubt, the largest and richest gold mine in Arizona and supported a small town, with a school for forty-five pupils. The ore averaged forty dollars ($40.00) to the ton and was entirely free milling, with vast tonnage seemingly inexhaustable in those days. While large bodies of rich ore were being blocked out, the timbering was neglected and most of the openings and shafts for some seven hundred feet along the ledge "caved in" and closed up the workings. In what was known as the "Mormon Stope" near the mill, there was blocked out about one hundred thousand dollars ($100,000.00) worth of rich ore. This was completely lost in the "cave in." The property was not reopened at that time on account of the death of its owner, Mr. Hall.

In 1910 the property was taken over by George U. Young, who has successfully opened up the property and by a carefully planned development scheme has proven the mine to be one of vast tonnage of both high and low grade gold values.

GEOLOGY

The claims cover a portion of a broad rolling, more or less cemented detrital basin, cut by several dry washes.

Most of the rock exposures are small patches in the dry washes, making geological conclusions from surface examination extremely uncertain.

At the north end of the group is a range of low peaks of volcanic rocks; to the east lies the Superstition Mountain which is "dactite;" to the south and west lie the upper slopes of the Salt River Valley.

The elevation is 2035 feet above sea level.

Accompanying this report is a geological map by Edgar W. Smith, E. M., who has given this feature a more thorough study than any other engineer. The following discussion is offered in connection with the map.

The principal ore bearing rock is a very course brecciated granite associated with which are a full series of tertiary, lavas, running from the old grey andesite to the comparatively recent dacite flows of the Superstition Range. Glassy rhyolites are noted in isolated exposures. These rocks are all highly altered in the mine which is four hundred and sixty-five feet deep.

Cutting through the entire formation are two main fault systems. The older system comprises a complex series running northwest. The second system or the more recent, called the Mammoth Fault, has a strike of almost due north, dipping 78° to the west. This system cuts the older series on the Mammoth Group.

the older series on the Mammoth Group.

It is along the Mammoth Fault and at its intersection with the northwest fault that the higher grade ore is found; and it is generally believed that the brecciation in the granite comprising the known low grade ore zone, is due to the Mammoth faulting.

This fault is of unusual length running through the entire district. Associated with it is a minor fault on the Black Canyon claim which forms the Black Queen ore body. To the north of the group the fault is made up of quartz filled fractures.

The two known developed ore bodies are the Mammoth and the Black Queen. But mineralization has been proven for the entire distance between them by shallow shafts sunk along the fault plane.

Further discussion of the ore and ore bodies will be found later under "ORE."

DEVELOPMENT

Mammoth Ore Zone.

See map herewith.

There are four main shafts sunk on this ore zone, viz. the South Shaft, four hundred and sixty-five feet in depth, along the dip of the fault; the Main Shaft, two hundred and twenty-five feet in depth, vertical in the low grade ore zone; the North Shaft, three hundred and twenty-five feet in depth, along the dip of the fault; and the New Shaft sixty feet in depth along the dip of the fault.

The horizontal distance along the fault from the South Shaft to the New Shaft is seven hundred and fifty feet.

Numerous levels have been opened up from all the shafts by drifting, crosscutting, raises and winzes. Considerable of the ground is caved and inaccessible, however.

By far the most important working is the four hundred and twenty-five foot level from the South Shaft. This level covers a longitudinal distance of eight hundred feet, or one hundred feet south of the South Shaft and six hundred and fifty feet north.

In addition to this main development work, a vast amount of exploration work has been carried on in the brecciated ore zone by means of the shafts and pits sunk to depths varying from ten to one hundred feet. By this method the ore zone has been explored over an area four thousand feet long by five hundred feet wide, and has generally proven the existence of an immense tonnage of low grade gold ore.

Black Queen Ore Zone.

A shaft one hundred and thirty-five feet, together with many shallow shafts and pits represent the development on the Black Queen.

ASSAYS

A mass of information has been furnished me regarding the assay value in various parts of the mine, both from mine, sampling and from milling tests. Those have been assembled on assay maps and sheets as shown herewith.

It will be noted that bodies of ore have been discovered assaying from $2.25 to several hundred dollars per ton.

An average sample taken from all available places

in the mine,-- the low grade ore in the South Shaft, the North Shaft, the North and New Shafts, dumps and caved ground, etc., assayed $5.30 in gold per ton.

The computed average of all samples taken in the mine and surface developments is $2.69 gold per ton. This covers an area five hundred feet long, four hundred and twenty-five feet deep and five hundred feet wide.

ASSAYS ON MAMMOTH MINE

Goldfield, Ariz.

North Shaft — Sheet #1

1st part of 2nd, 3rd Levels

No.	Date	Value-Gold	Location	Remarks
			First Level	
1	4-8	$ 8.00	15 ft N. of Shaft	Pile of muck
2	4-8	1.20	15 " " " "	Back of drift
			Second Level	
3	2-	2.80	Intermediate 15 ft N. of shaft 10" Wide	
4	"	1.20	" 157' " 5" "	
5	"	0.80	" 163' " 20" "	At top of
6	"	1.60	" 169' " 22" "	
7	"	2.00	" 175' " 15" "	Raise at
8	"	2.40	" 181' " 6" "	
9	"	1.60	" 187' " 24" "	and of S. on drift
10	"	1.60	" 193' " 20" "	
11	"	1.20	" 198' " 12" "	West wall
12	"	3.20	N. Drift 70' "	Hole in Foot Wall
13	"	2.40	" 76' "	Top of raise
			THIRD LEVEL	
15	4-3	0.40	65' N. of Shaft	Caved Muck-Course
16	"	0.40	" " " "	" " General
17	"	0.80	" " " "	" " Pines
			North Shaft-Second Level-North Drift	
1	2-26	0.40	151' N. of Shaft	Caved Muck from Mormon Stope
2	2-27	0.80	156' " " "	" " " "
3	2-28	11.60	158' " " "	" " " "
4	3-1	4.80	162' " " "	" " " "
5	3-2	2.00	159' " " "	" " " "
6	3-3	1.60	168' " " "	" " " "
7	3-4	1.60	164' " " "	" " " "
8	3-5	1.20	162' " " "	" " " "
9	3-6	2.00	154' " " "	" " " "
10	3-7	2.80	163' " " "	" " " "
11	3-9	2.80	170' " " "	" " " "
12	3-10	4.00	186' " " "	" " " "
13	3-12	1.40	167' " " "	" " " "
14	3-13	0.60	165' " " "	" " " "
15	3-14	2.20	181' " " "	" " " "
16	3-16	1.60	181' " " "	" " " "
17	3-17	3.60	182' " " "	" " " "
18	3-18	3.60	185' " " "	" " " "
19	3-19	2.00	183' " " "	" " " "
20	3-20	0.40	184' " " "	" " " "
21	3-21	34.80	184' " " "	Picked sample
22	3-21	1.80	181' " " "	Caved muck from Mormon Stope
23	3-24	66.40	182' " " "	4" stringer, hang Wall of drift

North Shaft-second leve[illegible]rth shaft
(continued)

No.	Date	Value-Gold	Location	remarks
24	3-25	$64.80	183' N. of shaft	Same stringer, 5' North of #23
25	3-25	0.80	183' " " "	Caved Muck Mormon Stope
26	3-25	3.40	183' " " "	Course Rock " "
27	3-25	3.20	183' " " "	Pines from " "
28	3-26	1.20	184' " " "	Caved Muck " "
29	3-26	39.60	184' " " "	8" Stringer Hang wall of drift
3o	3-27	4.00	185' " " "	Caved muck Mormon Stope
31	3-27	3.20	185' " " "	Same place check sample
32	3-27	1.20	180' " " "	1" stringer foot wall
33	3-28	3.20	185' " " "	Same as #31
34	3-28	4.40	185' " " "	2'wide on hang wall
35	3-28	4.40	185' " " "	Course rock at #33
36	3-29	8.00	190' " " "	Caved muck Mormon Stope
37	3-29	8.00	190'-200' " "	" " over 10' of pile
38	3-29	28.80	190' " " "	Hang wall of drift
39	3-29	2.40	191' " " "	Caved muck-Norman Stope
40	3-29	5.60	191' " " "	Hang Wall of drift
41	3-29	20.80	" " " "	~~Caved muck Mormon Stope~~
42	4-1	1.60	" " " "	18" Stringer-Hang wall
43	"	5.60	192' " " "	Caved Muck-Mormon Stope
44	3-31	4.00	191' " " "	" " " "
45	4-2	4.00	192' " " "	" " " "
46	"	29.20	" " " "	" " " "
47	" 3	29.20	" " " "	1" stringer foot wall
48	" "	2.40	" " " "	1" " hang wall
49	" 4	1.60	193' " " "	Caved Muck Mormon Stope
50	" "	1.80	" " " "	" " " "
51	" "	0.40	" " " "	1" stringer-foot wall
52	" 5	3.20	" " " "	Caved Muck-Mormon Stope
53	" 5	5.60	" " " "	" " " "
54	" 6	2.40	194 " " "	" " " "
55	" "	7.20	" " " "	Hang Wall Stringer
56	" "	0.80	" " " "	" " of drift
57	" 7	1.00	" " " "	Caved Muck-Mormon Stope
58	" 9	5.60	195' " " "	" " " "
59	" "	24.80	" " " "	" " " "
60	" 10	8.80	" " " "	" " " "
61	" "	0.40	" " " "	Hang Wall of drift
62	" 11	1.60	197' " " "	Caved Muck-Mormon Stope
63	" 12	4.00	" " " "	" " " "
64	" "	20.80	" " " "	4" Stringer on Hang Wall
65	" 16	64.40	" " " "	Hang wall knck in place
66	" 17	64.40	198' " " "	8" Stringer hang wall
67	" "	40.20	" " " "	" soft guage next to #66
68	" 19	1.00	162' " " "	Drift Chute
69	" "	.80	200' " " "	Breast "
70	" "	27.60xcut	182' " " "	" x cut west
71	" "	26.40 "	" " " "	Picked sample in #70 Breast
72	" "	8.00 "	" " " "	8" seam beyond talc slip
73	" "	19.60 stope from xcut		Breast muck
74	" 22	8.00 "	" "	" "
75	" "	8.40 "	" "	" "
76	" "	3.40	200' N. of shaft	" chute
77	" 23	2.40	201' " " "	Drift caved muck Mormon stope
78	" "	9.60 stope in hang walls		Breast 7' wide

North Shaft-Second Leve North Drift

No.	Date	Value-Gold	Location	Remarks
79	4-24	$ 1.60	Stope in hang wall of drift	Caved muck-Mormon Stope
80	"	6.40	" " " "	3' of rock in place
81	"	4.40	" " " "	Caved crushed rock
82	" 25	6.40	" " " "	Crushed rock
83	"	0.80	204' N. of Shaft	Solid rock-foot wall
84	" 26	4.00	205' " " "	Muck from Mormon Stope
85	"	5.20	Stope in Hang wall of drift	Crushed rock in breast
86	" 27	2.40	" " " "	Caved rock " "
87	"	9.60	208' N. of shaft	Drift breast
88	"	4.00	" " " "	Stringers in foot wall
89	" 28	0.80	" " " "	Muck Drift Breast
90	"	3.20	Stone in hang wall of drift	Crushed rock and caved muck
91	" 29	1.60	" " " "	West ½ of breast
92	"	3.20	" " " "	East ½ of Breast
93	"	4.80	" " " "	Breast-picked
94	" 30	19.60	" " " "	West ½ of breast
95	"	6.00	" " " "	East ½ of breast
96	5-1	16.80	210' N. of shaft	Caved muck-Mormon Stope
97	" 3	18.80	" " " "	" " " "
98	" 4	2.40	211' " " "	" " breast
99	"	2.00	" " " "	" " East side
100	" 5	0.40	" " " "	" " Mormon Stope
101	" 6	4.00	212' " " "	" " " "
102	"	1.20	Stope of drift	" " & filling
103	" 7	3.20	212' N. of shaft	" " Mormon Stope
104	" 8	2.20	213' " " "	Muck in drift
105	" 10	47.60	" " " "	Caved muck-Mormon Stope
106	"	8.80	" " " "	" " " "
107	" 11	9.60	" " " "	" " " "
108	"	10.00	" " " "	" " " "
109	" 12	2.40	215' " " "	" " " "
110	" 13	4.80	" " " "	" " " "
111	4-8	4.00 raise 45'	" " " "	South side 18" wide
112	"	trace	" " " "	Old filled stope muck
113	"	0.40	" " " "	North side 5' wide
114	3-18	5.10	Picked samples N of shaft	6" wide #1
115	"	5.10	" " "	1" wide #2
116	"	8.40	" " "	#3-
117	"	3.60	" " "	#4-2" wide
118	"	9.10	" " "	#5-3" "
119	"	4.80	" " "	#6-
120	"	0.40	" " "	#7-
121	"	5.10	" " "	#8-
122	"	8.40	" " "	#9-
123	"	3.60	" " "	#10-
124	"	22.00	" " "	#11-1" "
225	"	2.00	" " "	#12-
			North Shaft-Fifth Level ✓	
1	Feb.	1.60	56' N. of Shaft	1½ wide Roof
2	"	1.20	68' " " "	6" " "
3	"	0.80	92' " " "	12" " "
4	"	0.80	103' " " "	12" " "
5	"	3.20	113' " " "	24" " "
6	"	1.60	118' " " "	24" " "
7	"	4.00	123' " " "	18" " "
8	"	0.40	140' " " "	5' " "
9	"	0.40	147' " " "	Face of drift
10	Mch 7	4.40	114' " " "	Bottom muck pile face
11	"	5.20	" " " "	Middle " " "
12	"	2.40	116' " " "	Muck pile

North Shaft-Fifth Level (Continued)

No.	Date	Value-Gold	Location	Remarks
13	Mar.11	$ 2.00	123' N. of Shaft	Muck pile
14	" 12	0.60	127' " " "	" "
15	" 14	1.80	raise 110' " " "	Face 15' up-10' long
16	" 15	2.80	" " " " "	" 18' " " "
17	" 17	2.80	" " " " "	20' up North end
18	"	2.80	" " " " "	" " middle
19	"	2.80	" " " " "	" " South end
20	" 18	3.60	" " " " "	23' " North end
21	"	4.40	" " " " "	23' " middle
22	"	2.80	" " " " "	23' " South end
23	" 21	1.20	" " " " "	25' " North end
24	"	2.40	" " " " "	" " middle
25	"	3.20	" " " " "	" " South end
26	"	1.60	" " " " "	Picked sample
27	"	4.00	" " " " "	" "
28	" 26	2.60	" " " " "	20' up hanging wall
29	" 31	trace	" " " " "	22' " North end
30	"	1.20	" " " " "	" " South "
31	Apr. 1	1.60	" " " " "	24' " North "
32	"	2.00	" " " " "	" " South "
33	" 2	2.00	" " " " "	26' " North "
34	"	trace	" " " " "	" " South "
35	" 3	0.80	" " " " "	27' " North "
36	"	0.80	" " " " "	" " South "
37	" 6	0.40	" " " " "	30' " face North end
38	"	0.80	" " " " "	" " " South "

North Shaft-Surface Dump

1	Mar.25	2.80	Old Dump	Fines
2	"	2.80	" "	Coarse
3	"	3.00	" "	General
4	"	3.60	Mormon Stope Dump	Coarse
5	"	7.60	" " "	Fine
6	"	3.60	" " "	Bottom Fines
7	"	11.60	" " "	" Coarse
8	" 27	2.40	Old dump	General
9	"	2.40	" "	Coarse
10	"	2.40	" "	Fines
11	Apr. 8	1.60	Picked samples from dump to guide sorting	
12	"	1.60	" " " " " "	
13	"	1.20	" " " " " "	
14	"	0.60	" " " " " "	
15	"	trace	" " " " " "	
16	"	9.00	" " " " " "	
17	"	0.40	" " " " " "	
18	"	1.20	" " " " " "	
19	"	9.60	" " " " " "	
20	"	1.60	2nd level dump	Grab samples
21	" 12	17.60	" " "	Sorted ore
22	" 20	2.00	" " "	" "
23	" 21	2.40	" " "	" coarse
24	"	20.00	" " "	" fine
25	" 23	1.60	" " "	" general
26	" 25	2.80	" " "	" fines
27	"	3.20	" " "	Sorted middlings
28	"	8.80	" " "	" discard
29	" 28	3.20	" " "	" fines
30	" 30	4.00	" " "	" "
31	"	7.20	" " "	" middlings

North Shaft-Surface Dump
(Continued)

No.	Date	Value	Location	Remarks
32	May 1	$ 4.80	2nd level dump	Sorted general
33	" 3	33.60	" " "	" "
34	" 7	4.40	" " "	" "
35	" 10	5.20	" " "	" "
36	" 11	9.30	" " "	" "
37	" 12	10.00	" " "	" "
38	" 13	4.00	" " "	" "

Main Shaft-First Level

1	Mar.23	2.40	150' from shaft	Talc in Hanging wall
2	"	0.80	165' " "	Breast of drift
3	"	1.60	150' " "	Vein matter next to talc
4	"	0.80	90'-135' "	" " for 45'
5	"	0.80	at shaft station	conglomerate

South Shaft-Second Level

1	Feb.26	0.60	drift 165' S. of shaft breast	
2	" 28	2.00	" 170' " " " "	
3	Mar. 1	4.00	" 173' " " " "	2' wide E. side
4	" 2	2.40	" 174' " " " "	
5	" 3	2.40	" 177' " " " "	
6	" 4	1.60	xcut 180' " " " "	5' E of Hang wall
7	" 5	1.60	" " "	8' " " " "
8	" 6	1.60	" " "	10' " " " "
9	" 8	1.60	" " "	14' " " " "
10	" 10	3.20	drift 187' " " " "	
11	"	2.00	xcut "	18' " " " "
12	" 11	0.00	drift 189' " " " "	
13	"	1.40	xcut "	21' " " " "
14	" 12	1.00	drift 193' " " " "	
15	"	1.00	xcut "	23' " " " "
16	" 13	1.60	Drift 195' " " " "	
17	"	1.00	xcut "	24' " " " "
18	" 14	1.40	Drift 196' " " " "	
19	"	1.40	xcut "	26' " " " "
20	" 15	0.60	Drift 200' " " " "	
21	" [illegible]	2.60	xcut "	28' " " " "
22	" 25	0.80	Drift 201' " " " "	
23	"	2.40	xcut "	30' " " " "
24	" 26	0.80	Drift 203' " " " "	
25	"	0.80	xcut "	33' " " " "
26	" 27	1.60	Drift 205' " " " "	Stringer
27	"	4.00	xcut " " " " "	Talc on hang wall
28	"	Trace	" " " " " "	
29	"	"	" " " " " "	34' E. of Hang wall
30	" 28	2.40	Drift 208' " " " "	
31	"	0.80	xcut "	38' " " " "
32	" 29	0.40	Drift " " " " "	Talc on " " "
33	"	1.60	" " " " " "	
34	" 30	0.40	" " " " " "	
35	"	0.00	xcut " " " " "	41'E on hang wall
36	" 31	3.20	Drift 209' " " " "	

South Shaft-Second Level
(continued)

No.	Date	Value	Location	Remarks
37	Apr. 1	Trace	Drift 212' S. of Shaft Breast	
38	"	"	xcut "	42' E Hang Wall
39	" 2	$ 0.40	Drift 214' " " " "	
40	"	1.60	" " " " " "	Talc on Hang Wall
41	"	1.60	xcut "	45' E. " "
42	" 3	0.80	Drift 219' " " " "	
43	"	2.40	" " " " " "	Talc on Hang Wall
44	"	Trace	xcut "	47' E Hang Wall
45	" 7	"	" "	50' " " "
46	" 8	0.40	Drift 226' " " " "	
47	"	Trace	" " " " " "	Talc on " "
48	"	"	xcut "	54' E. Hang Wall
49	" 6	9.20	Muck on dump	Picked sample
50	Mar.26	2.00	Picked sample from dump	
51	May 10	2.00	Muck sample 5th level station	

ASSAY ON MAMMOTH MINE
Goldfield, Ariz.

North Shaft

Sheet #2

126	May 17	4.00	215' N. of shaft	Caved muck Mormon Stope
127	18	2.40	" " " "	" " " "
128	19	7.20	216' " " "	" " " "
129	20	4.00	" " " "	" " " "
130		8.40	" " " "	" " " "
131	22	6.00	217' " " "	" " " "
132	23	3.20	218' " " "	" " " "
133		4.00	" " " "	Hanging wall sample
134		2.80	" " " "	2" stringer in hang wall
135	24	10.00	217' " " "	Gen.caved muck Morm.stope
136		4.00	" " " "	Coarse " " " "
137		4.00	" " " "	Fines " " " "
138	25	4.00	" " " "	Gen. " " " "
139		6.00	" " " "	Fines " " " "
140		5.60	" " " "	2" stringer on hang wall
141	26	3.60	218' " " "	Foot wall
142	27	3.60	219' " " "	Hang Wall for 2' N & S
143	28	4.20	" " " "	Caved muck Morm.Stope
144	31	2.00	180' " " "	" " " "
145	Jun 1	4.00	210' " " "	Hole in wall
146	2	2.40	" " " "	Caved muck " "
146	3	3.60	" " " "	" " " "
147	4	2.80	" " " "	" " " "
148	6	16.00	176' " " "	" " " "
149		32.00	158' " " "	" " " "
150		16.00	" " " "	Fines " " "
151	7	21.60	176' " " "	Caved " " "
152	8	5.20	chute 182' " "	" " " "
153	9	2.00	" " " "	" " " "
154	10	2.40	" " " "	" " " "
155	11	3.20	" " " "	" " " "
156	12	1.20	" " " "	Bucket average
157	13	2.60	" 219' " "	Breast muck cave
158	14	7.20	" 168' " "	" xcut from drift

First level--continued

3	May19	31.60	18' N. of shaft	Muck pile
4	14	1.60	Station	Loose muck
5	17	19.20	15' N. of shaft	Muck pile

First Level-Continued

No.	Date	Value	Location	Remarks
6	May 18	$22.00	16' N of shaft	Muck pile
7	21	22.80	19' " " "	" "
8		0.80	" " " "	Coarse talc waste
9	22	4.00	26' " " "	Caved muck beyond crib
10	23	4.20	" " " "	" " " "
11	24	2.40	27' " " "	Gen " " "
12		2.80	" " " "	Fines " " "
13	25	2.80	29 " " "	Caved " " "

North Shaft-First Level-North Drift

14	26	6.80	22' N of shaft	Gen muck-Old chute
15		10.40	" " " "	Fines " " "
16	27	9.60	" " " "	Loose " " "
17	28	7.80	" " " "	" " " "
18	31	12.00	" " " "	Fines " " "
19	31	3.20	" " " "	Sec.#1-Trench sample
20		2.40	" " " "	" 2 " "
21		4.00	" " " "	" 3 " "
22		5.00	" " " "	" 4 " "
23	Jun 2	2.00	" " " "	Loose muck-Old chute

Surface Dump Samples, Continued

39	May 18	2.40	2nd level dump	general
40	19	1.60	" " "	Coarse
41		8.40	" " "	Fines
42	20	6.00	" " "	"
43	21	3.60	" " "	"
44		0.40	" " "	Oversize
45		92.40	" " "	Picked sample
46	22	3.20	" " "	Fines
47	23	4.80	" " "	"
48	24	1.20	" " "	"
49		1.60	" " "	Oversize
50	25	4.80	1st " "	Fines
51	26	8.80	" " "	"
52	Jun 12	3.20	West end of "	General
53	13	8.00	" " "	"

South Shaft-7th level-South

52	May 22	1.60	(Shaft muck-410'-415' below surface)	
53	28	2.00	25' S. of shaft	Roof 24" wide
54		2.00	" " " "	Gouge
55	31	2.40	95' " " "	Sec. #1-10" wide
56		8.00	" " " "	" 2-18" "
57		1.80	" " " "	Gouge & Porphyry
58	Jun 3	5.60	100' " " "	Muck in drift
59	6	0.80	98' " " "	E½ of drift bottom
60	4	0.80	92' " " "	W½ " " "
61		1.20	" " " "	E½ " " "
62		4.80	103' " " "	W½ " " "
63	5	3.20	" " " "	E½ " " "
64	3	0.80	107' " " "	W½ " " "
65	4	0.40	" " " "	E½ " " "
66	6	20.00	" " " "	Ore in hanging wall
67	4	4.00	112' " " "	W½ of drift bottom
68	3	2.40	" " " "	E½ " " "
69	6	3.80	" " " "	6" talc-Hanging wall

South Shaft-7th Level-South

No.	Date	Value	Location	Remarks
70	Jun 6	$ 4.00	112' S. of shaft	8" Gouge
71	4	0.40	117' " " "	W½ of drift bottom
72		2.00	" " " "	E½ " " "
73	6	26.40	" " " "	Ore on hanging wall
74	4	4.00	122' " " "	W½ of drift bottom
75	3	2.00	" " " "	E½ " " "
76	6	29.20	" " " "	Ore on hanging wall
77	5	3.20	127' " " "	W½ of drift bottom
78		3.20	" " " "	E½ " " "
79	6	18.20	" " " "	Ore on Hanging wall
80	4	3.60	132' " " "	E½ of drift bottom
81		19.00	137' " " "	" " " "
82	5	1.60	" " " "	W½ " " "
83	3	4.00	142' " " "	E½ " " "
84	5	2.40	" " " "	W½ " " "
85	6	0.80	81' " " "	xcut Muck-Hanging wall
86		0.80	156' " " "	Gouge-Face of drift
87		3.80	" " " "	12" Sec.next E of #86
88	7	8.80	91' " " "	Old chute #1
89		8.00	101' " " "	" " 2
90	7	12.00	111' " " "	" " 3
91		11.20	121' " " "	" " 4
93		20.00	131' " " "	Winz 1½' down-W 1'
92		9.20	" " " "	Old chute #5
94		2.40	" " " "	Winz 1½' down-W 3'
95	8	3.20	" " " "	" 3' " 2'
96		3.20	" " " "	" " " E "
97	9	3.20	" " " "	" 5' " W"
98		0.80	" " " "	" " " E "
99	10	34.00	136' " " "	" 2' " W 18'
100		1.60	" " " "	" " " E 16'
101		2.00	156 " " "	E½ of face
102		5.20	" " " "	Chute muck
103	11	28.00	136 " " "	Winze S end 2' down W 14'
104		2.80	" " " "	" " " " " E 3'
105		3.20	" " " "	Winze S end 2' hang wall
106		28.80	Winze" " "	Car sample at mill
107		4.40	Chutes " "	" " " "
108	12	22.40	Winze " " "	" " " "
109		4.80	Chute" " "	" " " "
110	13	12.00	Winze" " "	" " " "
111		6.00	Chute" " "	" " " "
112		39.80	136' " " "	Winze S end W 16'
113		12.00	129' " " "	" N " " 14'
114		12.40	129'-36' " "	" S-N end E 3'
115	14	2.00	" " " "	" " " " " "
116		15.00	Winze " " "	Car sample at mill
117		4.80	Chute " " "	" " " "
118	15	12.00	Winze " " "	" " " "
119	16	6.00	" " " "	" " " "
120	17	15.60	134' " " "	Winze 14' down hang wall
121		2.00	129' " " "	" " " N end w 12"
122		92.00	136' " " "	" " " S " " 18"
123		2.20	139'-36' " "	" " " E 3'
124	19	57.40	136' " " "	" " " S end W 16"
125		11.20	129' " " "	" " " N " " 8"
126	17	14.40	Winze ore "	Car sample at mill
127	18	8.00	" " "	" " "
128		3.60	" waste	" " on dump

South Shaft-7th Level-South Drift
(Continued)

No.	Date	Value-Gold	Location	Remarks
129	Jun 20	$20.00	129' S. of shaft	Winze N end Sec.2 12" Wide
130		46.00	" " " "	" " " 6" on hang wall
131		73.60	136' " " "	" S " W 16"
132		4.40	" " " "	" " " E 3'
133	19	9.20	Winze Ore "	Car sample at mill
134		4.20	" waste	" " " "

New Shaft

1	17	15.60	Picked sample by Massey	
2	18	4.00	25' below collar set across both ends	
3	19	8.00	28' " " " " " "	
4	20	6.00	30' " " " " " "	

Incline Shaft-300 ft.
East of South Shaft

1	17	4.00	15' below surface	North end-30" wide
2		4.20	" " "	South " 26" "
3		4.00	25' " "	North " 36" "

South Shaft-7th Level-South Drift

				Winze Cont.
135	20	3.00	130' S. of shaft	Winze waste-car sample
136	21	4.00	" " " "	" " " "
137	20	7.20	" " " "	" ore " "
138	21	4.00	" " " "	" " " "
139	22	6.80	" " " "	" " " "
140	22	2.80	" " " "	" waste " "
141	22	8.80	" " " "	" N. end 18" wide
142	22	20.40	" " " "	" S " 4" "
143	23	4.80	" " " "	" Both ends-12""
144	23	15.80	" " " "	" hang wall stringer
145	23	10.20	" " " "	" ore car sample
146	23	1.00	" " " "	" waste " "
147	24	8.00	" " " "	" hole in hang wall
147	24	4.80	" " " "	" " " " "
148	24	5.00	" " " "	" N.end " 16" wide
150	24	5.60	" " " "	" car sample ore
151	25	4.00	" " " "	" " " waste
152	25	6.00	" " " "	" N.end 12" wide
153	25	6.20	" " " "	" S " 4" "
154	27	5.60	" " " "	" " " 6" " 27'-
155	27	2.40	" " " "	" N " 12" " "
156	27	6.00	" " " "	" ore car sample
157	27	4.80	" " " "	" waste " "
158	29	8.20	" " " "	" N.end 9" wide 30'down
159	29	12.80	" " " "	" S. " 14" " " "
160	29	3.80	" " " "	" waste car sample
161	30	6.00	" " " "	" ore car sample
162	29	7.40	" " " "	" " " "
163	30	10.00	" " " "	" S.end 12" wide 31'down
164	30	4.00	" " " "	" N " " " " "
165	30	4.00	" " " "	" hang wall
166	30	5.20	" " " "	" waste car sample

South Shaft-7th Level-South Drift
Winze

No.	Date	Value-Gold	Location	Remarks
167	Jul 1	$ 2.80	130' S. of Shaft	Winze waste car sample
168	2	18.60	" " " "	" S end 10" wide 33' down
169	2	11.80	" " " "	" N " 14" " " "
170	2	7.00	" " " "	" ore car sample
171	2	2.80	" " " "	" waste " "
172	3-4	7.20	" " " "	" ore " "
173	" "	2.80	" " " "	" waste " "
174	5	77.60	" " " "	" N end 2' wide 36' down
175	5	8.00	" " " "	" S " 6" " " "
176	6	8.00	" " " "	" waste car sample
177	7	3.80	" " " "	" Aver.ore for 36' "
178	6	3.00	" " " "	" waste car sample
179	7	8.80	" " " "	" ore " "
180	8	32.40	" " " "	" N end 30" wide 38' "
181	8	6.00	" " " "	" S " 8" " " "
182	8	2.80	" " " "	" waste car sample
183	9	3.00	" " " "	" " " "
184	9	6.00	" " " "	" ore " "
185	11	3.60	" " " "	" waste " "
186	12	1.60	" " " "	" N end 12" wide 40' "
187	12	4.20	" " " "	" S " hang wall 40'"
188	12	0.80	" " " "	" Waste car sample
189	15	0.80	" " " "	" " " "

North Drift

190	7	3.40	45' N of shaft	3' of roof next to gouge
191	7	2.80	" " " "	14' " gouge
192	7	trace	70' " " "	Muck pile (caved)
193	16	1.20	150' " " "	Hang wall porphyry
194	16	6.80	" " " "	6" talc on hang wall
195	22	1.20	85' " " "	16" of gouge
196	22	2.60	xcut W. 213' " " "	8" gouge
197	22	2.60	" " " " " "	6" W of gouge
198	27	4.00	" " " " " "	Right side 20' in
199	27	3.60	" " " " " "	Face " "
200	29	1.80	" " " " " "	" 23' "
201	31	trace	" " " " " "	" 25' " porphyry
202	Aug 1	1.60	" " " " " "	" 26' " "
203	2	1.20	" " " " " "	" 27' " "
204	4	trace	" " " " " "	" 28' " "
205	Jul 19	5.00	217' " " "	Car sample
206	29	2.80	225' " " "	Face
207	31	1.20	227' " " "	"
208	Aug 2	0.40	230' " " "	"
209	4	1.00	232' " " "	"
210	6	1.20	233' " " "	"
211	7	0.40	234' " " "	"
212	9	0.40	238' " " "	"
213	13	4.00	244' " " "	8" E of gouge
214	13	0.80	244' " " "	12" W of "
215	15	4.00	246' " " "	24" E " "
216	15	0.80	246' " " "	24" " " "
217	19	5.60	252' " " "	24" " " "
218	20	3.20	255' " " "	car sample
219	20	1.20	255' " " "	24" W of gouge
220	20	4.80	255' " " "	24" " " "
221	21	3.00	258' " " "	Car sample
222	22	2.80	260' " " "	" "
223	23	3.20	262' " " "	" "
224	23	0.80	262' " " "	24" W of gouge
225	23	4.20	262' " " "	24" E " "

New Shaft

No.	Date	Value-Gold	Location	Remarks
5	Jun 21	$ 1.20	33' below surface	Entire bottom
6	22	18.40	36' " "	" "
7	23	4.60	40' " "	" "
8	24	5.20	42' " "	" "
9	26	3.00	44' " "	" "
10	27	2.80	46' " "	" "
11	27	2.60	xcut E 3' from shaft	Face
12	28	4.60	" " " "	"
13	29	5.00	" "12' " "	"
14	Jul 2	3.60	" SE 8' " "	"
15	2	4.00	" " 13' " "	"
16	4	3.00	14' SE of Shaft	SE xcut face
17	5	0.80	18' " " "	" " "
18	7	6.60	26' " " "	" " caved muck
19	7	4.20	26' " " "	" " Bottom caved drift
20	7	2.00	26' " " "	" " caved muck
21	9	2.20	26' " " "	" " " "
22	10	8.00	32' " " "	" " solid rock
23	11	11.00	35' " " "	" " N side
24	11	1.80	35' " " "	" " car sample
25	12	8.00	35' " " "	" " N side top
26	12	2.40	35' " " "	" " " bottom
27	12	1.00	38' " " "	" " car sample
28	13	1.20	41' " " "	" " " "
29	14	1.40	43' " " "	" " " "
30	15	2.40	45' " " "	" " " "
31	16	3.60	46' " " "	" " Breast
32	16	1.20	2' W " "	W xcut "
33	17	1.60	5' " " "	" " car sample
34	18	2.80	9' " " "	" " " "
35	19	2.40	13' " " "	" " " "
36	20	2.60	17' " " "	" " " "
37	21	0.80	21' " " "	" " " "
38	22	0.40	25' " " "	" " " "
39	23	0.60	27' " " "	" " " "
40	24	1.20	30' " " "	" " " "
41	25	1.60	32' " " "	" " " "

Open Cut 100 ft. North of New Shaft

1	Jun 30	6.00	N side 5' down	W sec. 2' wide
2	30	1.60	" " " "	E " " "
3	30	trace	" " " "	Foot wall rock
4	Jul 19	3.20	" " 7' "	E sec. 2' wide
5	19	2.40	" " " "	W " 15' "
6	22	2.20	" " " "	6" red rock E of yellow
7	22	7.00	" " " "	6" yellow streak
8	22	2.40	" " " "	2' of black-E end
9	22	2.20	" " " "	30" between gouge & "
10	22	1.40	" " " "	Gouge
11	27	9.60	" " 14' "	3' wide next to gouge
12	29	2.00	" " 15' "	3' " E "
13	29	4.40	" " " "	2' red rock E of #12
14	29	1.20	" " " "	2' grey " " 13
15	31	4.40	S side -17' down	4" red streak E of gouge
16	31	4.20	" " " "	2' " & white E of #15

Engine House Cut-North Shaft

No.	Date	Value-Gold	Location	Remarks
1	Aug. 4	$ 5.00	21' in from mouth	Face 3' E to Gouge
2	4	9.60	11' " " "	Roof
3	4	19.60	21' " " "	Face 10" gouge
4	7	5.40	Open cut at mouth	E side
5	7	10.60	" " " "	W
6	9	8.00	" " " "	"
7	15	4.00	" " " "	"

North Shaft-Second Level

159	9	3.00	95' N of shaft	Aver. muck sample
160	10	3.80	90' " " "	" " "

Third Level-North

18	Jul 5	3.40	at station	8" quartz stringer
19	5	2.20	25-35' N. of shaft	E wall sample 10' long
20	5	1.00	58' " " "	2" gouge on foot wall
21	5	0.20	" " " "	18" above gouge

ORE OCCURRENCE AND TONNAGE

The principal ore bearing rock is a highly fractured brecciated granite or granite porphyry. The brecciation is due to a general faulting which was described under "GEOLOGY."

The main fault plane, known at present as the hanging wall of the ore zone, is very pronounced, showing considerable movement with talc two inches to eight feet thick, with a strike of N8°, and dip 78° to the west, the known ore zone lying east of the fault plane.

West of the fault plane are found the intrusive porphyry giving rise to some geologists' conclusions that the ore concentration is due to contact metamorphism (porhpyries and granite) rather than to faulting and brecciation. However, the exploration, which has been confined entirely to the brecciated granite east of the fault plane has shown the occurrence of gold in fairly consistent commercial values throughout the brecciated area. The gold is found free and clean, and is comparatively fine although not too fine for amalgamation.

The cementing material in the breccia is quartz and iron oxide and it is in this material that the greater gold content is found.

To a depth of four hundred and sixty-five feet the ore zone is entirely oxidized; no sulphides having been encountered.

Two known ore zones have been discovered, viz. the Mammoth and the Black Queen. Surface indications point to a third on the Tom Thumb claim. The Balck Queen has not been developed sufficiently to warrant discussion in this report, although its possibilities merit consideration and considerable gold ore has been shipped from the shafts.

On the Mammoth Claim, however, the development has been sufficiently worked out to warrant definite conclusions regarding the ore and ore zones.

The main value of this property lies in the immense low grade ore bodies, however, several valuable shoots of high grade and medium grade ore have been encountered and in the early history of the mine a fortune was made from the high grade ore. Since the present company has been in possession, it too has milled ore from high grade shoots, approximately sixty three thousand dollars ($63,000.00). This high grade is found close to the fault plane. The old Mormon stope at the North shaft is nearly seventy feet wide on the surface, converging to six feet wide on the two hundred and forty foot level. It is caved at present and inaccessible. Ninety-three samples of the caved material gave an average of $5.25 per ton in gold. This ore shoot has been discovered in virgin ground on the three hundred foot level with a width of five feet, with values from $20.00 to $80.00. A second large high grade ore shoot was stoped at the South shaft. This has been explored on the four hundred and twenty-five foot level with a winze sunk forty-two feet below the level. This winze showed twelve and a half inches of an average of $25.75, with three foot assaying $3.50. The four hundred and twenty-five foot level proved the length of the shoot at this level to be fifty feet assaying for twelve inches wide $22.85.

The drift has been extended to the North to cut the Mormon shoot at the North shaft, but was abandoned within fifty feet of its computed location.

These two high grade ore shoots were mined by the old owners and produced a large tonnage of ore. There is every reason assure their continuation to a considerable depth below the present workings, and as shown by the map here-

with will be increased in length.

Almost all of the early work on the mine was done on or very close to the fault plane to develope the high grade ore. During the last three years, however, we have run a few crosscuts into the zone East of the fault and though not developing it, we have gained a fair idea of its nature.

Possibly the best work is the long drift on the four hundred and twentyfive foot level which assayed its entire length. A crosscut from this drift East for one hundred and sixty feet have astounding assays for consistency of gold values, giving an average of $3.60 for the entire one hundred and sixty feet with samples assayed from $3.50 to $4.00--another crosscut on the level averaged $2.50 for one hundred and five feet.

On the one hundred and twenty-five foot level two cross-cuts to the East, South of the South shaft, assayed fifteen feet long $2.65, and fifty feet, $2.26.

In the North shaft on the fifty foot level, fifty feet South of the shaft a fourteen foot cross-cut averaged $4.05.

In the New Shaft, two hundred and thirty feet North of the North Shaft and thirty-six feet below surface a crosscut twenty-four foot long averaged $3.33.

This gives us a range of assays for crosscuts over a length of over one thousand feet, width one hundred and sixty feet and depth four hundred and twenty-five feet from $2.26 to $4.60, giving an average of about $3.00. In addition to this, we have the Mormon caved stope on the North and averaging $5.24, for a tonnage approximated at one hundred thousand tons.

Supplementing this underground development, many shafts and test pits have been sunk in the ore zone East

of the shaft. At a distance averaging four hundred and twenty-five feet East of the fault plane a row of holes established the maximum Eastern development assayed from $0.80 to $4.20 practically at the surface.

This evidence over an area of one thousand feet long, four hundred and twenty-five feet wide by four hundred and twenty-five feet deep, certainly permits expectations of a mineralized zone averaging from $2.50 to $3.00 in gold per ton or in figures at twelve cubic feet to the ton, the possibilities are fifteen million tons of $3.00 average on which a profit should be made of better than twenty million dollars.

We should be permitted, however, to double the present depth and add one third to the length for a basis of possibilities, thus increasing the possible gross tonnage to forty-five million tons.

If thw working on the Tom Thumb and Black Queen are considered, the possibilities increase the length to four thousand feet or sixty million tons. However, the Northern end is not sufficiently developed to warrant any such definite conclusions.

Several engineers have estimated four million tons of ore actually developed, assaying $3.00 per ton. More conservative estimates run from two hundred thousand tons to five hundred thousand tons of $3.50 to $5.00 per ton for ore developed.

COSTS.

Result of twelve thousand ton mill test of lowest grade ore estimated on a two hundred ton per day basis:

Capacity.....	..16 hours.....	25 tons	
Assay value ore.....	$2.10		
Gross value per day.....	52.50		
Amalgam recovered.....	...$0.40	ton.....	$ 10.00
Cyanide "	2o tons per day.. 1.20		24.00
" tailings loss.....	.45		9.00
Slimes loss per day, 5 tons.....	1.90		9.50
		Total values per day	$ 52.50

Costs per ton

Overhead costs	$ .30
Mining	.65
Milling	.60
Cyaniding, per mill ton	.84
Power and water	1.00

Actual saving per ton	$ 1.26
Operating loss per ton	2.13
Actual saving per day	32.35
Operating loss per day	53.25

200 ton per day operating Basis

Capacity.....24 hours.....	200 tons
Assay value ore	$.2.60
Gross value per day	420.00
Amalgam & Cyanide recovery, $2.00 per ton	$400.00
Cyanide tailings, loss.....10 " "	20.00
Total values per day	$420.00

Costs per Ton Estimated

Mining	$ .25
Milling	.60
Power and water	.45
Office, Supt. Assaying	.10
Depreciation	.10
	$1.50

Actual saving per ton	2.00
Operating profits per ton	.50
Actual saving per day	400.00
Operating profit per day	100.00

TREATMENT

The ore is amenable to amalgamation and cyaniding and it is probable a combination of the two after stamp mills will be found the most efficient.

The following cyanide test by Mr. E. O. Kennedy is quoted:

About a 100 lb. sample was taken, value $5.30 gold to the ton. The tails, after leaching, contained $0.20 to the ton. Lime added, 1 lb. to the ton of ore. Loss of cyanide, 4 lbs.-less than 7 oz. to a ton of ore. The ore is nearly neutral, 0.5 lb. of lime giving an alkaline reaction. I added, however, 1 lb. to the ton, as I favor an excess of lime. More extensive tests on a large scale may find the lime unnecessary. The test was made in an open glass vessel, by agitation. As I inferred from you letter that you wanted to arrive at results by the sliming process, 500 grammes of ore were mixed with 500 c. c. of 0.30% of cyanide solution and agitated off and on for 12 hours. The mass was then filtered off and a weaker solution 0.10 K. C. N. added and agitated at times for 4 hours. The solution was then filtered, washed twice with water, dried, weighed and assayed. (After grinding the pulp very fine, it leached quickly, and the apparent slimes settled rapidly. I may speak of this later)

This average sample was taken from all available places in the mine-the low grade ore in the South shaft, the North and New shafts, dumps and caved ground, our desire being to find out to a certainity if all of the ore, where ever found, would yield to the cyanide process. By following this preliminary test, it is plain to men familiar with the business that the ore can be cyanided direct at a very low cost, while giving high extraction. In this low grade $5.30, we extract over 96%. A small loss will occur in the precipitating boxes, but with ore so remarkably free from cianicides, the loss there will be small.

Sample No. 2 represents an average of the rich ore in the 40 ft. winze in the South Shaft. This sample was taken from top to bottom with great care by Messrs. Massey and Smith. It represents an average of 15 inches of ore, and assays in gold $30.80 to the ton.

I will here note the ore in the winze to-day is 32 inches wide and assays $32.80. This is not in sample No. 2. In testing No. 2 sample, I followed the same lines as in No. 1, only started with 0.50 solution instead of 0.30. The tails from the leached ore have a value of $0.50 to the ton, or an extraction of 98%; loss of cyanide, 9 oz. to the ton of ore.

Now you want my opinion as to machinery. In the first place, I want nothing to do with the multitude of new grinding devices now flooding the market. Let the "other fellow" test by Chilean or tube mills, nor the complete elimination of the amalgam process. In your many letters sent you and read by us, recommending this and that process, they overlook one important fact-- we have no sulphide ores, no concentrated to contend with that have to be ground to such an impalpable powder before the solution can come in contact with the gold atoms--you have an absolutely free cyanide ore.

I am in favor, however, of a continuous process. This can be done as follows: Erect, say 4 Gates, Hendy or any other first class steel friction rolls, equal to 100 tons daily, and sufficient cyanide tanks both percolating and agitating, to handle the ore. About 60% of the ore can be leached, the remaining 40% going from the classifiers to the agitating tanks. The entire tailings from the mill, including slimes, were percolated and leached rapidly. The work was done under the supervision of Mr. Malcolm McLeigh. By continuous process, we could not do this, as the slimes in solution would not mix as when dry. I have made some leaching tests of the ore with satisfactory results.

As to the agitators, the L. C. Trent looks good to us. You can both agitate and supply air as you see fit. It can be placed in any tank at slight cost. The necessity of oxygen in hastening the dissolving power of cyanogen seems to admit of little doubt. An excess, however, consumes some cyanide. In this agitator, it seems the air is controlled by the operator.

Now as to amalgamation. The plates could be so placed that at any time you saw fit to use them, the pulp could be turned on directly from rolls. While you figure entirely on handling large tonnage of low grade ores, the time is fast coming--and to my mind before your new plant is completed--when you will need the amalgam plates. It is not economy to cyanide high grade ore if it is easily amalgamated.

As a general rule, the higher the grade, the coaser the gold. You must not forget the days when $105,000.00 was taken out in this old mill in one month and while this month of February is the banner one, many others came close to it. Can you expect to continue going down and drifting on a vast unknown deposit of this nature, and find no more of this ore? As an example, the winze in the South shaft is down 40 feet below the deepest of the old workings, all in virgin ground, and at the bottom there is a 2½ ft. of ore averaging $32.20. This evidently a new chute of ore, and as far as known from the old workings, the rich ore seemed to lie in chambers widening out from one foot to five, ten, fifteen and even more, and the wider the ore, the richer. Will the 2½ ft. streak, when you run your drifts, widen out as it did above, or will it remain as it is, or drop in value? This no one can answer. All we know is-it is absolutely free and similar, in every - respect, to the rich ore in the upper chambers. To my mind, it will widen as of old, and then your amalgam plates will come in play. It will cost but little to put them in place, and if you do not need them, they will not be in the way. However, this rich ore in the winze, to my mind, is one of nature's finger boards pointing to a repetition of the above rich chambers.

I wish to state that Superintendent Massey and Assayer Smith took both the samples, Nos. 1 and 2, and worked diligently to arrive at an average. The pulp was prepared and assayed by Mr. Smith, and turned over to us. The tails in turn were given to Mr. Smith for assaying. Knowing how desirous you have been to secure a safe working average, we decided to divide the work.

To say the least, it is cold-blooded, and you can have no fears that the average values are too high.

Respectfully submitted,

(signed) E. O. Kennedy, M. E.

WATER AND POWER.

Water for the present need is plentiful. A water right containing a probability of an inexhaustable supply is only one and one third miles from the mine and can be piped to the mine. Development at depth will also increase the water supply.

Power is obtainable from the Roosevelt Dam-Phoenix Power line passing through the property.

PRESENT EQUIPMENT.

A 20 stamp mill-capacity 40 tons to 40 mesh.

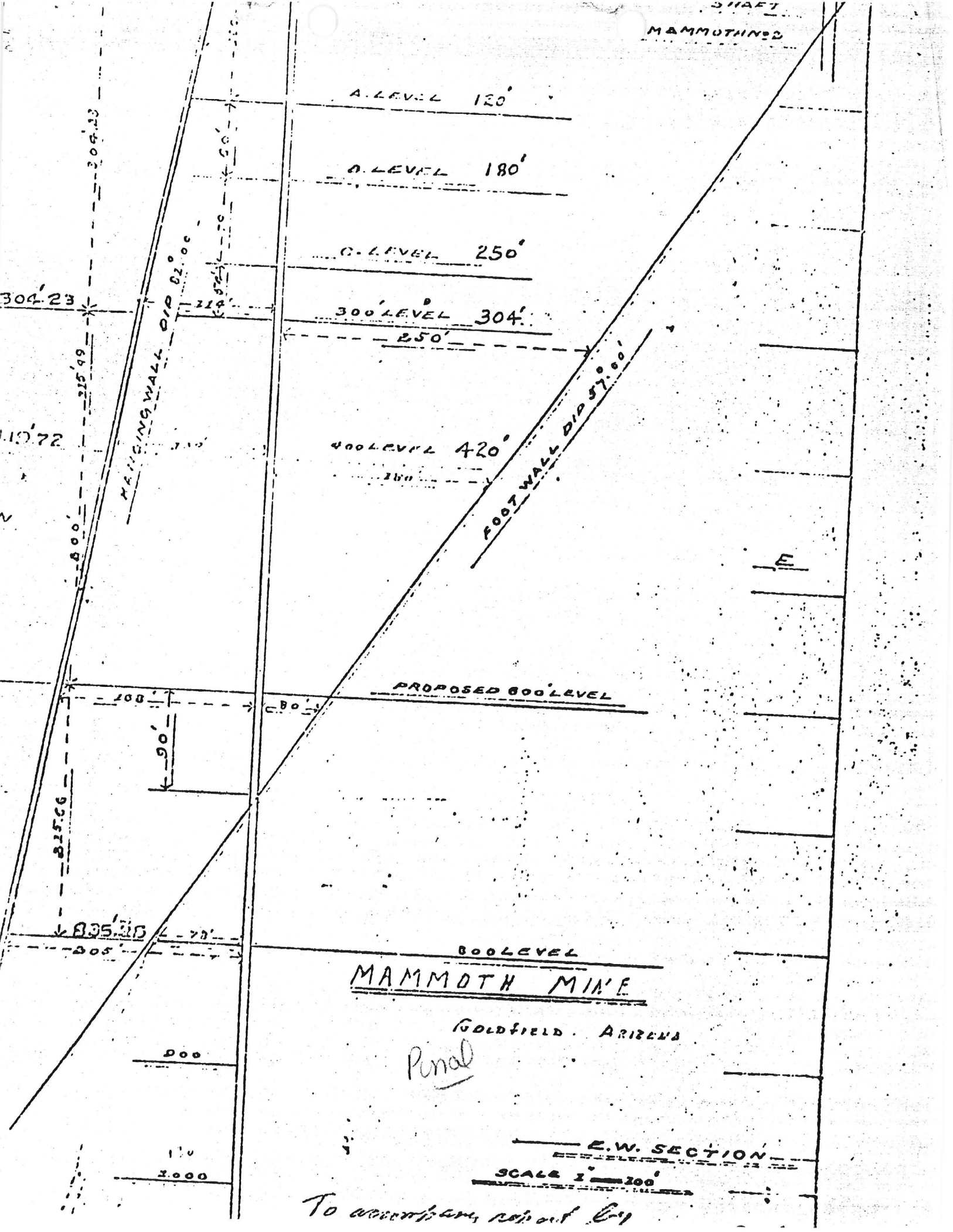
A 50 ton cyanide leaching plant

Two complete boiler plants total 175 H. P.

Two " sets of hoisting, pump and shaft equipment.

Two drill air compressor.

Present power is steam generated by crude oil.


MAMMOTH No 2 SHAFT
A. LEVEL 120'
B. LEVEL 180'
C. LEVEL 250'
300' LEVEL 304'
250'
400 LEVEL 420'
HANGING WALL DIP 82.00°
FOOT WALL DIP 57.00°
304.23
315.99
110.72
800'
PROPOSED 600' LEVEL
100'
80'
90'
815.66
835.36
70'
205'
600 LEVEL
MAMMOTH MINE
GOLDFIELD. ARIZONA
Pinal
200
1000
E.W. SECTION
SCALE 1" = 200'
To accompany report of Eng

A SHORT HISTORY OF THE YOUNG MINES

In the early 70's, this property was located and worked by a Mr. Hall in conjunction with Dennis Sullivan of Denver, Colo. The Engineer and Assayer for Hall was a Mr. Kennedy.

The following information was given me by Kennedy some 18 years ago.

The discovery pit called the "Mormen Chamber" opened up high grade ore. This ore was so rich in gold that Kennedy was obliged to stop the mill once and sometimes twice a day to take off the amalgum from the plates as they could not hold any more gold.

When I examined the property I found this pit which was caved in, size at this time was some 30 to 40 feet in diameter and about 15 feet deep. Kennedy said this pit was sunk about 150 feet, ore taken out to that depth and gave a production of over $1,000,000. before the pit caved in. Hall tried to come under this pit with a shallow shaft and drift, but the ground was too heavy to hold and he was obliged to give it up. Going to Denver, he consulted with Sullivan regarding opening up this rich ore again. There Hall died and the property laid idle.

Young later got an option on the mine from Hall's daughters and he also tried to get under this ore body. He not being able to hold his drift, gave up that project and drifted south on a lower grade ore, keeping his mill running on ore extracted from this south drift.

The pit mentioned and called the Mormon Chamber and the gold extracted by Hall amounted to over $1,000,000. according to Mr. Kennedy's statement. Reports on this property, mentions that it is a steam shovel proposition. Width of the fault some 600 feet wide, total width carrying low grade gold values.

In 1914 or 1915 I received a letter from the late Senator Wm. Flinn of Pittsburgh, asking me if I knew of a large body of low grade ore, as his mine The Pittsburgh-Silver Pick, located at Blair, Nev. was about bottomed and he wanted to move his mill to another property. I mentioned the Young mine, and received a telegram from Flinn to go and make a preliminary examination of the property. I trenched across the fault in several places and also sampled the caved in pit. My samples across the fault, some 600 feet in width gave an average value of over $3.25 gold per ton. The caved in material at the pit assayed over $15.00 gold per ton.

On reporting to Senator Flinn the results I obtained, Flinn had Mr. Wm. Bradley, his engineer at the Pittsburgh & Silver Pick mine go and examine the property and recheck my values. Bradley's sampling was slightly higher than what I got. On his report to Flinn, I received a wire saying to bring Young on to Pittsburgh to figure on a deal for the mine.

The meeting in Pittsburgh was held with the following gentlemen being present:

Senator Oliver, of the Oliver Iron Works
Senator William Flinn
Senator Weller
Mr. Crump and Mr. Miner

The following ofrer was made to Mr. Young:

If after drilling 40 holes 400 feet deep over ground 500 feet in width by 1,000 feet in length, and the ore body should assay between $2,50 and under $2.75 the price to be ..... $ 250,000.

If between $2.75 and under $3.00 Price of property ..... $ 300,000.

If between $3.00 and under $3.25 Price of property ..... $ 400,000.

Over $3.25 per ton, price to be. $ 500,000.

Payments to be 6% of gross returns, and not less than $50,000. per year guaranteed.

Young said price was satisfactory, but he demanded a large cash payment which was refused by Senator Flinn, and the deal was declared off.

Young returned to Arizona and later put down a new shaft some 600 feet south of his old shart. This new shart he put down to a depth of 1,000 feet and drifted south some 1,000 feet where he encountered very good grade of ore.

MAMMOTH GOLD MINE

SUPERSTITION MINING DISTRICT, ARIZONA

By

Allan P. Fawley

Report Written February 1978

Property Examined October 1977 and January 1978

MAMMOTH GOLD MINE

Superstition Mining District, Arizona

The twelve-claim Mammoth property lies in the old Goldfield-Superstition gold mining area of Arizona, thirty-five miles east of Phoenix. The Mammoth was a successful gold mine that started operations in 1893. The medium to high-grade ore was mined out but old reports state that a large tonnage of low-grade gold-bearing rock remains, and under todays price of $173.00 per oz. for gold, vs. $20.67, this low-grade material could be most profitable. Also, a methodical exploration program of the twelve-claim group may discover high-grade ore.

Information for this report has been obtained from various private and government reports and maps, in particular from: "Arizona Lode Gold Mines and Gold Mining" by Wilson, Cunningham & Butler, Arizona Bureau of Mines, Bull. 137 (1934); the Geologic Maps of Maricopa County (1957) and Pinal County (1959), Arizona Bureau of Mines, University of Arizona; "Operations at the Mammoth Mine, Goldfield, Arizona" by Chas. A. Dinsmore, Mining and Engineering World (1911); and from personal examinations of the property in October 1977 and January 1978.

LOCATION AND ACCESS

The Mammoth property is in the Goldfield-Superstition Mountains area of Arizona, and can be reached from Phoenix by forty-five miles of good road via Mesa and Apache Junction. The property is in rolling, almost barren desert country, approximately 2,000 feet above sea level.

PROPERTY

The property consists of twelve adjacent maining claims, namely:

Mammoth, Mammoth No. 2, Mammoth No. 3
Laurence
Annex
Indian No. 1, Indian No. 3, Indian No. 6
Tom Thumb
Mother Hubbard, Mother Hubbard No. 2
Black King.

The claims are 600 by 1,500 feet in dimension and are at the borders of Maricopa and Pinal Counties, Superstition Mining District, Arizona.

HISTORY

The Mammoth property is in the Goldfield-Superstition Mountains district, an old gold mining area that had a population of about 1,500 from 1892-1904. The Mammoth Mine was discovered in 1893 due to a flash flood and washout in a gully. Production from a "Glory Hole" (open pit) was promptly undertaken and proved to be highly profitable. Later underground mining was undertaken and mining continued until 1897.

Work on the property was restarted by the Young Mine Company who explored the property from 1918 to 1925 with three shafts (one of which was sunk to a depth of 1,000 feet) and with thousands of feet of drifts. A ten-stamp amalgamation plant and fifty ton cyanide mill were operated intermittently for load purposes and yielded about $67,000.00 (at $20.67 per oz.) worth of gold and silver from 7,100 tons of ore (Wilson, Cunningham & Butler, 1934). Mining was again undertaken during 1949-1950 by extending the open-pit workings. Since then little work has been undertaken on the property. At present the underground workings are flooded, the shafts have been filled in, and the large open pit is filled with water.

GEOLOGY

The regional geology is comprised of a wide variety of rocks, mainly Precambrian granites; sandstone, shale, conglomerate and various

volcanic rocks of Cretaceous age; and decite of Teritary age. The Mammoth area is a "pediment floored by coarse-textured granite, indurated conglomerate, and granite breccia". The principal workings were reported to "have been in the vicinity of two northward-trending steeply westward dipping faults which outcrop some 300 feet apart" (Wilson, Cunningham & Butler, 1934).

Ore occurs as quartz veins and stringers which are oxidized to a depth of at least 400 feet (so that no sulphides are present) and contain gold and silver as the only valuable minerals. Dinsmore (1911) described the property as a "disaminated gold porphyry". The veins are associated with faults that generally trend northwards, and are usually richest at contacts between andesite and brecciated rock or conglomerate.

ORE POSSIBILITIES

The Mammoth group of claims are well located and are believed to have been kept in good standing ever since the 1890's. The richer ore sections at the Mammoth Mine ran from one-half to several ounces gold per ton, and it is quite possible that careful and methodical prospecting of this twelve-claim group will find other deposits of this grade. However, the best possibility of finding an economic deposit here, considering the present very high price of gold and the case with which ore in this area can be cyanided, is to find a large, low grade gold deposit that can be mined by open-pit methods and treated by cyanide leaching.

At the Mammoth Mine, Dinsmore (1911) reported that based on a great many open cuts and shallow shafts and on underground drifts, cross-cuts and winzes and thorough sampling and assaying, there are "over 3,000,000 tons of ore running better than $4.00 per ton in gold" (this $4.00 per ton gold" is worth $33.00 per ton at todays price of $173.00 per ounce). The above reserves are somewhat corroberated by a 1921 letter from C. B. Brean, Superintendent, to

Young Mines Company, that states P. R. Hubbard, E.M. estimated that $8 million ($66 million at todays gold price) of low-grade rock was "ready for milling".

CONCLUSIONS AND RECOMMENDATIONS

Considering the present very high price of gold ($173.00 per ounce), the cost with which the oxidized ore in this area can be treated to recover gold and silver, and the reported large tonnage of low-grade gold-bearing rock already indicated at the old Mammoth Mine -- then the possibility of discovering an economic open-pit gold mine -- is excellent. There is also the possibility of finding medium to high-grade gold deposits on the well-located claims.

As the claims area has already been mapped, and as the Mammoth open pit is an ideal "target" for a large low-grade gold deposit, it is recommended that drilling be started at the Mammoth pit and the drilling program be expanded as results warrant. The early drilling should be by percussion drilling because of its low cost, later, to get greater depth especially below the open pit, diamond drilling will probably be necessary.

Exploration should be carried out in a two-stage program, the second stage to be dependent on the results obtained in the first stage. The first stage should consist mainly of percussion drilling in the vicinity of the Mammoth open pit, with a minor geochemical gold survey and preliminary drilling on the remaining claims. The second stage would be detailed drilling, where warranted, to outline ore.

ESTIMATED EXPLORATION EXPENSES

The cost of a two-stage exploration program as recommended for this report will be about as follows:

STAGE 1

(a) For a 2,000 ft. percussions drilling program, at $7.50 per foot for drilling, plus the cost of supervision, assaying, etc., about $20,000.00

(b) For geochemical prospecting and preliminary drilling of the twelve-claim group, about 5,000.00

Total $25,000.00

STAGE II

The amount of drilling required will be dependent on the results of STAGE 1. Assuming the results of STAGE 1 are favorable, then the following drilling program should be undertaken -- 2,000 feet of diamond drilling at $15.00 per foot, and 2,000 feet of percussion drilling, which along with surveying, sampling, administration, etc., will cost roughly $50,000.00

Respectfully submitted,

(signed)

Allan P. Fawley, B.A. Sc.,
M. Sc., Ph. D., P. Eng.

Vancouver, B.C.
January 17, 1978

I, ALLAN PRIEST FAWLEY, of the City of Vancouver, in the Province of British Columbia, HEREBY CERTIFY:

1. THAT I am a Consulting Mining Engineer and Geologist, and that my address is 1947 West King Edward Avenue, Vancouver, B.C. V6J 2W7

2. THAT I am a graduate of the University of British Columbia with the degree of B.A., Sc. (1937) in Mining Engineering, of Queen's University with the degree of M.Sc. (1946) in Geology, and of the University of California with the degree of Ph.D. (1948) in Geology.

3. THAT I am a registered Professional Engineer in the Province of British Columbia and in the Yukon Territory and also a member of the Society of Economic Geologists, of the Canadian Institute of Mining and Metallurgy, and of the Geochemical Society.

4. THAT I have practiced my profession as a Geologist for more that thirty years.

5. THAT I have no direct interest or indirect interest, nor do I expect to have any interest in the Clark-Oliver claims or in Loredi Resources Ltd.

6. THAT this report on the Clark-Oliver claims and area is based on my personal examination on October 10-11, 1977 and on January 4-8, 1978.

DATED this 16th day of February, 1978.

(signed)
Allan P. Fawley, Ph.D., P. Eng.
Consulting Mining and
Geological Engineer.

G O L D F I E L D M I N E S

MAMMOTH GROUP

BLACK QUEEN

APACHE JUNCTION

GOLDFIELD MINING DISTRICT

ARIZONA

Submitted by:

CHARLES R. WARD
Mining Development & Mineral Recovery

P.O. Box 32274
Phoenix, Arizona 85016

Telephone: (602) 939-6834

July 1978

ALLAN P. FAWLEY, PH.D., P.ENG.
CONSULTING MINING AND GEOLOGICAL ENGINEER

1947 WEST KING EDWARD AVENUE
VANCOUVER 9, BRITISH COLUMBIA

MAMMOTH GOLD MINE

Superstition Mining District, Arizona

by

Allan P. Fawley

Report Written January 1978

Property Examined October 1977 and January 1978

MAMMOTH GOLD MINE

Superstition Mining District, Arizona

of

LOREDI RESOURCES LTD.

This is different from the Allan P. Fawley report that was retyped with his copied signature

INTRODUCTION

The twelve claim Mammoth property of Loredi Resources Ltd. lies in the old Goldfields-Superstition gold mining area of Arizona, 35 miles east of Phoenix. The Mammoth was a successful gold mine that started operations in 1893. The medium to high-grade ore was mined out but old reports state that a large tonnage of low-grade gold-bearing rock remains, and under to-days price of $173.00 per oz. for gold, vs $20.67, this low-grade material could be most profitable. Also, a methodical exploration program of the twelve-claim group may discover high-grade ore.

Information for this report has been obtained from various private and government reports and maps, in particular from: "Arizona Lode Gold Mines and Gold Mining" by Wilson, Cunningham & Butler, Arizona Bureau of Mines, Bull. 137 (1934); the Geologic Maps of Maricopa County (1957) and Pinal County (1959), Arizona Bureau Mines & University of Arizona; "Operations at the Mammoth Mine, Goldfields, Arizona" by Chas. A. Dinsmore, Mining and Engineering World (1911); and from personal examinations of the property in October 1977 and January 1978.

LOCATION AND ACCESS

The Mammoth property of Loredi Resources Ltd. is in the Goldfield-Superstition Mountains area of Arizona, and can be reached from Phoenix by 45 miles of good roads via Mesa and Apache Junction. The property is in rolling, almost treeless desert country, approximately 2,000 feet above sea level.

PROPERTY

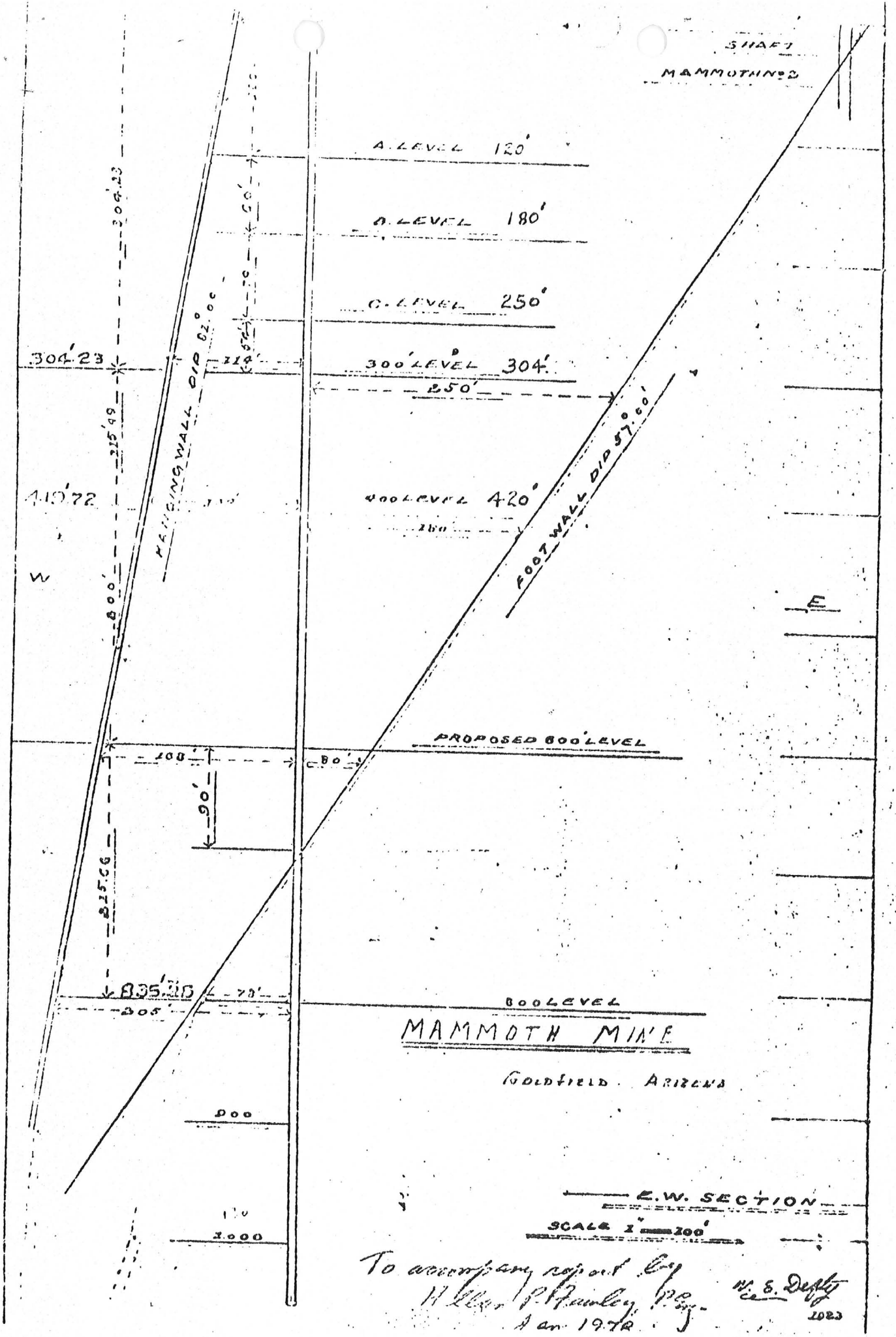
The property of Loredi Resources Ltd. consists of 12 adjacent mining claims, namely:

Mammoth, Mammoth No. 2, Mammoth No. 3
Lawrence
Annex
Indian No. 1, Indian No. 2, Indian No. 6
Tom Thumb
Mother Hubbard, Mother Hubbard No. 2
Black King.

The claims are 600 by 1,500 feet in dimension and are at the border of Maricopa and Pinal Counties, Superstition Mining District, Arizona.

HISTORY

The Mammoth property is in the Goldfield-Superstition Mountains district, an old gold mining area that had a population of about 1,500 from 1892-1904. The Mammoth mine was discovered in 1893 due to a flash flood and washout in a gully. Production from a "Glory Hole" (open pit) was promptly undertaken and proved to be highly profitable. Later underground mining was



To accompany report of
H. Ellis P. Rawley Mgr.
Jan 1912.

W. E. Duffy
1023

[illegible] underground, and mining continued until 1937.

Work on the property was re-started by the Young Mine Co. who explored the property from 1910 to 1925 with 3 shafts (one of which was sunk to a depth of 1,000 feet) and with thousands of feet of drifts. A 10-stamp amalgamation plant and 50-ton cyanide mill were operated intermittently for test purposes, and yielded about $67,000.00 (at $20.67 per oz.) worth of gold and silver from 7,100 tons of ore (Wilson, Cunningham & Butler, 1934). Mining was again undertaken during 1949-50 by extending the open-pit workings. Since then little work has been undertaken on the property. At present the underground workings are flooded, the shafts have been filled in, and the large open pit is filled with water.

GEOLOGY

The regional geology is comprised of a wide variety of rocks, mainly Precambrian granites; sandstone, chale, conglomerate and various volcanic rocks of Cretaceous age; and decite of Tertiary age. The Mammoth area is a "pediment floored by coarse-textured granite, indurated conglomerate, and granite breccia". The principal workings were reported to "have been in the vicinity of two northward-trending steeply westward dipping faults which outcrop some 300 feet apart" (Wilson, Cunningham & Butler, 1934).

Ore occurs as quartz veins and stringers which are oxidized to a depth of at least 400 feet (so that no sulphides are present) and contain

gold and silver as the only valuable minerals. Dinsmore (1911) described the property as a "disseminated gold porphyry". The veins are associated with faults that generally trend northwards, and are usually richest at contacts between andesite and brecciated rock or conglomerate.

ORE POSSIBILITIES

The Mammoth group of claims are well located and are believed to have been kept in good standing ever since the 1890s. The richer ore sections at the Mammoth Mine ran from ½ to several ounces gold per ton, and it is quite possible that careful and methodical prospecting of this 12 claim group will find other deposits of this grade. However, the best possibility of finding an economic deposit here, considering the present very high price of gold and the ease with which ore in this area can be cyanided, is to find a large, low grade gold deposit that can be mined by open-pit methods and treated by cyanide leaching.

At the Mammoth Mine, Dinsmore (1911) reported that based on a great many open cuts and shallow shafts and on underground drifts, cross-cuts and winzes and thorough sampling and assaying, there are "over 3,000,000 tons of ore running better than $4 per ton in gold" (this"$4 per ton gold" is worth $33 per ton at to-days price of $173 per ounce). The above reserves are somewhat corroberated by a 1921 letter from C. B. Brean, Superintendent, to Young Mines Co. that states J. R. Hubbard, E. M. estimated that $8 million ($66 million at to-days gold price) of low-grade rock was "ready for milling"

CONCLUSIONS AND RECOMMENDATIONS

Considering the present very high price of gold ($173 per ounce), the ease with which the oxidized ore in this area can be treated to recover gold and silver, and the reported large tonnage of low-grade gold-bearing rock already indicated at the old Mammoth Mine,- then the possibility of discovering an economic open-pit gold mine is excellent. There is also the possibility of finding medium to high-grade gold deposits on the wall-located claims.

As the claims area has already been mapped, and as the Mammoth open-pit is an ideal "target" for a large low-grade gold deposit, it is recommended that drilling be started at the Mammoth pit and the drilling program be expanded as results warrant. The early drilling should be by percussion drilling because of its low cost, later, to get greater depth especially below the open pit, diamond drilling will probably be necessary.

Exploration should be carried out in a two-stage program, the second stage to be dependant on the results obtained in the first stage. The first stage should consist mainly of percussion drilling in the vicinity of the Mammoth open pit, with a minor geochemical gold survey and preliminary drilling on the remaining claims. The second stage would be detailed drilling, where warranted, to outline ore.

MILAN P. PAWLEY, PH.D., P.ENG.
CONSULTING MINING AND GEOLOGICAL ENGINEER

ESTIMATED EXPLORATION EXPENSES

The cost of a two stage exploration program as recommended for this report will be about as follows:

STAGE I

(a) For a 2,000 ft. percussions drilling program, at $7.50 per foot for drilling, plus the cost of supervision, assaying, etc., about ..... $ 20,000.00

(b) For geochemical prospecting and preliminary drilling of the 12 claim group, about 5,000.00

TOTAL ..... $ 25,000.00

STAGE II

The amount of drilling required will be dependent on the results of Stage I. Assuming the results of Stage I are favourable, then the following drilling program should be undertaken - 2,000 feet of diamond drilling at $15.00 per foot, and 2,000 feet of percussion drilling, which along with surveying, sampling, administration, etc. will cost roughly ..... $ 50,000.00

Respectfully submitted,

Allan P. Fawley, B.A. Sc.,
M. Sc., Ph. D., P. Eng.

Vancouver, B.C.
January 17, 1978.

I, ALLAN PRIEST FAWLEY, of the City of Vancouver, in the Province of British Columbia, HEREBY CERTIFY:

1. THAT I am a Consulting Mining Engineer and Geologist, and that my address is 1947 West King Edward Avenue, Vancouver, B.C. V6J 2W7.

2. THAT I am a graduate of the University of British Columbia with the degree of B.A. Sc. (1937) in Mining Engineering of Queen's University with the degree of M. Sc. (1946) in Geology and of the University of California with the degree of Ph. D. (1948) in Geology.

3. THAT I am a registered Professional Engineer in the Province of British Columbia and in the Yukon Territory and also a member of the Society of Economic Geologists, of the Canadian Institute of Mining and Metallurgy, and of the Geochemical Society.

4. THAT I have practised my profession as a Geologist for more than thirty years.

5. THAT I have no direct interest or indirect interest, nor do I expect to have any interest in the Mammoth property or in Loradi Resources Ltd.

6. THAT this report on the Mammoth property is based on my personal examination on October 10-11th, 1977 and on January 4th-8th, 1978.

DATED this 17th day of January 1978.

Allan P. Fawley, Ph. D., P. Eng.
Consulting Mining and
Geological Engineer.

THE SECOND CLAIM GROUP

SUPERSTITION MINING DISTRICT, ARIZONA

By

Allan P. Fawley
Consulting Mining and Geological Engineer

1947 West King Edward Avenue
Vancouver 9, British Columbia

Report Written February 1978

Property Examined October 1977 and January 1978

THE SECOND CLAIM GROUP

Superstition Mining District, Arizona

The Second Claim Group is a group of fifteen mining claims in the Goldfield-Superstition mining area of Arizona. The Second Claim Group is about a mile to the northwest of the Mammoth Claim Group and is located on geological formations that are favorable for the occurence of oxidized gold and silver mines, and sulphide ore deposits may occur at depth. The old Mammoth gold is in the Mammoth Claim Group and a half a dozen other old mines and prospects are in the locality.

Information for this report has been obtain from various private and government reports and maps, in particular from:

"Operations at Mammoth Mine, Goldfield, Arizona" by C.A. Dinsmore, Mining and Engineering World (1911).

"Arizona Lode Gold Mines and Gold Mining" by Wilson, Cunningham and Butler, Arizona Bur. Mines, Bull. 137 (1934).

"Geology and Ore Deposits of the Mammoth Mining Camp Area, Pinal County, Arizona" by N.P. Peterson, Arizona Bur. Mines, Geol. Series No. 11, Bull. 144 (1938).

The Geological Maps of Maricopa County (1957) and Pinal County (1959), Arizona Bur. Mines & University of Arizona.

"Principal Gold Producing Districts of the United States" by A.H. Koshman and M.H. Bergendahl (1968).

Information has also been obtained from personal examinations of the Goldfield-Superstition mining area in October 1977 and January 1978.

LOCATION AND ACCESS

The Second Claim Group is in the Goldfield-Superstition Mountains area of Arizona and can be reached from Phoenix by 45 miles of paved roads via Mesa and Apache Junction and by a few miles of gravel trails. The property is in rolling to semi-mountainous, almost barren desert country, about 2,000 to 2,300 feet above sea level.

CLIMATE

The temperature rises to over 100° F (38° C) during June and July and drops to below zero in December and January. The annual rainfall is about 10 - 13 inches and occurs mostly in July and August or during the winter. Very little snow falls in the area.

PROPERTY

The Second Claim Group consists of fifteen adjoining claims named Clark-Oliver Nos. 44 - 58 (see enclosed claim map). The claims are 600 by 1,500 feet in dimension and are beside the Maricopa-Pinal County borders, in the Superstition Mining District, Arizona.

HISTORY

Lack of roads and the hostility of the Apache Indians discouraged prospecting in the Goldfield-Superstition Mountains area until the 1870's. Prospecting and mining was then actively undertaken and the population is reported to have reached 1,500 during the main mining boom of 1892-1904. Mining continued periodically until 1950; since then, mining has only been undertaken on a minor scale. At present, due to the high price of gold, exploration is again active in the area.

GEOLOGY

The area is underlain by a wide variety of rocks, including granites, sandstone, conglomerate, etc., and various types of volcanic rocks. A

C O P Y.

E.O. Kennedy

REPORT OF MAMMOTH MINE

and

PERSONAL RECOMMENDATION TO GEO. U. YOUNG.

L O C A T I O N.

The Young Mines Company, Ltd., property is situated in the counties of Maricopa and Pinal, Arizona, twenty miles northeast of Mesa, a town on the Arizona & Eastern Railway. The Government road to the Roosevelt Storage Dam passes through the property. It was built at great cost, and is an ideal highway.

POWER ADVANTAGES.

The wires from the electric power plant at Roosevelt pass within 300 feet of your mill.

DESCRIPTION.

The ground belonging to your company as shown by map of approved official survey, contains ten full mining locations, and a fraction of a claim. Each location is 1500 feet long by 600 feet wide, including the "Fraction". There are about 216 acres. All are found on Books of Mining Records of Maricopa and Pinal Counties, and are known as follows: - Mammoth, Mammoth No. 2, Mammoth No. 3, Aztec, Annex, Tom Thumb, Black King, Black Queen, Mother Hubbard, Montezuma and Fraction.

TITLE.

The title is perfect and beyond dispute; the owners being in quiet possession for many years. The property is under approved official government survey, and is ready at this time for filing in the Department, and ready for the proper prosecuting to securing of a deed.

DESCRIPTION OF VEIN.

This lode is a large, wide contact - the hangingwall porphyry; the foot granite. The trend or course is North,27 degrees West, and has a slight dip to the East - about ten degrees. It varies in width between walls from 10 to 50 feet, and is traceable by outcrop for over a mile, at times covered by shallow wash from

the mountains. The many trenches and small shafts prove the present ore chute more than 1500 feet long.

DEVELOPMENT WORK.

The North, or old working shaft, is 320 feet deep and fully equipped with a Gallow Frame; wire cable 800 feet long, and steam hoist which are all in good condition. 100 feet along the ledge south is the Middle, or new three compartment vertical, intended to be main working shaft. It is down 185 feet, thoroughly timbered with 8 x 8 square sets and lined with 2 inch plank. It has a new up-to-date gallows frame; 1000 feet wire cable and new cage on the ground ready to install. The present power is a steam friction hoist. This shaft is not on the ledge, but from present dip will intersect, according to survey, at a depth of 600 feet. Going south along the ledge some 300 feet, we come to what is known as the south shaft. It is 426 feet deep. It has a new and up-to-date gallows frame, wire cable and steam hoist. The ore is delivered from the hoist to the mill by rail tramway. Your men are cleaning out this shaft. They are at present down 250 feet, and have 180 feet farther to reach the crosscut in the bottom.

So far, caved ground is visible behind the shaft timbers, but no effort is made to remove it. The main object in view is to get to the bottom and clean out the crosscut where there is 20 inches of free milling ore, assaying $40.00 to the ton. In the first level at 115 feet, going south, the drift, when cleaned, was in 140 feet. It has since been driven to 187 feet and work is still in progress. A crosscut in which work is also progressing is in 40 feet; all in ore, and as yet no sign of any foot wall. This vast chamber is not high grade, averaging $3.50, but indications, at present, are all in favor of higher grade. What will be found on the wall, will, undoubtedly, raise its average value.

MILL.

On the Mammoth location, and about 100 feet from the North shaft, a twenty stamp mill has been erected, with engine, boilers,

crusher, challenge feeders, together with 4 copper silver-plated plates, each 4 x 16 feet. A pump installed in the North shaft supplied water for the mill. Ten of the stamps are in good condition. The remaining ten can be put in commission with an outlay of about a thousand dollars. This mill was built by Hall and Sullivan, and money was foolishly lavished on its erection.

HISTORY OF MINE.

Here let me say a few words of the early history of this property. It was discovered some sixteen years past. Great excitement followed. The country was located for miles around. It was without a doubt, the largest and richest gold mine in Arizona. The brush was cut 200 feet on each side of the wagon road so the guards escorting the bullion would not be ambushed by road agents. A small town grew upon the property, and a public school was maintained; all depending upon the mine. The ore averaged free milling $40.00 to the ton. The values were not so remarkable, but the vast tonnage and seemingly inexhaustible supply were the encouraging feature.

While large, rich ore chambers were being blocked out, the timbering was neglected, and there came a great "cave" along most of the openings and shafts from some 700 feet along the ledge.

In what is known as the "Mormon Stope", near the mill, there was blocked out $90,000/00 of the rich ore, which was lost when this "cave" occurred. Then developed ore from $10.00 to $30.00 for several hundred feet south. The owner, Hall, died at that time. Since then, many attempts and much money have been wasted in trying to reach the known rich ore chutes.

DEDUCTIONS.

In looking over the field, it would seem a mistake was made in ignoring the vast tonnage of low grade ore while striving to secure the rich ore. We cannot say how much high grade is mixed with the tumbling walls and lower values. However, the present

work in cleaning some drifts being part of the caved ground, shows, from daily millwork, that the values vary greatly. As an example, the mill run November 14th, averaged $18.00. Now this ore came from a small shaft 200 feet south of the mill, supposed to be virgin ground. They sunk 30 feet. The ore was clear across the shaft. When they started in to crosscut, one shot, or round of shots, broke into the cave, and then it was abandoned.

SUGGESTIONS.

There seems but one way to handle this wide ledge and large tonnage, and that is, pay no attention to the high grade ore in the caved chambers at this time, but start right on the surface. Mine all the caved ground, mixed or unmixed, irrespective of values, and then mill and cyanide the entire tonnage. From samples, and average mill runs, I feel safe in calling the average $4.00. The mine and mill assays show higher values, and should future work sustain the increase, so much the better. 94% of the values can be extracted by cyaniding the tailings, and the cost of mining and milling should not exceed $1.25 per ton. To do this, however, you must make many changes; install an electric plant. The power is at your door. The mill should be removed further up the hill so your tailings can go from the stamps to the cyanide leaching tanks without rehandling. A large percentage of the ore is soft and easily milled. In addition to the twenty stamps, I would install some Huntington Mills or Gates rolls. You must prepare to work a large tonnage to secure economy.

DETAIL INFORMATION.

During Mr. Tong's foremanship he sunk a 4 x 6 surface shaft, as he supposed, to the east of the mine. At 50 feet he came into the cave, proving the ledge at this place over 50 feet wide. The pressure was great and his timbers crushed and the caved ground entered the shaft. Had this surface excavation been sufficiently long and wide, the cave would have run till the angle was formed and the ore could be taken out with very little timbering. Working wide caved ground in this manner is not new. Mr. Tong got to the

surface a ton of the caved boulders and waste. It assayed $18.00. One boulder about 40 lbs. averaging $29.60. From all reports, Hall and son milled about 50,000 tons of the high grade ore befors the "cave".

TONNAGE ESTIMATES.

From the present shafts and surface openings, there is remaining in caved and virgin ground now opened up, not less than four hundred thousand tons in sight, averaging not less than $4.00 per ton. This is assuming the ledge is but 15 feet wide, 1200 feet long and 400 feet deep, allowing 15 (15) cubic feet to the ton.

SUGGESTIONS REGARDING SOUTH SHAFT.

Returning to the South Shaft, I would push the work, and mix the high grade with the caved ground, and not strive to reach rich chambers which may, by this time, be commingled with the great mass. If sufficiently strong financially, the proper method is, by all means, to sink the main vertical shaft for 600 feet, where you are supposed to intersect the ledge you have every reason to expect to strike the same rich ore as was found in the old workings. This is not a great depth for values to continue in a vein as wide and chute as long as the Mammoth.

PITCH OF ORE.

The ore pitches to the South. The high values in the South shaft, 430 feet deep, would confirm the belief of rich ore at great depth. This deduction is, undoubtedly, true, and if so, and you are not sufficiently strong financially at this time to prosecute work on the new shaft continuously, it is wisdom to do this at your leisure while working the large tonnage of low grade in sight. It is true, in justice to legitimate mining, you must go deep and block out new ore bodies; but would it not be business to take out the cash in sight while proceeding with the development?

CONCLUSION.

Immediate success depends upon the installation of the proper machinery and the economical installation of power, and if these

two factors are immediately taken up and settled, there is no danger whatever of this proposition not being a fine success.

Attached herewith please find copies of assays of mill and mine, together with map.

Respectfully submitted,

(Signed) E. O. Kennedy, E. M.

concise description of the geology by Koshman and Bergendahl states that the area is "characterized by broad alluvial plains and scattered mountain ranges, which are composed of Precambrian schist and granite uncomformably overlain by younger Precambrian and Paleozoic sedimentary rocks and by Teritary volcanic rocks. Dikes, irregular bodies, and stocks of granitoid rocks and rhyolite of Cretaceous and Teritary ages have intruded Paleozoic and older rocks. Large areas are covered by sedimentary rocks of Cenozoic age."

ORE DEPOSITS

The known ore deposits that were producing mines are believed to have occurred in veins or lodes within fault fissures or brecciate zones. The ore did not occur uniformly throughout the veins, but formed ore shoots along sections of the faults where shattering and brecciation were relatively intense. Veins are usually only a few feet wide, but brecciated ore zones may be up to sixty and more feet in width.

The ore deposits are highly oxidized at the surface, and oxidation extends to a depth of more than 800 feet at the Mammoth Mine. However, massive sulphide zones may be found at depth as in another similar mining area in Pinal County which is called "Mammoth" (there are two "Mammoth" mines in Pinal County, Arizona). Peterson states that although oxidation may extend for over 800 feet in some mines, in other massive sulphides containing copper, lead, zinc, molybdenum and vandaium there may occur a few hundred feet below the surface. Peterson also states that although in the oxidized zone sulphides have been almost entirely removed (for example, pyrite oxidized and went into solution leaving only clean, cubical cavities in quartz to indicate its earlier existence) that during oxidation galena (lead sulphide) was immediately fixed in more stable forms as carussite (lead carbonate) and anglesite (lead sulphate). Even gold appears to have been partially removed from near the surface during oxidation and redeposited at depth as the gold content may be highest a few hundred feet below the surface.

CONCLUSIONS AND RECOMMENDATIONS

The Second Claim Group is a favorable area for the location of near surface oxidized gold and silver deposits, and also for the location of massive sulphide deposits at depth that may contain copper, lead, zinc, molybdenum and vanadium as well as gold and silver.

To discover ore deposits in the claims area will require careful and methodical work as exploration is handicapped by the fact that part of the claims area is covered by alluvium and post-mineral volcanic rocks, and because geophysical exploration methods will probably be unsatisfactory, and because geophysical exploration methods will probably be unsatisfactory because of the depth of oxidation and leaching. However, gold and lead will remain in oxidized deposits so that a geochemical survey for gold and lead should be a very suitable exploration method.

It is recommended that:

1. The fifteen claims of the Second Claim Group be geologically mapped, with particular attention paid to faults and beccia zones.

2. A geochemical survey be carried out for gold and lead. To obtain satisfactory samples below barren rock formations and alluvium, it may be necessary to use shallow percussion drilling.

3. Any anomalous zones of gold and/or lead that are discovered during the geochemical survey should be tested by diamond and/or percussion drilling.

(signed)
Allan P. Fawley, B.A. Sc.,
M. Sc., Ph.D., P. Eng.

Vancouver, British Columbia
February 16, 1978

I, ALLAN PRIEST FAWLEY, of the City of Vancouver, in the Province of British Columbia, HEREBY CERTIFY:

1. THAT I am a Consulting Mining Engineer and Geologist, and that my address is 1947 West King Edward Avenue, Vancouver, B.C. V6J 2W7

2. THAT I am a graduate of the University of British Columbia with the degree of B.A. Sc. (1937) in Mining Engineering, of Queen's University with the degree of M.Sc. (1946) in Geology, and of the University of California with the degree of Ph.D. (1948) in Geology.

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4. THAT I have practiced my profession as a Geologist for more that thirty years.

5. THAT I have no direct interest or indirect interest, nor do I expect to have any interest in the Clark-Oliver claims or in Loredi Resources Ltd.

6. THAT this report on the Clark-Oliver claims and area is based on my personal examination on October 10-11, 1977 and on January 4-8, 1978.

DATED this 16th day of February, 1978.

(signed)
Allan P. Fawley, Ph.D., P. Eng.
Consulting Mining and
Geological Engineer.

REPORT OF MAMMOTH MINE
and
PERSONAL RECOMMENDATION TO GEO. U. YOUNG

The Young Mines Company, Ltd., property is situated in the counties of Maricopa and Pinal, Arizona, twenty miles northeast of Mesa, a town on the Arizona & Eastern Railway. The Government road to the Roosevelt Storage Dam passes through the property. It was built at great cost, and is an ideal highway.

POWER ADVANTAGES

The wires from the electric power plant at Roosevelt pass within 300 feet of your mill.

DESCRIPTION

The ground belonging to your company as shown by map of approved official survey, contains ten full mining locations, and a fraction of a claim. Each location is 1500 feet long by 600 feet wide, including the "Fraction". There are about 216 acres. All are found on Books of Mining Records of Maricopa and Pinal Counties, and are known as follows: Mammoth, Mammoth No. 2, Mammoth No. 3, Aztec, Annex, Tom Thumb, Black King, Black Queen, Mother Hubbard, Montezuma and Fraction.

TITLE

The title is perfect and beyond dispute; the owners being in quiet possession for many years. The property is under approved official government survey, and is ready at this time for filing in the Department, and ready for the proper prosecuting to securing of a deed.

DESCRIPTION OF VEIN

This lode is a large, wide contact - the hangingwall porphyry; the foot granite. The trend or course is North 27 degrees West, and has a slight dip to the East - about ten degrees. It varies in width between walls from 10 to 50 feet, and is traceable by outcrop for over a mile, at times covered by shallow wash from the mountains. The many trenches and small shafts prove the present ore chute more than 1500 feet long.

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The North, or old working shaft, is 320 feet deep and fully equipped with a Gallow Frame; wire cable 800 feet long, and steam hoist which are all in good condition. 100 feet along the ledge south is the Middle, or new three compartment vertical, intended to be main working shaft. It is down 185 feet, thoroughly timbered with 8x8 square sets and lined with 2 inch plank. It has a new up-to-date gallows frame; 1000 feet wire cable and new cage on the ground ready to install. The present power is a steam friction hoist. This shaft is not on the ledge, but from present dip will intersect, according to survey, at a depth of 600 feet. Going south along the ledge some 300 feet, we come to what is known as the south shaft. It is 426 feet deep. It has a new and up-to-date gallows frame, wire cable and steam hoist. The ore is delivered from the hoist to the mill by rail tramway. Your men are cleaning out this shaft. They are at present down 250 feet, and have 180 feet farther to reach the crosscut in the bottom.

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HISTORY OF MINE

Here let me say a few words of the early history of the property. It was discovered some sixteen years past. Great excitement followed. The country was located for miles around. It was without a doubt, the largest and richest gold mine in Arizona. The brush was cut 200 feet on each side of the wagon road so the guards escorting the bullion would not be ambushed by road agents. A small town grew upon the property, and a public school was maintained; all depending upon the mine. The ore averaged free milling $40.00 to the ton. The values were not so remarkable, but the vast tonnage and seemingly inexhaustible supply were the encouraging feature.

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SUGGESTIONS

There seems but one way to handle this wide ledge and large tonnage, and that is, pay no attention to the high grade ore in the caved chambers at this time, but start right on the surface.

Mine all the caved ground, mixed or unmixed, irrespective of values, and then mill and cyanide the entire tonnage. From samples, and average mill runs, I feel safe in calling the average $4.00. The mine and mill assays show higher values, and should future work sustain the increase, so much the better. 94% of the values can be extracted by cyaniding the tailings, and the cost of mining and milling should not exceed $1.25 per ton. To do this, however, you must make many changes; install an electric plant. The power is at your door. The mill should be removed fruther up the hill so your tailings can go from the stamps to the cyanide leaching tanks without rehandling. A large percentage of the ore is soft and easily milled. In addition to the twenty stamps, I would install some Huntington Mills or Gates rolls. You must prepare to work a large tonnage to secure economy.

DETAIL INFORMATION

During Mr. Tong's foremanship he sunk a 4x6 surface shaft, as he supposed, to the east of the mine. At 50 feet he came into the cave, proving the ledge at this place over 50 feet wide. The pressure was great and his timbers crushed and the caved ground entered the shaft. Had this surface excavation been sufficiently long and wide, the cave would have run till the angle was formed and the ore could be taken out with very little timbering. Working wide caved ground in this manner is not new. Mr. Tong got to the surface a ton of the caved boulders and waste. It assayed $18.00. One boulder about 40 lbs. averaging $29.60. From all reports, Hall and son milled about 50,000 tons of the high grade ore before the "cave."

TONNAGE ESTIMATES

From the present shafts and surface openings, there is remaining in caved and virgin ground now opened up, not less than four hundred thousand tons in sight, averaging not less than $4.00 per ton. This is assuming the ledge is but 15 feet wide, 1200 feet long and 400 feet deep, allowing 15 cubic feet to the ton.

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Returning to the South Shaft, I would push the work, and mix the high grade with the caved ground, and not strive to reach rich chambers

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The ore pitches to the South. The high values in the South shaft, 430 feet deep, would confirm the belief of rich ore at great depth. This deduction is, undoubtedly, true, and if so, and you are not sufficiently strong financially at this time to prosecute work on the new shaft continuously, it is wisdom to do this at your leisure while working the large tonnage of low grade in sight. It is true, in justice to legitimate mining, you must go deep and block out new ore bodies; but would it not be business to take out the cash in sight while proceeding with the development?

CONCLUSION

Immediate success depends upon the installation of the proper machinery and the economical installation of power, and if these two factors are immediately taken up and settled, there is no danger whatever of this proposition not being a fine success.

Attached herewith please find copies of assays of mill and mine, together with map.

Respectfully submitted,

(signed)
E. O. Kennedy, E. M.

December 8, 1949

Mr. Earl Hastings
Director of Securities
Arizona Corporation Commission
Capitol Annex
Phoenix, Arizona

Dear Earl:

Alfred Lewis has asked us to tell you something of the Goldfield Mine. We have only made a very superficial examination of the Goldfield, but the mine had extensive early day production of gold and the occurrance is such that there could well be a mineralized surface area, low grade but extensive enough to permit mining and treatment at a profit.

In this area are several stringers of very high grade gold ore that would be mined with the general mass.

It is very difficult to sample such an occurrance to obtain a true average - about the only way would be to install some sort of sampling plant or pilot plant, and such an installation, while highly speculative, seems justified.

We know nothing about the organization or other pertinent matters pertaining to the company.

Yours very truly,

Chas. H. Dunning
Director

CHD:mh

November 28, 1949

Mr. Fred M. Guiry
811 East Camelback Road
Phoenix, Arizona

Dear Fred:

Mr. Alfred S. Lewis has asked that I give you a copy of a memo I made a year ago regarding an old shaft he discovered at the Goldfield Mine. This is to help you in any publicity for the Dons trip next Sunday.

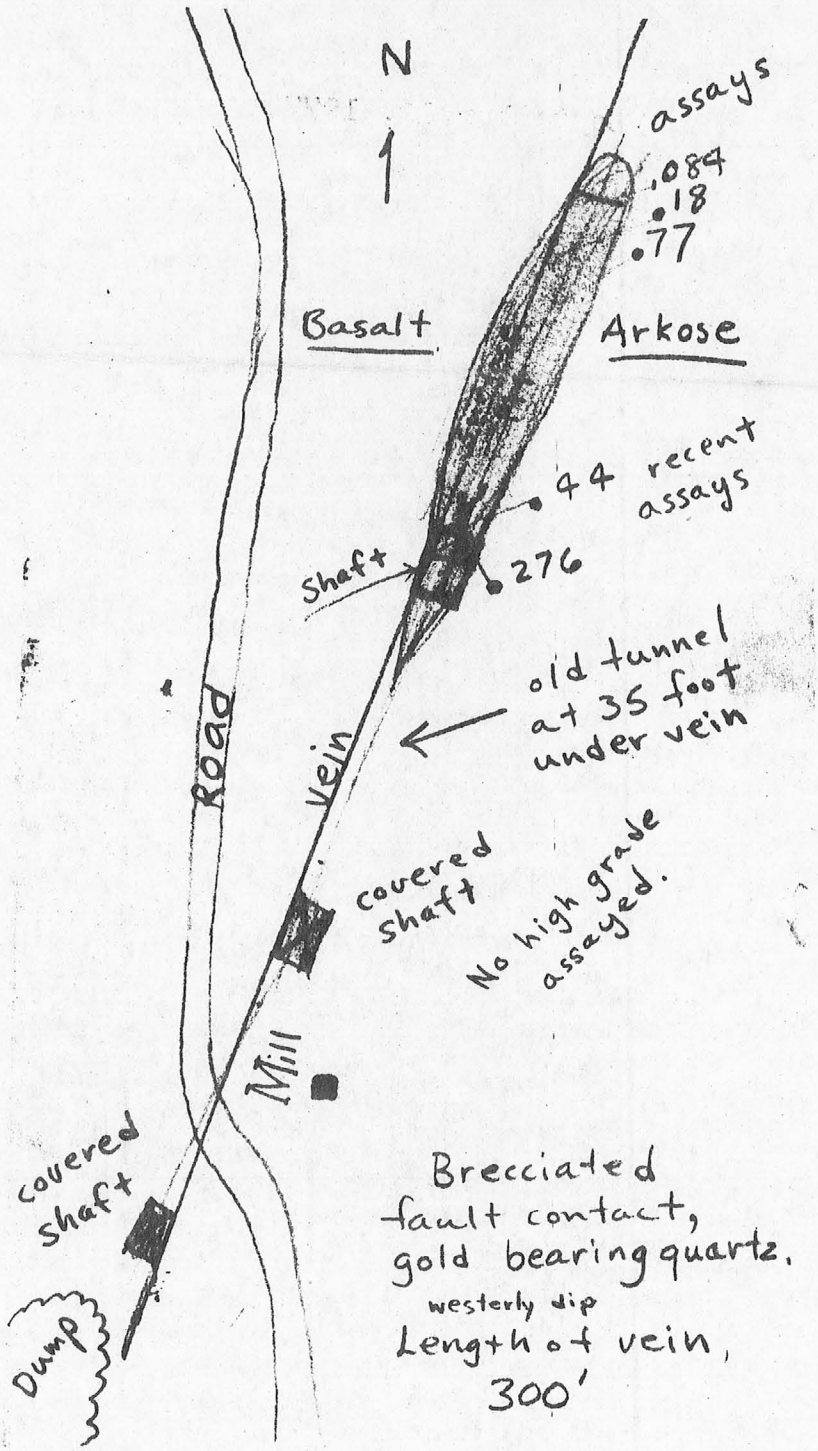
Since this was written Lewis has excavated a large pit with a bulldozer - including the location of this shaft - to a depth of about 60 feet. Shaft is continuing below. A tunnel or drift has been encountered which may connect with the shaft.

Some stringers of very high grade gold ore have been encountered.

Yours very truly,

Chas. H. Dunning
Director

CHD:mh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covered shaft
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Mill
covered shaft
Dump
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westerly dip
Length of vein, 300'

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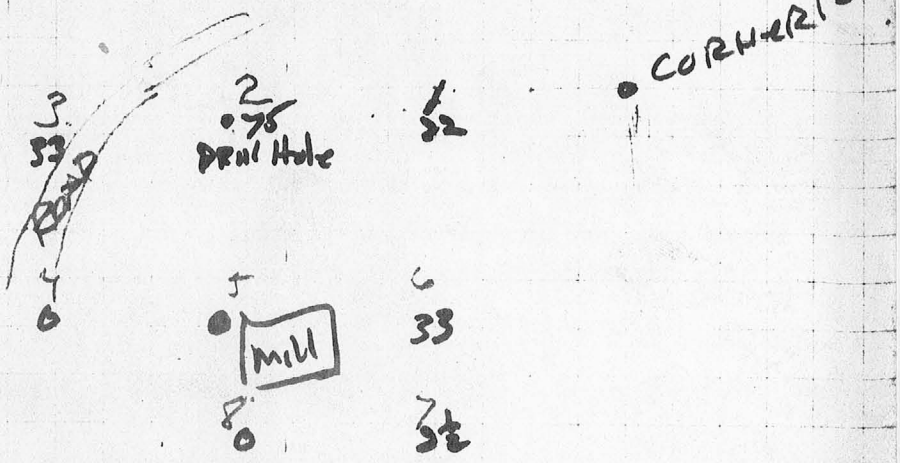

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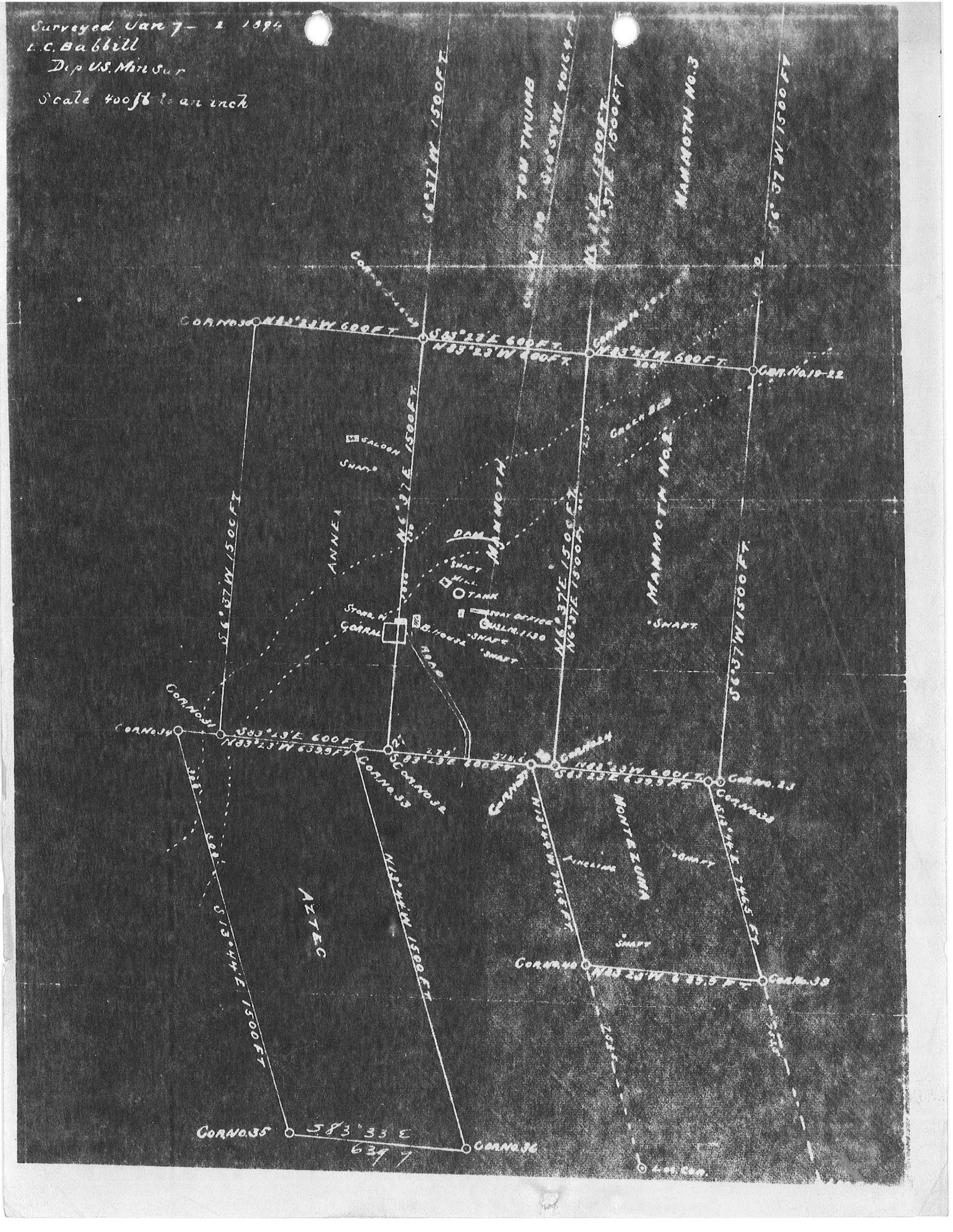
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TOM THUMB
MAMMOTH No.3
MAMMOTH No.2
ANNEX
Cor. No.30
Cor. No.31
Cor. No.32
Cor. No.33
Cor. No.34
Cor. No.35
Cor. No.36
Cor. No.37
Cor. No.38
Cor. No.39
Cor. No.40
Cor. No.41
Cor. No.42
Cor. No.43
Cor. No.44
SALOON
SHAFT
DAM
MILL
TANK
STORE
POST OFFICE
DWELLING
BARN
AZTEC
MONTEZUMA
FENCE
Log Cab.

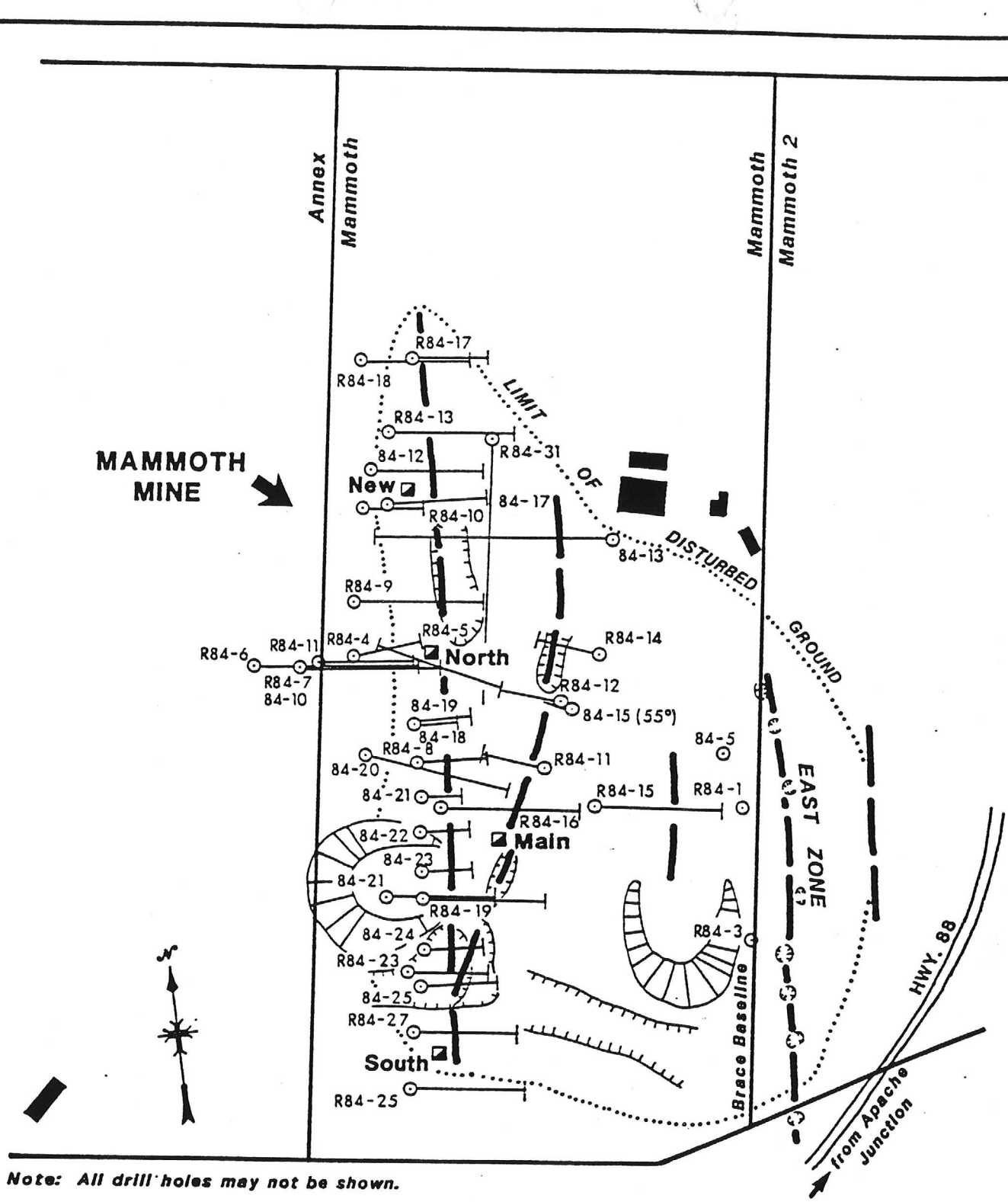

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Figure 5

Surface Plan
Mammoth Mine

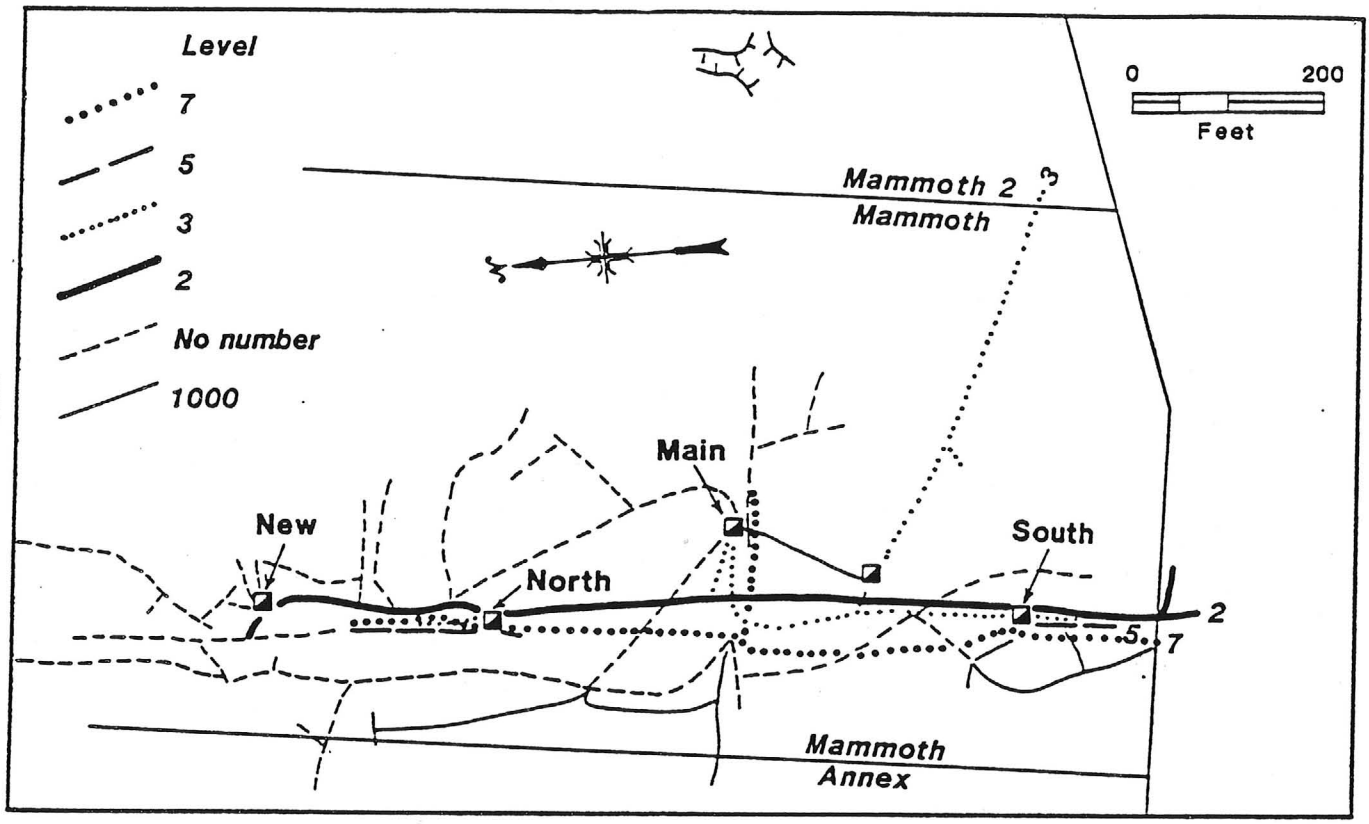
Mammoth Property
Maricopa and Pinal Counties, Arizona

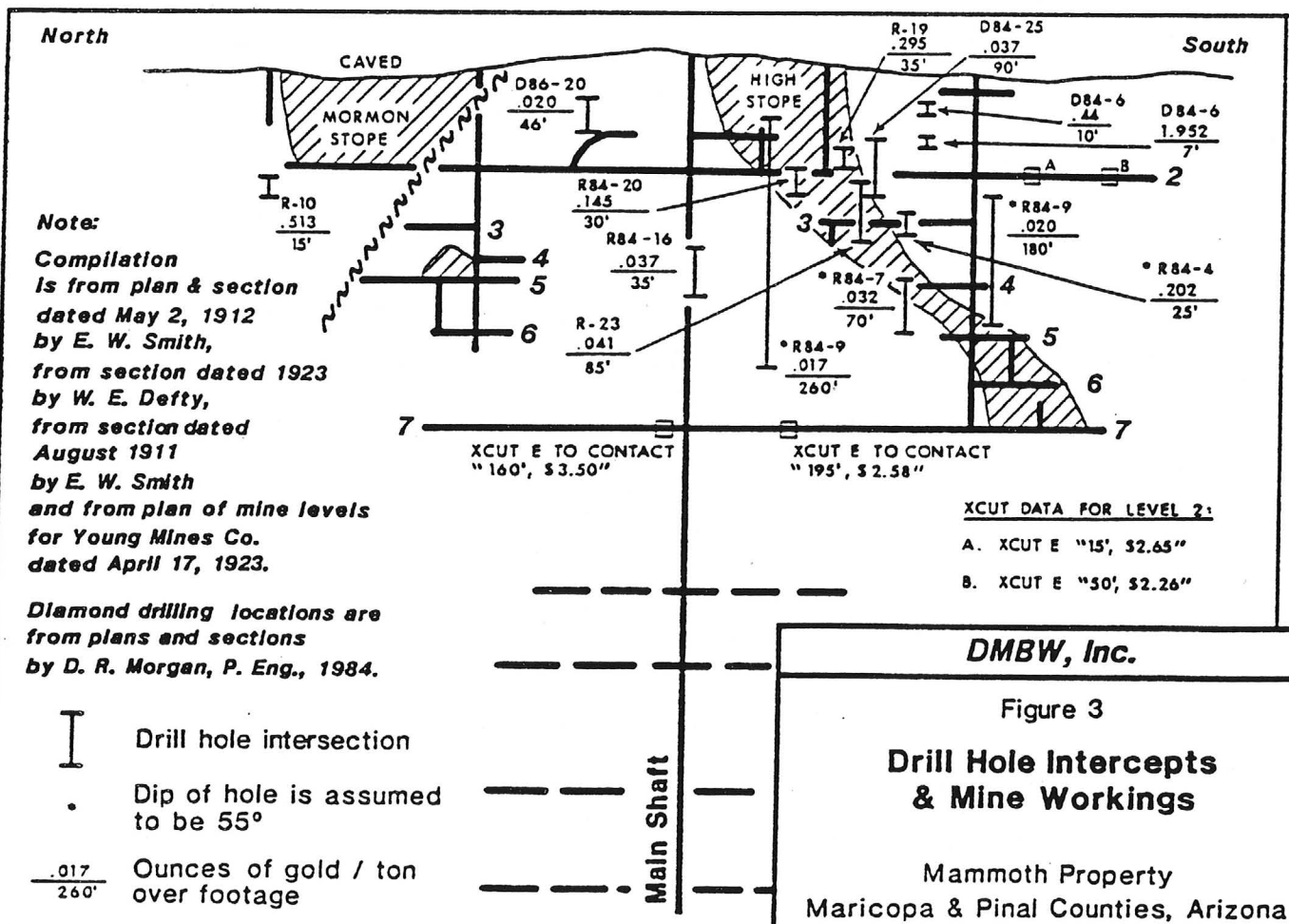
February 1990

TABLE 1

DRILL HOLE INTERSECTIONS BY BRACE RESOURCES LTD.
(Summarized from reports by D. R. Morgan, P. Eng.)

Hole No.	From (ft.)	To (ft.)	Hole Length	Assay Oz. Au/t	Dip (degrees)	
Reverse Circulation						
R84- 4	190	200.0	10.0	0.450	?	
R84- 4	175	200.0	25.0	0.202	?	
R84- 7	320	325.0	5.0	0.126	?	
R84- 7	280	350.0	70.0	0.032	?	
R84- 9	100	360.0	260.0	0.017	?	
R84-10	165	180.0	15.0	0.513	60	
R84-16	260	265.0	5.0	0.149	60	
R84-16	290	295.0	5.0	0.160	60	
R84-16	275	305.0	35.0	0.035	60	
R84-19	140	160.0	20.0	0.367	60	
R84-20	160	190.0	30.0	0.145	60	
R84-20	165	185.0	20.0	0.209	60	
R84-22	105	110.0	5.0	0.238	60	
R84-24	230	260.0	30.0	0.028	?	
Diamond Drill						
D84 1	53	58.0	5.0	0.110	45	(sludge)
D84 2	70	85.0	15.0	0.100	60	
D84 5	125	130.0	5.0	0.108	90	
D84 5	120	149.0	29.0	0.033	90	
D84 6	50	60.0	10.0	0.440	55	
D84 6	90	102.0	12.0	1.160	?	
D84 7	84	86.5	2.5	0.154	?	
D84 8	95	100.0	1.0	0.084	?	
D84 20	31	32.0	40.0	0.020	60	
D84 25	-	-	5.0	0.160	?	
D84 25	-	-	5.0	0.175	?	
D84 25	-	-	90.0	0.027	?	





Note:

Compilation is from plan & section dated May 2, 1912 by E. W. Smith, from section dated 1923 by W. E. Defty, from section dated August 1911 by E. W. Smith and from plan of mine levels for Young Mines Co. dated April 17, 1923.

Diamond drilling locations are from plans and sections by D. R. Morgan, P. Eng., 1984.

I — Drill hole intersection

. — Dip of hole is assumed to be 55°

.017 / 260' — Ounces of gold / ton over footage

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Figure 3

Drill Hole Intercepts & Mine Workings

Mammoth Property
Maricopa & Pinal Counties, Arizona
February, 1990

sections (Figure 3) prepared in 1912, suggest both shoots continue below the 7th level.

A program to reclaim and develop the mine began in 1910 and continued sporadically for about 20 years. This work included deepening the shaft to allow development of several new levels down to 1000 feet below surface. Crosscuts and drifts were driven at this horizon to the limit of the Mammoth claim. Down dip extensions of both the ore shoots mined at higher elevations are reported to have been met in drifting on the 1000 foot level. A plan from 1925 gives values of channel and muck samples taken during this work.

Production during this second period of operations was sporadic. A mill was operated on an occasional basis which resulted in treatment of a recorded 7,100 tons from which 3,241 ounces of gold were recovered for an average grade of 0.456 oz. Au/t. A dam was built which has protected the site from further flooding.

For twenty years following 1929, litigation precluded any serious work on the property. When the final settlement was reached, Goldfield Mines, Inc. became undisputed owner of the property and attempted to reclaim the "Mormon" stope, the larger of the two stopes which break surface (Figures 3 and 4). This work is said to have ceased in 1950. There is no record of what was accomplished.

Work on the property has been minimal since 1987. The chief events being the resolution in August, 1989 of the lawsuit which recognized ownership of the claims by M & M Enterprises and the treating of 2,000 tons of ore at the WLE facility in Apache Junction.

At the time of visits by DMBW, the four principal shafts (Figure 3) through which the Mammoth Mine was developed were capped and underground workings flooded to within 50 feet of surface. The shafts are said to have been filled with loose rock before capping, but this cannot be confirmed due to the cement caps covering the shaft collars. The sites of collars of several of the less important shafts are obscured by recent trenching and earth moving activity.

GEOLOGY

The most complete description of the geology of the area around the property is given by Kilbey in his thesis (op.cit.). He recognizes a well defined sequence of clastic and volcanic rocks of mid-Tertiary age which were deposited during the formation of a caldera which he identifies to the north of the property. The base of this sequence is exposed at the property where an arkosic conglomerate, overlain by an alkali olivine basalt volcanic lie unconformably over a granitic rock of Precambrian age. Kilbey's thesis map shows that the sunken portion of the caldera, lying to the north of the property, is

cut by an anastamosing system of block faults. Volcanic activity associated with the formation of the caldera continued from about 29 to 20 million years before present.

Fractures developed during the end of this volcanic activity became the sites for deposition of gold mineralization.

The records contain results of several efforts to map the geology of the area, but there is a lack of consistency between them. There is an obvious need for a reliable map showing the surface geology. Figure 4 shows the distribution of the rocks as extrapolated to surface from logs of drill holes completed by Brace and reported by Morgan (op.cit.) A map by Kilbey is used to illustrate the "Geology" section of Buchella's report, but in the copy available to DMBW the legend is missing. Every effort should be made to recover this record.

Morgan gives the dip of bedding seen in shallow workings at the Mammoth Mine as 35 degrees in the direction 063 degrees, or roughly northeastwards.

Mineralization

The principal structural feature of the geology of the property is a series of fracture zones which strike roughly northwards and control the distribution of gold mineralization (Figures 3 and 4). The most important of these structures contains the mineralization in the Mammoth Mine. Here the zone is described by contemporary observers

as about 30 feet wide containing in places what is described as a "pegmatite" which has been disturbed by movement.

From the frequent references on the old plans and sections to caved ground, it is probable that the mineralized ground does not stand well. Efforts to reopen and rehabilitate old workings could prove very costly. It is recommended that new workings should be made in solid, undisturbed ground, preferably on the west side of the old mine. This proposal is discussed further in a later section.

Free gold occurs in veins of brecciated quartz. Some of the gold occurs in coarse, spectacular concentrations which yield very high assay values. When oxidized, the quartz contains traces of copper mineralization and cavities the shapes of which suggest the primary ore contained pyrite. Pyrite is reported in cuttings from drill holes of the Brace program. Oxidized ore is also frequently stained with black manganese oxide. Depth of oxidation is not recorded, but may be at no great depth if the present level of water seen in old workings is any indication. Whether or not the ore is oxidized can have an important influence on the practicality of heap leaching, so it is important to determine to what depth oxidation, or surface weathering, extends.

Compilation of information from drill sections and plans of old workings of the Mammoth Mine (Fig. 4) suggests

that there are at least four parallel zones of fracturing which contain gold values. Three of these lie to the east of and parallel to the one which was mined. The zone mined in the Mammoth Mine is, of course, the most important. Contemporaneous records give little indication of the widths actually mined except to suggest that in places the stopes were up to ten feet wide.

A longitudinal section of the Mammoth Mine made by E. W. Smith and dated May 2, 1912, shows two crosscuts on the second level near the south end of the mine where average assays are stated to be 15 feet at $2.65 and 50 feet at $2.26 (see Figure 3). If the prevailing price of gold at that time is assumed to have been $20.67 per ounce, these values translate into 0.128 oz. Au/t across 15 feet and 0.109 oz. Au/t across 50 feet respectively at a depth of 120 feet below surface.

The same section shows two further assays of crosscuts. These are at a depth of about 420 feet from the surface on the seventh level and are close to the Main Shaft. One of these shows 0.174 oz. Au/t for a width of about 15 feet and the other 0.124 oz. Au/t for about the same width. The crosscut from Main Shaft on this same level is shown on the plan to average $3.65 (0.17 oz. Au/t, $71.40 @ $420 Au price) for a length which measures 125 feet on the plan. The values presumably represent averages of several samples, but the nature of these is not apparent from the section.

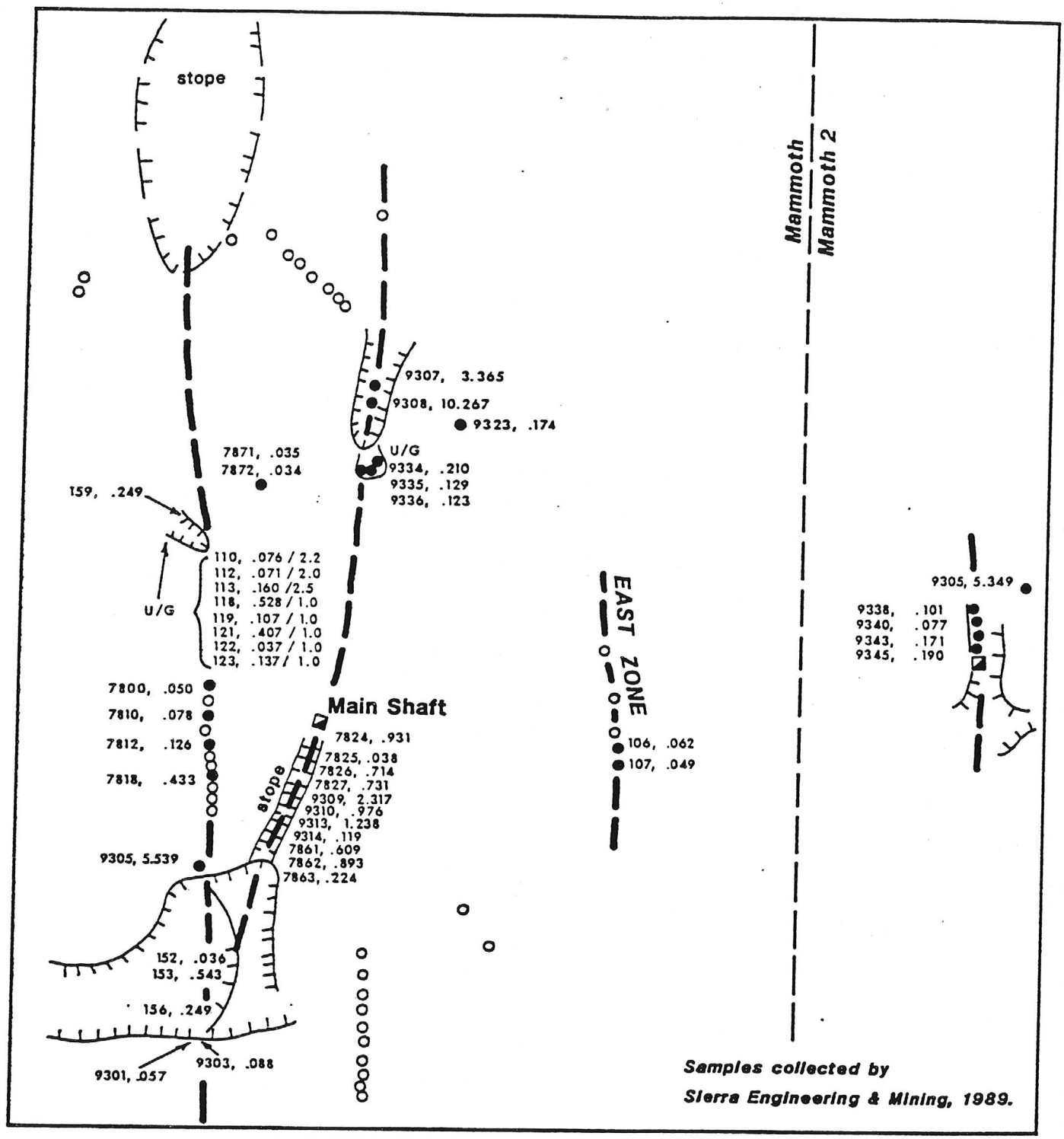
DMBW cannot give an opinion on the validity of these assay values, but simply draws attention to them as evidence for the existence of what could be a large body of of low to medium grade ore.

The location of all these references is shown on the section in Figure 3 in relation to the values cut in drill holes completed by Brace. The values in the drill holes confirm the observation that the potential exists for substantial widths of mineralization in the walls of the structure which was mined previously.

Numerous samples from surface collected by Sierra Engineering and Mining in 1989 yielded values of interest some as high as 10 troy ounces per ton. These are shown in Figure 6.

None of the above results is sufficient to allow incorporation into a more formal estimate of ore reserves, but the figures are very encouraging. All the data strongly suggests there may be on the order of at least one million tons of gold-bearing material to a depth of about 450 feet from surface along a strike length of 500-600 feet. Further drilling and testing of this section of the property should receive priority in the work proposed below.

Northwards from the Mammoth Mine there is little evidence of prospecting along the continuation of the Main Zone, or any of the lesser ones, for the 1,200 feet representing the length of the Tom Thumb claim (Figure 2 and



0 100 200 feet

● Sample site with ≥ 0.030 oz. gold per ton

123, .137/1.0 Sample location number, oz. Au per ton / feet where available

Excavation

Mineralized zone

DMBW, Inc.

Figure 6

Channel & Grab Samples ≥ 0.030 OPT

Mammoth Property
Maricopa and Pinal Counties, Arizona

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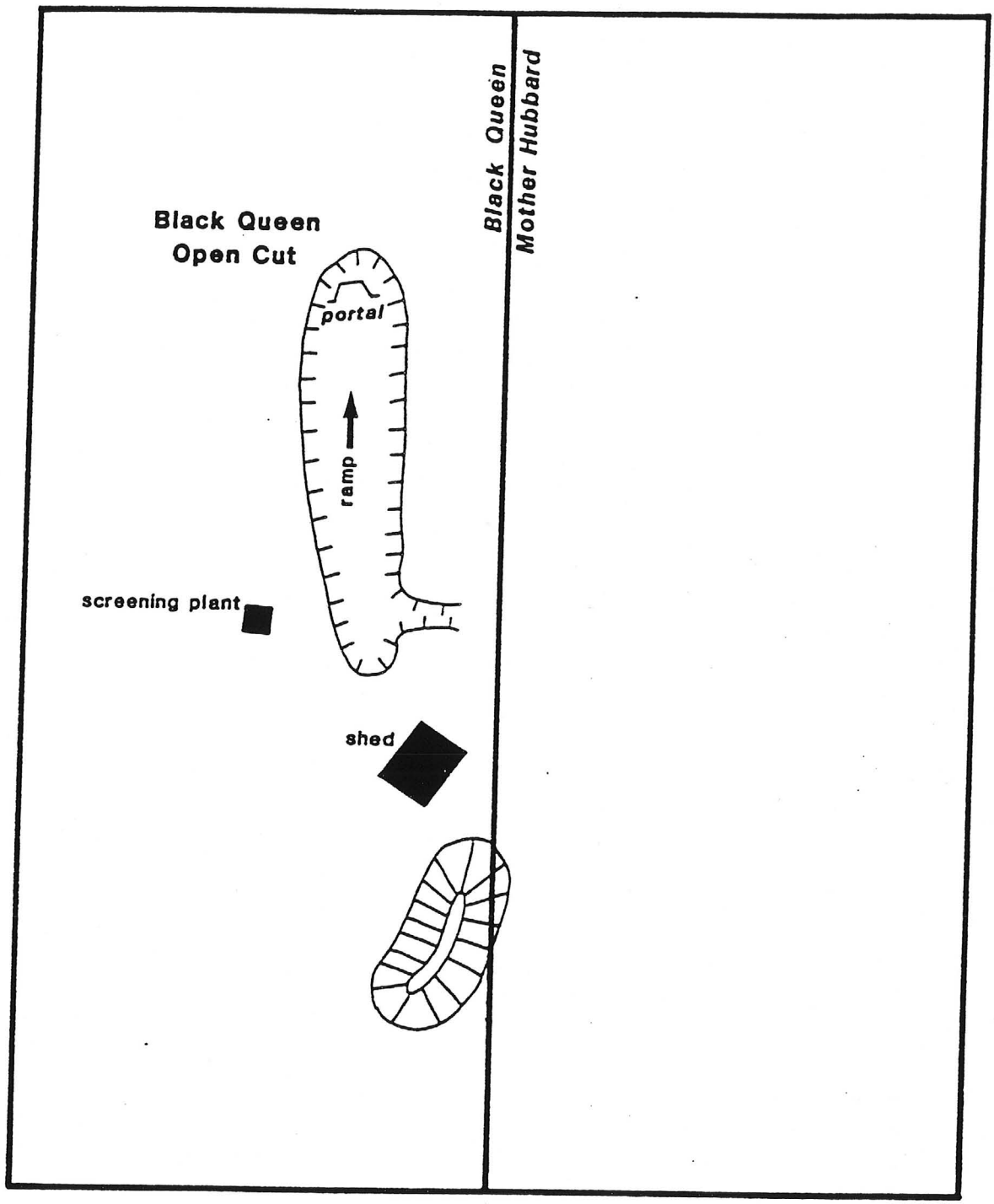


0 100 500 ft.

Excavation

Dump

N

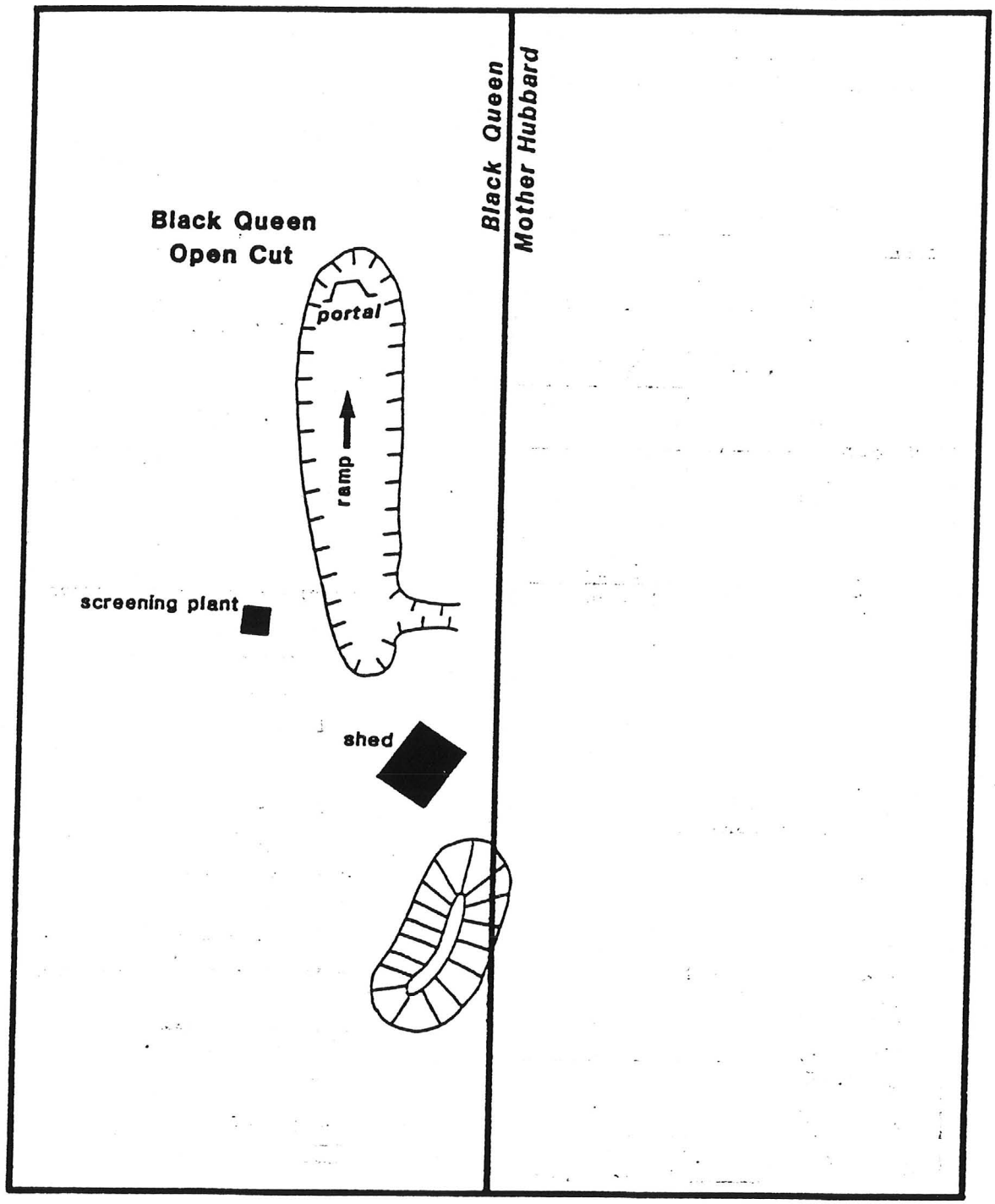
DMBW, Inc.

Figure 8

Surface Plan
Black Queen Mine

Mammoth Property
Maricopa and Pinal Counties, Arizona

February 1990



0 100 500 ft.

Excavation

Dump

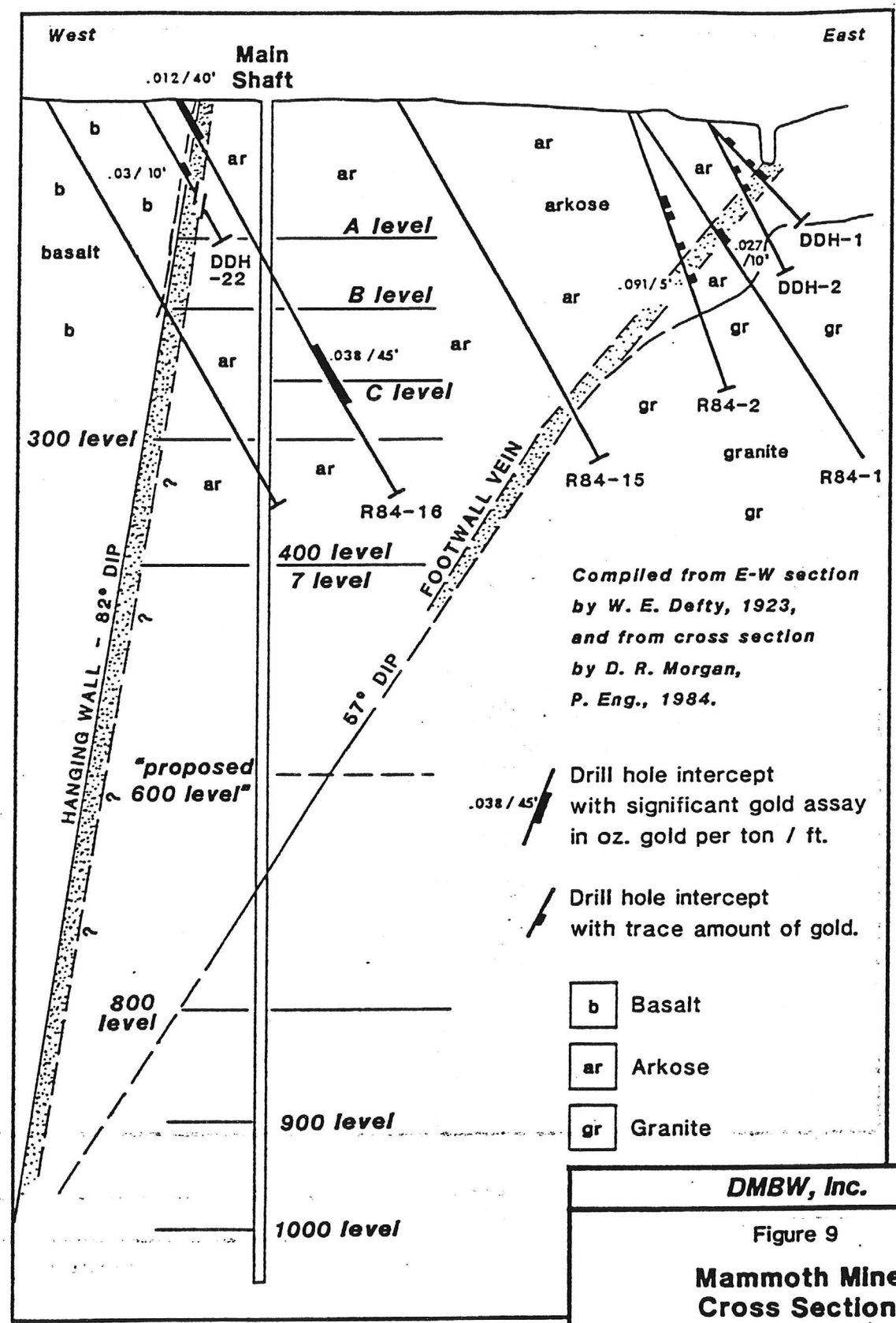
DMBW, Inc.

Figure 8

Surface Plan
Black Queen Mine

Mammoth Property
Maricopa and Pinal Counties, Arizona

February 1990



DMBW, Inc.

Figure 9

Mammoth Mine Cross Section

Mammoth Property
Maricopa and Pinal Counties, Arizona

February 1990

4). At that distance there is evidence for the continuation of the zone in material recovered from holes on Section 29N of the Brace grid (Figure 7). The entire distance between this section line and the workings of the old mine represents an excellent prospect for new ore, as does the extension of the zone further north again onto the Black Queen claim where gold mineralization is exposed in an open cut (Figure 8). The area north of the Mammoth Mine and on the main structure, warrants careful prospecting for the possible presence of ore suitable for heap leaching, or ion exchange resin recovery.

From the plan (Figure 4) it appears that the more continuous fracture lies in the hanging, or western, wall of the 30 foot wide Main fracture zone.

No mineralized fractures of consequence appear to lie west of the mine. In depth, the possibility has been tested without much encouragement by a crosscut driven westwards from the mine workings 420 feet below surface on Level 7. There is no record of any surface exploration to the west.

East of the mine, there are several occurrences of gold-bearing fractures. The closest is represented by surface samples 106 and 107 (Figure 6) and the values encountered in reverse circulation drill hole R84-16 (Figure 9) of the Brace program which averaged 0.038 oz. Au/t over a hole length of 45 feet. This zone contains one intersection of five feet which assayed 0.149 oz. Au/t and another of

COPY.

Mr. George U. Young, Mgr.,
Young Mines Co.,
410 Fleming Building,
Phoenix, Arizona.

Dear Sir: - Pursuant to your request I have carefully made a geological exami
cal examination of your Mammoth Mine at Youngsberg, Pinal County, Arizona, spending 30 days from Dec. 1st to 31st, on the ground, and herewith submit my report thereon:-

The scope of my investigation has been confined solely to the geologic conditions within, and contiguous to, the mine. Fortunately the mine development to date facilitates an appraisal of those features so that little is left to inference. The several formations and their physical conditions, contacts, etc., have been carefully checked. Note was taken of all jointing planes, and slips, together with their attitude, but they represent only the tension, and compression fractures as consequent adjustment planes to local stresses, etc., accompanying larger scale displacements. They have slight bearing on considerations relative to solution of problems sought, therefore I have generally omitted them on the maps, and reference to them herein will be made only as necessary. In compiling these data I have eliminated technical terms where their use is not consistent with the clarity of the report. Based on results of my investigation I have arrived at conclusions as under: -

GENERAL HISTORIC GEOLOGY.

In Archean time the country rock was primarily an undisturbed granitic batholith, and this formation probably constituted the earth's lithosphere for the early part of the period. Pre Cambrian faulting ((See Hanging Wall Fault Vein) resulted in a plane of low resistance traversing the batholith. Probably contemporaneous, or as a close sequence thereto, was the injection along this rupture of an intrusive mass crystallizing out as pegmatite. The pegmatite ascended along the fault plane, and nearing the Pre Cambrian surface, the horizontal and lateral resistance of the older wall rocks was less stable as against the superpressure exerted by the magmatic pegmatite with the consequence that the walls of the primary fault were forced apart by the intruding mass to an

extent consistent with the proportionate degree of resistance exerted by the wall rocks. The resultant mass solidifying between the displaced walls formed a pegmatite chonolith. The feeder to, and the bulk of, the chonolith is Scutherly from the area under consideration, hence only the extreme North extremity in encountered in your mine development to date. Radiating along fracture planes in the older wall rocks are many injected vein-dikes of pegmatite magma. Reference to Sheet No. 2 will give you a comprehensive idea of the lateral displacement of the footwall country rock side of the primary fault.

The pegmatite probably extended to the Pre Cambrian surface but, owing to its structure, pegmatite resists weathering and erosion to a lesser degree than the more compact granite serving as its wall rocks. Early Paleozoic (Cambrian) weathering disintegrated the pegmatite and apparently the chonolith was eroded to a depth equal to the 400 level of the main shaft, or perhaps deeper to the East, however movement along the master fault planes resulted in an upthrust of the footwall rocks to the extent that the Cambrian erosion elements became more quiescent; probably due to segmental uplifts in the older rocks, forming barriers that precluded the intense erosive action of previous torrents. With more quiescent conditions the process became one of deposition with silicification where favorable. This deposition in the form of a fluviatile piedmont plain was made up of quartz and other fragments, both transported and local, which when consolidated formed quartzite, or graywacke, conglomerate as the bonding constituents permitted. Following this was a period of slow, long-enduring, disintegration of the conglomerate effecting for the most part the conglomerate predominently graywacke, as owing to the silicious bond in the quartzite that rock was more stable.

Toward the end of Paleozoic era (Permian) this disintegration, ceased, and the process of recementation of the residual products took place in a relatively short period. This is indicated by the fact that the residual recementation is an arkose-graywacke continental

conglomerate. The arkose is especially predominent along the basal contact of the conglomerate against the Pre Cambrian pegmatite. Few quartzite pebbles are noted in the later conglomerate, and on the surface an unconformity is observed between the remnant Cambrian quartzite and the recemented arkose-graywacke.

Since Permian time no great change is evidenced locally with the exception of a very considerable movement having taken place along the fault planes. The hanging wall fault, owing to its great length and depth, is amenable to the reactions of adjustment in the igneous rocks within an extensive area of the earth's lithosphere. Regionally there have been extrusions of volcanic lavas, probably late Cretaceous, such as basalt, rhyolite, trachyte, and andesite, however none of these have any relation to the problem under consideration. A basaltic flow traverses the property and fragments of the other lavas are to be found in the unconsolidated alluvium overlying the Permian and older conglomerates.

The above gives a general outline of the events in their geologic sequence from earliest time to the present, however I have not considered accessory conditions in the above; such as fault brecciation and contact metamorphism; having in mind a separate discussion of these subjects, as the conditions have direct bearing on the mineralization of your ore bodies at the time of magmatic injection, and during the long period of weathering since. These same agencies have extensively leached with the aid of circulating ground waters, the soluble minerals and transportation has been back to the ground water level where reprecipitation is favored.

Fault Brecciation. Fault breccia is the product of the crushing, grinding, and abrasive action of the two component walls of a fault. The material ranges from microscopic in size to that weighing several tons. The mass is termed the fault zone. Locally the fault zone averages twenty feet in width, and owing to intermittent movement along the planes, particularly at the hanging wall fault, since the

injection of the pegmatite magma there are found in addition to the fragments of the original wall rocks those of the younger injected rock. Minerals from accession vapors, thermal metamorphism, and chemical replacements from down trending ground waters are noted in the ground mass.

Metamorphism. All rocks are subject to metamorphism if the conditions under which they were formed are changed. Such alterations are termed metamorphism, It may be induced chemically or mechanically. Accession gasses from the magmatic intrusions, circulating ground waters, heat, stress, and period of time, all act to the end of changing the identity of a rock and its constituents. With the injection of the pegmatite and its ultimate solidification, as previously outlined, the gasses, heat, and stress served to lay the foundation of metamorphism later completed through the ages by the circulation of the ground waters. Now we have the fault zones and their adjacent wall rocks, more particularly the pegmatite, in various degrees of alteration. Metamorphism being intense at the fault plane diminishes in degree over an average distance of sixty feet to the unaffected rock. On account of different conditions existing at various depths within the lithosphere, different chemical processes assume chief importance in their respective zones. These zones may be termed (1) Belt of Weathering, in the vertical plane of the main shaft I estimate the depth of this belt to approximate 1200 feet. See Sheet No.2. In this zone fractured by the processes of weathering, oxidation, hydration and carbonation prevail. Complex silicates break down and simpler less dense minerals, such as iron oxides, etc. are formed. The dissolved minerals carrying a proportion of the values are carried down to; (2) Belt of cementation. In which the ground water level is constant and the process is that of cementation effected by the deoxidation, dehydration, and decarbonation of the solutions from the weathering belt. Silicates are built up and great pressure leads to the formation of denser minerals and a compact crystalline structure. It is here that most vein deposits of economic value originate under

geologic conditions such as are apparent at your property, therefore I would anticipate the zone below the constant water level to be characterized by massive silicification in the zone of fault brecciation, and also as stringers throughout the contact metamorphic zone adjacent to these faults; accompanied by enrichments of gold values leached out by, or entrained with decending ground waters from the belt of weathering in addition to the original primary values in situ within the ores of the anamorphic zone, or belt of cementation.

Economical ore deposits between the 300 level and at, or just below, the constant water level are limited to the fault zones, and then are contingent on pre-existing barrier conditions such as impervious gouges, etc., having retained primary ascending mineralizing agencies, or the descent of the ground waters in such manner as to have formed local concentrations.

Considerable movement along the master fault planes since their primary shear is evidenced, not only by pegmatite fragments in the breccia, but by vertical displacements of the wall rocks. That these events have been accompanied by ascending vapors is evidenced by the silicification of the Cambrian conglomerates superimposing the Archean fault zones. Along fault planes in the conglomerate silicification was extensive, and enrichments of gold ores deposited forming the surface ores mined by your predecessors. This condition should obtain equally as rich in the conglomerate superimposing the footwall fault, beginning at a point about East of the main shaft at the footwall and extending Southeasterly therefrom.

SUMMARY OF HISTORIC GEOLOGY.

The Historic Geology may be summarized thus: -

First. Undisturbed granite batholith.

Second. Faulting in a North and South plane in the batholith.

Third. Injection into this fault rupture of pegmatite magma which forced component parts of wall rocks apart. Axis is vertical plane of shaft estimated at from 1000 to 1250 feet. Is

progressively deeper to South. Injection of magma accompanied by thermal mineralizing vapors which started alteration in cooling magma.

Fourth. Continued movement in planes of faulting built up wide fault zones which in turn were heavily mineralized.

Fifth. Erosion of less stable pegmatite with later faulting of foot wall with up thrust.

Sixth. Arresting of erosion and the gradual building up in Cambrian time of piedmont plains composed of the detrital material from granite and pegmatite. The latter is predominent. Areas of this material consolidated to a quartzite, or graywacke as conditions favored.

Seventh. A long period of weathering (Cambrian to Permian) disintegrated the conglomerate, particularly the graywacke.

Eighth. During a short period of time (Permian) products of disintegration consolidated into residual arkose conglomerate.

Ninth. Weathering and leaching (Permian to and including Quaternary Recent) has extensively returned solubles to belt of cementation.

PETROGRAPHY.

In the above outline of the geologic history consideration as to their occurrence is taken of all the three great classes of rocks in the earth's lithosphere. An outline of the physical conditions, and the characteristics of these rocks is as under: -

1. Igneous. The granites in mass as a batholith. The pegmatites as an injected chololith along a low resistance plane in the batholith, and also as vein-dikes in fracture planes in the wall rocks contiguous to the chonolith. Basalt as an extrusive lava flow. Minerals of the igneous rocks grouped according to their order of crystallization in solidifying are 1. Iron. 2. Ferromagnesian silicates.(Olivine, Pyroxine, Amphibole, and Mica). 3. Feldspar and Feldspathoids. (Plagioclase, Orthoclase, Nephelite, Leucite, and Analcite). 4. Quartz.(in acidic rocks). Pegmatites being the product of magmatic interior of semi solidifying igneous

rock obviously are composed of a preponderence of those minerals which would solidify lastly, such as quartz, feldspar and some of the ferromagnesian silicates. Basalt owing to its more sudden cooling is a fine grained rock. All the constituents cool to a more homogenious mass. i.e., before they have had opportunity to cool selectively as individual aggregates. The granites normally have their characteristic light color, however locally circulating solutions have added a preponderence of ferromagnesian minerals which unoxidized give these rocks a green color, and if oxidation in any of its stages has taken place the rock is light green to red. The basalt is dark gray to black owing to an excess of dark silicates. (Pyroxene and Olivine) and magnetite.

2. Metamorphic Rocks. The quartzite and graywacke conglomerates while originally a sedimentary are metamorphic by reason of their being bonded by newly deposited silica, or silicates, and if metamorphism is complete the rock is compact and will not retain cleavage along previous aggregates. The contact metamorphic pegmatites are in various stages of alteration from gneiss at the fault contact to that showing various stages of change effected by gaseous accessions and circulating ground waters. The pegmatite fragments making up, in part, the fault breccia are highly metamorphosed by heat and pressure, also the gasses and solutions traversing the fault planes. Coloring of the quartzites is brown to red owing to oxidation of their component dark silicates. These rocks and those of contact metamorphism have the following mineral consituents. Quartz, Feldspars, Biotite, Muscovite, Hornblende, Epidote and chlorite. The graywacke has in addition to the above the ferro magnesian silicates.

3. Sedimentary. These rocks are the residual products of former disintegrations. The arkose conglomerate makes up the bulk of this formation. The sedimentaries retain the constituents, less oxidation, hydration, etc. of their former aggregates and in addition feldspar and newly deposited ferromagnesian silicates. Where oxidation and weathering has broken down the ferromagnesian constituents the color is brown to red depending

on the degree of oxidation. Where unoxidized the color is green. Phenocrysts of feldspar are predominently white in the arkose ground mass.

PHYSICAL CONDITIONS.

For area considered see Sheet No. 1.

The area under consideration being in the foothill wash country contiguous to the Superstition mountains is superficially covered by erosion products from the higher reaches, and the unconsolidated alluvial fill is largely made up of fragments and pebbles that bear no relation to the geologic formations in situ locally. The detrital materials extensively obscure outcrops and other surface expression of the underlying conditions. Basalt as a superficial extrusive mass is noted, but it bears no relation to geologic structures influencing economic mineralization. Conglomerate ranging from arkose to quartzite is predominent being more resistant to erosion this formation now lays in small hillocks upon one of which your camp has been built. In the Northeast quarter pegmatite is noted. Its downward trend correlates with the cross dikes noted in the extreme North drifts of the 300 and 400 levels. Contacting the pegmatite on the West is an outcrop of trachyte porphyry. I have made no inference as to the genesis of this rock. The master fault is traceable partly through outcrops and otherwise by oxide stain in the conglomerate and unconsolidated alluvium. Faulting North of the North shaft is indicated by the wash and this fact is substantiated by underground conditions of the 300 and 400 levels. (North drifts). This fault has been called the East and West fault. The youngest master fault is the Apache fault South of the South drift. It indicates a lateral displacement to the West affecting all the formations including the basalt flow. It is my opinion that this movement was one of adjustment following the disturbances that extruded or erupted the lavas of the region. No underground development has encountered the fault as yet. With few exceptions the surface has little expression of the underlying geologic conditions.

GEOLOGIC FEATURES OF THE MINE.

Consideration of the geologic features of the several levels in the mine together with those of the vertical cross-section will give you a conception of the ultimate result of the geologic events.

The A.B. and C levels. See Sheet No 3, as indicated were driven in the conglomerate formation. Ores were mined from the silicious zones superimposing the master faults. Arkose breccia is noted in the general plane of the underlying fault zones. Numerous silicifications paralelling the fault zone are noted.

The 300 level. See Sheet No.4. Consideration of this level gives a conception of the relation between the conglomerate formation and its country rock. A remnant of the pegmatite chonolith is noted parallelling the master fault. Reference to the cross-section will explain this. Brecciation along the fault zones is well developed. The breccia contains fragments of the older wall rocks, also the pegmatite, and occasionally conglomerate. The East and West fault indicates a South boundary of a later pegmatite injection not considered herein. The fault terminates with its intersection with the hanging wall fault. The country is highly crushed and metamorphosed into the conglomerate indicating a younger age of the fault and the adjacent pegmatite to the North. The long crosscut East failed to intersect the footwall fault, however a flat fault near the end of the crosscut has apparently displaced a segment of the wall to the East. I have assumed the condition noted on the map solely on account of the flat fault. Otherwise I would infer that a portion of the wall was eroded by a Cambrian eddy.

The 400 level. See Sheet No. 5. Development on this level is geologically important in that it determines the depth of erosion of the pegmatite chonolith and indicated the basal contact of the conglomerate as of the vertical plane of the shaft. Contact metamorphism in both formations is well advanced. The depth of the erosion possibly extended farther East, but the uplift of the wall rocks since primary erosion has apparently altered the Cambrian cross-section. Brecciation along all

faults is well developed. Fragments of conglomerate are noted in the footwall breccia indicating post Permian movement of the wall.

The 700 Level. See Sheet No. 2. At a point just above the 700 level the main shaft intersected the footwall fault.

800 Level. See Sheet No. 6. The station is in the footwall. The footwall fault was intercepted at 75 feet, and the hanging wall at 180 feet from the shaft. Beyond the hanging wall 195 feet of cross cut was driven into the hanging wall without intersecting any parallel ore deposits. Occasional pegmatite vein-dikes are noted. Drift to the North was for the most part maintained in the hanging wall side of the fault. Two additional cross cuts were driven into the hanging wall country at intervals of 400 feet and 500 feet respectively. Two cross-cuts were driven across the brecciated zone of the vein to the wall. Foot wall fault vein makes its junction with hanging wall fault vein 175 feet North of main crosscut. South drift is now prospecting hanging wall fault vein from which favorable samples are being taken. The brec-ciation along both faults is well developed, and the pegmatite between walls is in a high state of metamorphism.

The 1000 level. See Sheet No. 7. From the station the cross-cut intersects the footwall fault vein at 110 feet, and the hanging wall fault vein at 200 feet. The crosscut extends into the hanging wall country rock an additional 100 feet. A drift North for 100 feet along the brecciated fault zone did not reach the junction of the two faults. The ground is heavy and impossible to hold with timbers. The hanging and foot wall veins will join at 150 to 175 feet from the cross cut. Pegmatite between walls is highly crushed in addition to metamorphism. Footwall country rock is also crushed. This is due to the area being local to the axis of the lateral thrust of the foot wall country.

RECOMMENDATIONS.

Shaft. See Sheet No. 2. Anticipating that the water level will be constant at about the 1200 level, and that the nature of the mineral deposition will change as outlined under Historical Geology

and that ore deposits of economical importance will be proven to be greater in extent, and better in average values than those deposits now developed I would strongly advise that your main shaft be sunk an additional 450 feet from its present bottom. This work completed will establish the 1500 level plus an adequate sump. Cut the 1500 station with an ample pump chamber as water conditions will very materially change when the drift has encountered the fault vein. Cross cut 270 feet East to the primary fault zone. Drifts parallelling the vein in each direction should be driven. Their position can be determined after reaching the locale of the vein. I am of the opinion that the vein matter will be compact and will take a minimum of timbers to mine. In sinking I would advise that only stations be cut intermediate between the 1000 and 1500 levels. It is possible that an intermediate pump station be required. Heavier timbers are necessary in any new shaft development.

1000 level. Drift North and South in the foot wall country as outlined on sheet No. 7. Completion of this work will have prospected the hanging wall fault vein without passing through excessively heavy ground. Possibilities for ore are fair along the vein in both proposed developments. Keep away from the locale of the junction of the two fault veins, as ground is too heavy to hold, being shattered and crushed, also no doubt more or less completely leached. I would recommend abandonment of the crosscut beyond the footwall fault vein.

800 level. See Sheet No. 6. Keep South drift in ground that will stand and crosscut through hanging wall fault vein at say, 50 foot intervals. I would favor the driving of this drift at least 250 feet farther South as I believe that the region south of the Apache fault has possibilities. If fault is intersected turn West along drag to again pick up hangingwall fault vein. It is hardly advisable to drift East along the Apache fault, as the fact that this fault is of comparative recent age gives me reason to believe that there will be no ore deposition influenced by it. North drift. From survey station 815 Northerly I advise crosscutting through the fault vein brecciation at least at 75 foot intervals. The drift itself and hanging wall cross cuts do not give

a fair idea of your ore possibilities. No particularly adequate cross-cuts proved the vein in this drift. There are some very interesting assays on record as coming from this drift, and considering the comparatively length of the drift that had no cross cuts to the wall I would advise giving this your attention. The bulk of the much could possibly be stored in the hanging wall cross cuts.

400 level. No further work on this level advised at this time.

300 level. No work advised other than that in progress at this time.

A, B, and C levels. No work advised other than that in progress at this time.

Surface. I would recommend that any future prospecting in the conglomerate be along the foot wall fault vein. This could be accomplished by cutting a station on the East side at the 175 level of the main shaft. Cross cutting S 75° E to the foot wall fault vein. Silicious segregations there should prove as remunerative as those of h the hanging wall fault vein.

CONCLUSION.

In conclusiong I have no hesitancy in stating that with the possibilities to be developed under the constant ground water level at this property your operations should have a favorable outlook. Further I would warn you that while the gold values in your already developed ore body are amenable to reduction by comparatively simple processes, this fact is no criterion as to what the same flowsheet would recover on your ores from depth. I would suggest that you make no plans for a reduction plant until such time as future development at depth demonstrates the type of ore available for reduction. Have absolute demonstrations of any new and untried processes. Flotation is hardly indicated. Cyanidation, while its first cost is possibly higher than other processes has proven to be the most efficient, and costs less

per tone milled than any other medium of reduction, if the ores are amenable to that treatment.

In making my examination I have been very gemerously aided by your Superintendent, Mr. Broan, as also by your Engineer, Mr. Stanton. Acknowledgment of my appreciation is made.

Very Truly Yours,

E W Bedford

Dated December 31st, 1923.