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

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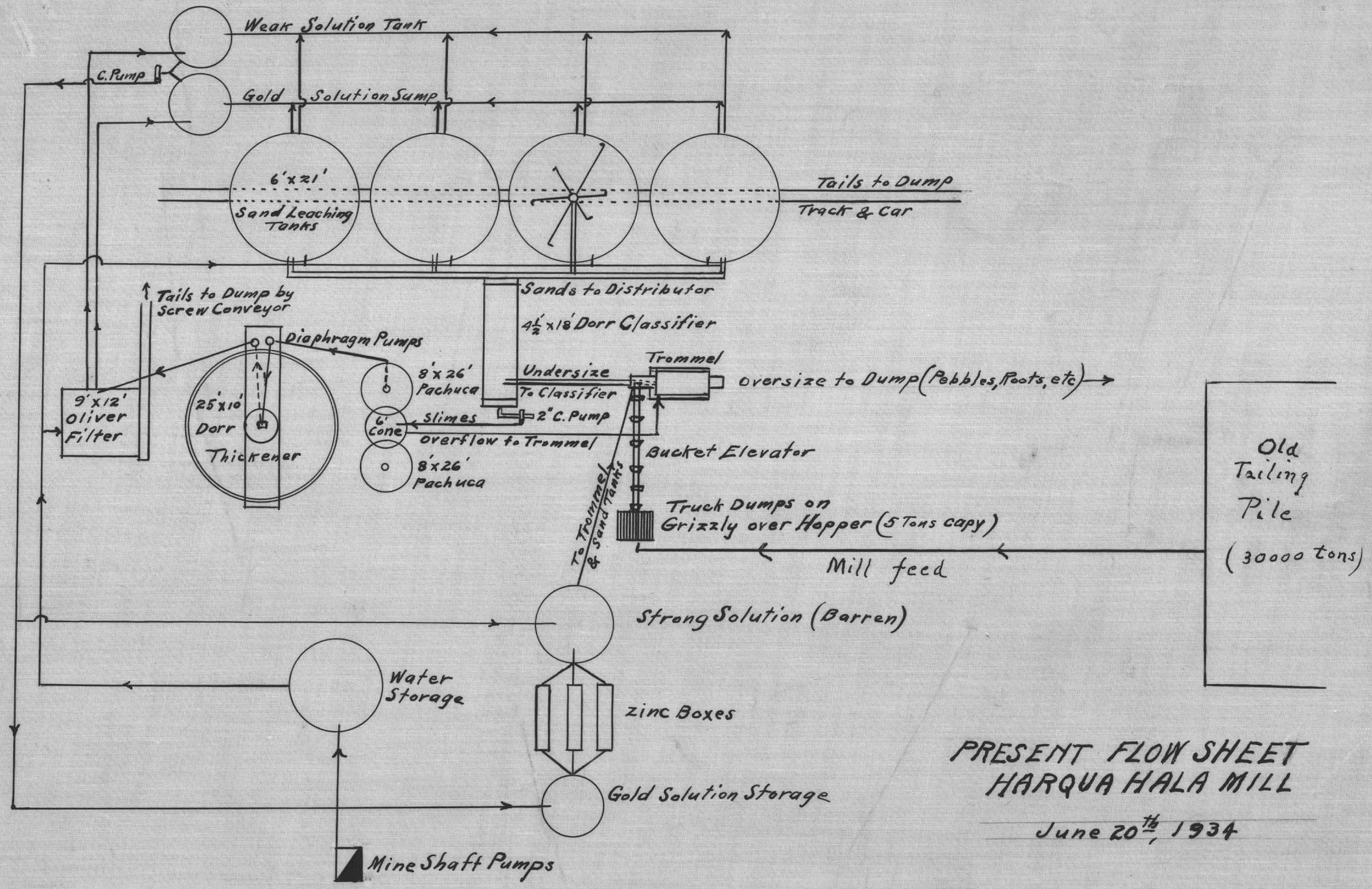

PRESENT FLOW SHEET
HARQUA HALA MILL

June 20th, 1934

Harqua Hala file

June 16, 1943

Mr. Walter T. Martin, Secretary,
Bonanza & Golden Eagle Mining Co.,
44 North 1st Ave.,
Phoenix, Arizona.

Dear Mr. Martin:

In April, 1941, Mr. Verne Winters took a lease on your tailings at the old Harqua Hala Mine. The preliminary test work that was done on these tailings led to some ideas which were later incorporated into a patent of cyaniding pulps without agitation. It was about the time that these ideas were being tested that we entered into the picture and took over from Mr. Winters the responsibilities of his lease.

Mr. Winters went onto the ground and installed sufficient equipment to practicably test out the ideas incorporated into the patent. Since undertaking this work, Mr. Winters has treated about 3500 tons of the tailings and has accumulated about 12 tons of concentrates with a gross value of about $6,200, indicating a recovered value of about $1.77 a ton. None of the concentrates have been sold or smelted yet. I believe that he estimates there are remaining available about 7500 tons of the original untreated tailings. My understanding is that Mr. Winters figured there was probably about $40,000.00 gross recoverable value in the tailings when he took over the lease, which at a 10% royalty, would amount to $4,000.00. There has now been paid you $4,000.00, or the equivalent of what was estimated as the maximum to be expected.

Mr. Winters has been equipped for, and on full operating days has treated, about 25 tons per day. For a commercial operation, this should be stepped up to at least 50 tons a day, which could not be done under present conditions. We feel that we have accomplished here about all that we can expect to do with this size operation and the equipment we have, and any work that we may wish to do in the next few months will be merely checking over some of the tests that we have been running, and confirming results. Feeling that we have paid in royalty the royalty value of the tailings, we would like to ask that the minimum royalty of $200 a month be discontinued and that you allow us to pay you, say a rental of $25 a month, for continued occupancy of the ground and buildings for what time we may wish to remain there and continue testing.

Thanking you for many courtesies and helpful cooperation, we are,

Yours very truly,

Eagle-Picher Mining & Smelting Company.

E.D. Morton-
OC

Morton advised that request was granted

Blind Copy to Mr. G.M. Colvocoresses
Mr. D.C. MacKallor

Tucson, Arizona
February 2, 1946

Byrd Mining Company
Tucson
Arizona

Gentlemen:

I have studied your reports on the Harqua Hala Mine, particularily that of George M. Colvocoresses.

On January 20-22 I visited the Harqua Hala Mine accompanied by C. O. Byrd, Geo. Dillard and two experienced samplers.

I had three objectives: First and primarily, to check the possibility of being able to surface mine from the glory hole (old caved stopes) and the dumps, $3.00 to $5.00 ore. Most of the sampling was done with this objective in view; Second, to get an idea of what tonnage of $2.00 (or better) ore might be available for surface mining; Third, to study the possibility of underground mining of $5.00 to $15.00 ore.

The values found in 79 samples were spotty and should be checked in order to verify the following statements:

First:

21,400 tons of $3.35 ore estimated available for surface mining.

Second:

460,000 tons of $2.00 ore estimated available for surface mining.

A larger tonnage might possibly be proven by spending some $10,000 to $20,000. However, the indications are that practically all the values were found in the veins that have already been stoped and most of the values that could be recovered today would have to come from small pillars or small undeveloped veins between the existing caved stopes. The wall rocks apparently carr y very little value, and a heavy ratio of waste would have to be mined to recover the small pockets of high grade ore. This accounts for the low value of $2.00 given above.

Third:

The information available and the time spent was not sufficient to draw a conclusion on the higher grade ore. I am doubtful if the outlook is as good as your information would indicate. However, it seems probable that this mine would warrant the expenditure of some money to develope this ore, provided an option could be secured on a reasonable basis.

A surface sketch of samples with explanation accompanies this letter.

Very truly yours,

M. B. Mills

EXPLANATION OF SAMPLING:

Sampling was of two types: First, rough channel samples, cut with moil and hammer, about 10#, then broken up and cut to 5#; Second, muck grabs of around 15#, broken and cut to 5#.

Samples #1 to #11: cut samples on face of old Stamp Mill floor--object to get an idea if rock off structure would run. Weighted average, $0.23. h. g.

Samples #12 to #25: cut samples on rocks on structure near mined areas which would have to be taken in order to get a mechanical shovel working in the glory hole at elevation of mill floor. Value indicated $0.50. Sample #26: large boulder (surface sluff) in glory hole--$0.50. h. g.

Samples #27 to #30: cut samples on wall structures in glory hole. #30 ran $2.10; others below $0.50; average, $0.75. h. g.

Samples #31 to #50 were muck grabs in lower part of glory hole. They were screened through 1/4" screen and plus size and minus assayed separate. Object: to see if screening would give concentration of values. About 40% of the material by weight was minus 1/4". Undersize average, $6.20; oversize average, $1.59. Cutting out one high grade sample, the average was: undersize, $2.10; oversize, $0.75. These results along with your screen size test at the U. of A., from dump material, would indicate some concentration in the fines and would probably warrant further investigation. ?

Samples #51 to #57 were muck grabs in upper part of caved stopes. #52, #53, and #54 were probably considerably diluted by surface sluff. Average, $0.85. h. g.

Samples #58 to #61: muck grabs from stopes on 400 Level. Although probably diluted by roof sluffings, values are definitely disappointing--average, $0.71. Sample #62 gave $38.50 and was taken as muck grab on the 400 Level in the tunnel which runs from the shaft up through the stopes and exits near creek bed and which is now used as the second exit from the mine. This should be checked before being taken at face value. It might represent some 300 tons of ore. ?

Samples #63 to #67: muck grabs from outside dumps. Weighted average, $3.06, representing about 1600 tons.

Samples #101 to #103: cut samples from caliche near wash--average, $0.99. Object: considerable of this material would have to be moved in order to get mechanical shovel operating on elevation of wash. h. g.

Samples #201 to #209: cut samples from cross-cut which runs directly under caved stopes area. Object: to see if any areas here could be found which had value enough to do some work towards caving and drawing off from caved stopes above. Samples #201 to #207 averaged $0.29 and were discouraging. However, #208 gave $6.30 and #209 gave $1.40 which might indicate that the first forty feet of this tunnel would run $3.85 and offer a good working point. By breaking the forty feet down into eight or ten samples, this could be verified. ✓

DEDUCTIONS:

Samples #1 to #10 should be disregarded. That is to say, the wall rocks carry very little value.

An arithmetical average of the rest of the samples gives $2.28; a weighted average gives $1.99.

The results as a whole were disappointing; however, a few things should be pointed out.

FIRST: An increase in the price of gold might change the entire picture.

SECOND: By partially grouping the best samples from the glory hole and using the first forty feet of the tunnel under the glory hole, a possible tonnage of 20,000 tons of $3.28 is indicated as being available for surface mining on a small scale.

Taking caved stope area as a whole, I have estimated 225,000 tons of $1.99 available above mill floor level, and 225,000 tons more above the creek bed level of similar value. However, this grade might be raised in mining the whole thing as there would be some high grade pillars and some unmined small veins to sweeten the grade. It would be necessary to spend considerable money (probably actually mine part of it) in order to prove just how much the grade would be raised.

THIRD: By selecting the best dump assays and using also the values fround by Dillard, 1400 tons of $4.50 ore could be added to the above, for selective surface mining. I have estimated the whole dump tonnage at 10,000 tons of $2.52 value.

Available for surface mining--

Selective:	Possible	20,000	tons	at	$3.28	
	"	1,400	"	"	4.50	from dump
	Total	21,400	"	"	$3.35	
As Whole:	Possible	450,000	"	"	$1.99	
	"	10,000	"	"	2.52	from dump

FOURTH: It should also be considered that cheap underground methods (probably caving) might be able to get better results than surface mining. This would cost considerable but might be carr ied out along with a program outlined under "FIFTH".

FIFTH: Any conclusion arrived at in regard to this mine would be incomplete without due consideration for the possibilities of finding unmined $5 to $15 ore. All of my information on this subject comes from you, Dillard, and a study of your reports. I am inclined to believe that your information is over optimistic. I expect that the most of the values shown on your underground assay map have either been mined or are misleading. However it seems evident that the sulphide zone (containing considerable copper sulphide) was reached by the early mining, and since it is reported that the lower levels have not been unwatered since 1914 or 1916 (before flotation), some ore might be found there that they would have found unprofitable to handle in their amalgamation mill. Further, the geology of this mine is complex (much complex fracturing), and the possibilities of finding new ore laterally, in depth, and around the old stopes, should be excellent.

not correct

open in 1932

If the mine could be obtained on a reasonable basis, then my idea would be as follows: Appropriate $5,000, unwater the mine (should not be difficult), do a lot of sampling and mapping, and spend the rest of the $5,000 in underground development in the most favorable places (to be determined by the sampling and mapping). If this proved unfavorable, then abandon the project. If it proved favorable, some shipping ore might be found that would help with further financing the next step, probably being $20,000 or $30,000 to develop enough ore for a mill. This would probably be for a fifty or one hundred ton flotation plant (depending on the type of ore found). This mill could be operated, and the tailings accumulated (probably have some value); at the same time further work could be done towards determining the value and method of mining the upper low grade caved portions of the mine with the final object of running this and the accumulated flotation tailings through a Cyanide Plant.

C
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Sampling Results

Samples were taken to the office of E.A. Jacobs, registered assayer for assay and cyanide tests. One composite sample was made by combining proportionate parts of samples No's. 1-7 which showed $2.20 gold per ton.

A second composite sample of No's. 8-17 similarly prepared showed $2.40 gold per ton.

The first composite representing 6,000 tons, and the second representing 24,000 tons gives an average gold content of $2.36 per ton.

On January 2, 1932, a second check sampling was made on the dump by Evarard Leland, who was General Superintendent of the Nacazari Mine of Phelps Dodge Corporation at the time it was closed down. These samples were taken on portions of the dump not sampled by me, and were assayed at the State Bureau of Mines with the following results:

B - $2.40	H - $2.40	
C - 4.60-	J - 2.20	Arithmetical
D - 3.20	K - 2.40	Average of
E - 3.20	L - 1.80	12 Samples
F - 2.60	M - 2.20	$2.62 per ton Gold
G - 2.40	O - 2.00	

The average of my results and those of Mr. Leland is $2.49, a dead check on Mitchell's results.

Cyanide Tests

Laboratory tests were made on material from my original sampling, by E. A. Jacobs, with the following results:

Test No. 1	Sample	Oz. Gold	Val. Gold	Extraction
6,000 Tons	Heads	0.11	$2.20	
	Tails	0.02	0.40	81.9%

Cyanide Consumption per ton ore 1.8 lbs.

Test No. 2	Sample	Oz. Gold	Val. Gold	Extraction
24,000 Tons	Heads	0.13	$2.60	82.7%
	Tails	0.02	0.45	

Cyanide Consumption per ton ore 1.7 lbs.

Time of percolation both tests 72 hours.

My further tests on the treatment of this tailing covering rate of percolation indicate that it would be better practice to take out the finest of the slime, preferably with a Dorr Classifier, before leaching. The small amount of slime removed could be agitated crudely and settled and the charged solution drawn off by decantation. The sands will then percolate readily along the lines recommended.

REPORT OF EXAMINATIONS OF
BONANZA GOLD MILL TAILING
HARQUA HALA MINE, SALOME, ARIZONA.

By

Miles M. Carpenter, E. M.
Tucson, Arizona.

The Bonanza Gold Mill Tailing

Harqua Hala Mine, Salome, Arizona

My original examination of the tailing dump of the old Bonanza (Harqua Hala) Mine was made August 20 and 21, 1931 to check the report of F. H. Mitchell, copy of which is attached hereto.

It is difficult to believe that 30,000 tons of tailing assaying $2.50 gold has been lying dormant for an average of thirty years, and at one of the famous gold mines of Arizona. The mines of Harqua Hala were described over twenty years ago in a U. S. Geological Bulletin prepared by Howland Bancroft, and mining men throughout the Southwest are more or less familiar with the history of the Bonanza Mine.

Nevertheless, the tailing is there in approximately the quantity and of the grade stated. Figuring gold at $30.00 per ounce and adding .5 oz silver per ton at 36¢ per ounce, the present gross value of the tailing is $3.90 per ton.

HISTORY OF MINE

The Bonanza Mine was discovered in 1888 at the outcrop of what became the Castle Garden Glory hole and stope. Except for a small tonnage of high grade ore milled at Harrisburg, the ore from the first was milled on the ground and the tailing stored.

The early owners milled some 35,000 tons of ore and recovered over $1,000,000.00 in gold by amalgamation. The total production of the mine probably exceeds $3,500,000.00.

In 1894, the mine was purchased by the Harqua Hala Gold Mining Company Ltd. of London, which increased the capacity of the plant to 40 stamps and installed the cyanide leaching process, just coming into use, to treat the tailing from the amalgamating plates. About 90,000 tons of tailing, said to assay from traces to 80¢ per ton, was left by the English Company from its combined treatment by amalgamation and cyanidation.

The low gold content of the cyanided tailing compared with the tailing that has not been cyanided suggests how completely the ore yields to cyanide treatment.

The English company dropped the Harqua Hala Mine for a mine in Australia, leaving about 10,000 tons of the tailing upon which brush and trees grew to obscure its nature. The other 20,000 tons of tailing came from later operations of the mill.

EXAMINATION

My original examination consisted of

1. General survey of tailing dumps and surroundings.

2. Compass survey to trace the margins of the old dump and to locate the pits to be sampled.

3. Reopening from the surface to bed rock and sampling 16 of the original 133 test pits sunk by Mitchell.

4. Inspection of equipment on ground.

5. Inspection of site for plant.

The old tailing dump is spread over an area 700 feet long by 420 feet in greatest width. Desert growth covers much of the area and mesquite trees 10 inches in diameter are growing in the tailing.

The cyanided tailing stands like palisades rising 20 feet above the level of the unworked tailing dump.

The surroundings explain why the old tailing has lain for forty years. Scores of prospectors and mining men have doubtless walked over this tailing to sample the prominent dump of cyanided tailing, for the sand and brush covered area of the old tailing is uninteresting at first sight.

The outline of the tailing dump is shown by the accompanying blue print, which shows also the approximate locations of the test pits sunk by Mitchell and the location of the pits reopened and sampled by me.

The pits of the Mitchell sampling are still in evidence and though some are partly filled from caved and blown sand, enough are open to prove that the depths reported by Mitchell are not exaggerated.

Sampling was done in six pits in the center of the west or 6,000 ton body and in ten pits across the main or 24,000 tons body of this tailing. Pits were cleaned out to bed rock, a channel 4 inches wide by two inches deep was cleaned from top to bottom and the sample 1 inch deep was cut from width of the channel, caught on canvas, mixed by rolling and cut down to one quarter of the amount taken.

Pits sampled were carefully measured and the proportion of sands and slimes roughly estimated.

The depths of pits are shown below:

6,000 Ton Block Samples 1-2 to 7		24,000 Ton Block Samples 8 to 17		
No 1-2	7.5 ft	No 8	2.5 ft	
3	4.0	9	2.6	
4	4.4	10	2.3	
5	3.5	11	3.1	(no bottom)
6	6.9	12	4.1	
7	5.0	13	3.8	
	31.2 ft	14	6.6	
		15	6.3	
Six pits average depth 5.2 feet.		16	12.6	
		17	3.2	
			47.5 ft	

Ten pits average depth 4.75 ft.

These samples were taken independently, carefully guarded and brought to Tucson to be assayed.

Inspection of equipment showed the following that could be utilized in a cyanide leaching operation:

11 Iron Tanks, 10 ft. deameter, with cone bottoms, each with capacity of about 4,000 gallons; eight of same in good order, others need miner repairs.

3 Iron Boxes, each 20 in. by 20 in., 12 ft. long, 6 compartment, with covers; for precipitating gold from cyanide solution on zinc shaving. Good order.

Pipe, 2½ in. and 3 in. in good condition and ample quantity.

Miscellaneous shafting, pulleys, bearings, etc.

Firebrick, 6 graphite crucibles, (new) bullion moulds, etc for melting gold bullion.

The site for the leaching tanks is below a rock wall that borders the old 40 ton mill and stands above the tailing about thirty feet. Little excavation will be needed to set the tanks, which can be loaded by dumping from the upper side and unloaded from beneath by car and track. The tailing can be worked from the mill side outward, and the cyanided tailing stored in the cleared space. The lay out of the plant as proposed by Mitchell is illustrated in the accompanying sketch.

An arrangement for conditioning the tailing on the South margin of the dump and elevating to a deslimer set above the tanks would do away with the truck haul, be cheaper to operate and put the material in better state for percolating.

Sampling Results

Samples were taken to the office of E. A. Jacobs, registered assayer, for assay and cyanide tests. One composite sample was made by combining proportionate parts of samples No's 1-7 which showed $2.20 gold per ton.

A second composite sample of No's 8-17 similarly prepared showed $2.40 gold per ton.

The first composite representing 6,000 tons, and the second representing 24,000 tons gives an average gold content of $2.36 per ton.

On January 2, 1932, a second check sampling was made on the dump by Everard Leland, who was General Superintendent of the Nacozari Mine of Phelps Dodge Corporation at the time it was closed down. These samples were taken on portions of the dump not sampled by me, and were assayed at the State Bureau of mines with the following results.

B - 2.40	H - 2.40	
C - 4.60	J - 2.20	Arithmetical
D - 3.20	K - 2.40	Average of
E - 3.20	L - 1.80	12 Samples
F - 2.60	M - 2.20	$2.62 per ton Gold
G - 2.40	O - 2.00	

The average of my results and those of Mr. Leland is $2.49, a dead check on Mitchell's results.

Cyanide Tests

Laboratory tests were made on material from my original sampling, by E. A. Jacobs, with the following results.

Test No. 1	Sample	Oz Gold	Val. Gold	Extraction
6,000 Tons	Heads	0.11	$2.20	
	Tails	0.02	0.40	81.9%

Cyanide Consumption per ton ore 1.8 lbs.

Test No. 2	Sample	Oz Gold	Val. Gold	Extraction
24,000 Tons	Heads	0.13	$2.60	82.7%
	Tails	0.02	0.45	

Cyanide Consumption per ton ore 1.7 lbs.

Time of Percolation both tests 72 Hours.

My further tests on the treatment of this tailing covering rate of percolation indicate that it would be better practice to take out the finest of the slime, preferably with a Dorr Classifer, before leaching. The small amount of slime removed could be agitated crudely and settled and the charged solution drawn off by decantation. The sands will then percolate readily along the lines recommended.

Conclusions

The Harqua Hala tailing dump was a good small scale proposition at the old price for gold, and with gold selling around $30.00 per ounce, it is doubly attractive.

With the equipment already on hand and work already done, it should not cost more than $5,000.00 to install suitable plant and put same in operation. A good "rawhider" might do the job for $3,000.00. An operating account of $2,000.00 should be ample to carry the project until returns begin.

As a rough estimate of what this dump should yield, I submit the following:

Total Gold content	3,750 Oz.,	Recoverable	3,000 Oz.
Total Silver content	15,000 Oz	Recoverable	10,000 Oz.(estimate)

Gross value of recoverable metals with Gold at $30.00 per ounce and Silver at $0.36 per ounce		$93,600.00
Less cost of equipment installed	$5,000.00	
Less operating costs @ $1.00 per ton	30,000.00	35,000.00
Net value of recoverable metals - - - - - - - - - -		$58,600.00

From which must be deducted purchase price and royalty, a matter of negotiation with the owners.

The time required for the operation will be about a year and one-half.

Respectfully submitted,

Tucson, Arizona
October 20,1933

Miles M Carpenter E.M.
Miles M. Carpenter, E. M.

P.S. Since the time in which dump must be worked is getting short it would be best to put in plant of 100 Tons per day which would increase plant cost to about $10,000 MMC
11/20/33.

ASSAYS OF GOLD MILL TAILING LYING BELOW
OLD 40 STAMP MILL AT BONANZA MINE
AT HARQUA HALA, ARIZONA.

- - - - - - - - - -

Assays per foot-ton top sands

Pit No.	Depth-feet	Gold value
00	2	$4.40
0	1	2.00
1	2	3.60
2	3	6.00
3	3-8"	6.95
4	3	4.20
5	2-2"	2.80
6	1-6"	1.95
7	1-4"	1.72
8	1	2.80
9	1-9"	5.25
10	4"	.48
13	4	15.20
14	2-8"	6.03
15	1	2.00
16	1-6"	4.95
17	10"	2.33
18	3-5"	6.84
20	6-6"	11.22
21	2-6"	5.00
22	12	21.60
23	5-8"	10.18
"	3-4"	13.98
"	1	3.40
24	2	2.60
25	1	1.50
26	1	3.20
27	3-6"	12.60
28	3-2"	5.07
29	4-2"	10.84
30	6	10.80
31	2-8"	4.42
33	5-6"	9.90
35	1-3"	2.25
36	3-9"	13.17
37	6	8.40
38	2	3.20
40	1-7"	3.52
42	5	14.00
44	2	4.40
45	3-4"	12.65
46	6	14.40
Total	127	281.80

Top sands continued

Pit No.	Depth-feet	Gold value
51	3-4"	$19.09
52	2-4"	6.52
53	4-10"	16.49
55	9"	1.02
56	4	10.80
57	5-6"	17.60
58	3-4"	6.99
59	1	1.20
63	1-6"	7.30
64	3-3"	6.50
65	3	12.00
66	1	1.90
68	4	13.60
69-	1	3.20
70	8"	2.11
71	1-6"	4.80
72	1-2"	4.68
74	3-5"	8.89
75	1	2.70
76	1	2.60
77	3-5"	8.20
78	1-4"	2.92
79	2-6"	6.20
80	2-2"	2.60
81	1-6"	3.00
West Pits 1	1	1.80
2	1-8"	4.64
3	2-2"	8.68
4	3-4"	9.32
5	2-2"	6.94
6	1-4"	2.66
7	2	4.80
8	2-3"	3.60
9	1-10"	3.33
10	1	1.60
11	3	9.60
12	1-6"	5.40
13	1-3"	2.75
14	10"	2.72
15	1-2"	2.92
16	9"	2.10
17	2-6"	4.50
18	8"	1.05
19	1-8"	2.65
Total	90-7"	253.97

Top Sands continued

Pit No.	Depth-feet	Gold value
-20	2-5"	$5.39
21	1-10"	3.33
22	3-8"	7.32
23	1-10"	3.33
24	1-10"	2.96
25	2-6"	5.75
26	1	2.80
27	4	7.20
28	4-8"	7.45
29	3-4"	4.99
30	2-11"	5.84
31	2-5"	4.90
32	3-4"	7.32
39	8-4"	14.12
40	9-4"	18.12
41	4-10"	10.69
43	7	14.30
44	4-5"	14.91
45	3-3"	6.52
47	7-1"	17.82
48	4-8"	9.15
49	3-5"	5.86
51	3-7"	7.13
52	2-9"	6.62
Totals	89	$199.97
"	127	281.80
"	90-7"	253.97
	306-7"	$735.74

Average value of top sands per ton..... $2.30

Top slimes

Pit No.	Depth-feet	Gold value
10	9"	$0.97
11	3	4.20
12	1-4"	2.12
19	4-4"	9.52
32	1-5"	3.48
34	6-6"	11.70
39	1-7"	3.84
41	5-2"	11.37
43	2-10"	10.26
47	3-4"	8.65
48	3-2"	5.07
49	3-1"	5.58
50	2-5"	4.65
55	6"	.80
60	1	1.20
61	9"	.82
62	1-10"	6.93
73	11"	1.67
-34	2-6"	14.50
35	4	12.80
36	4-5"	17.80
37	3-5"	6.90
38	3-6"	5.60
42	3-3"	7.80
46	2-2"	3.47
50	3	4.80
Totals	70	$166.50

Average value of top slimes per ton $2.37

Middle sands & slimes

Pit No.	Depth-feet	Gold value
7 Sa	1-4"	$2.26
12 Sa	2-9"	4.40
31 Sl	3-3"	5.20
34 Sa	2-9"	8.80
38 Sl	1-5"	2.61
43 Sa	1	1.75
Totals	12-5"	$25.42

Average value middle tailing per ton $2.03

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Bottom sands

Pit No.	Depth-feet	Gold value
10	1	$3.40
11	10"	2.32
17	3"	1.30
21	1	3.00
25	4-2"	20.00
31	10"	2.38
38	2	4.20
39-	1-7	3.48
47	5-2"	10.34
61	1	1.20
78	1-10"	4.44
-25	5"	2.16
27	4-4"	6.92
34	1-10"	3.70
35	8"	4.08
36	1-1"	4.32
38	9"	1.74
Totals	29	$79.04

Average value bottom sands per ton $2.72

Bottom slimes

Pit No.	Depth-feet	Gold value
3	4"	$0.62
4	6 6"	1.40
5	4"	.46
6	6"	1.60
7	1-2"	3.51
12	1	4.20
14	3	9.60
15	5-5"	16.50
17	10"	4.42
21	1-8"	5.04
25	7	22.40
28	1	1.60
30	10"	1.53
33	5	19.50
34	4-3"	14.87
40	4-6"	13.50
43	1-4"	3.72
52	11"	1.76
66	1-7"	3.16
78	10"	2.04
Total	42	$135.43

Average value of bottom slimes per ton $3.17

Total depth of all sands and slimes measured and assayed from the 133 test pits sunk in the tailing area:

Feet	Composite value
460	$1140.13

Average of all tailing per ton $2.478

Total depth of 133 pits sunk in tailing area ..... 460 feet

Average depth of entire tailing area ..... 3.455 feet.

Total tonnage and cyanide data on Page No. 4.

The tailing lies in two areas; the larger lying to the northeast of the mill, and a smaller section immediately adjoining the larger one on its western edge.

The area of the larger portion between the limits of test pits is 467 feet in length and 318 feet wide and contains 148,506 square feet.

The smaller section is 169 feet long and 94 feet wide between pits and contains 15,886 square feet.

The combined square feet of the two tailing areas is 164,392 which, multiplied by the average depth of 3,455 feet, gives a total of 567,974 cubic feet of tailing in the two areas.

A number of carefully measured and weighed samples of the sands and slimes of the tailing averages 95.24 pounds per cubic foot dry weight, making almost exactly 21 cubic feet of the tailing to the ton of 2,000 pounds.

Since the tailing contains 567,974 cubic feet of sands and slimes, the total tonnage inside the test pits is 567,974 divided by the 21 cubic feet contained in one ton, making 27,046 tons.

In addition to the tonnage of tailing within the area of the test pits, there is a border of tailing from 10 feet to over 20 feet completely around the tested area which contains at least 3,000 tons identical to the portion figured above.

As the average value per ton of the tailing in gold is $2.478, the total amount of gold in the 30,000 tons is $74,100.00.

- - - - - - - - - - - - - - - -

Leaching tests of composite samples of the tailing extending over six weeks and using 2½ pounds of sodium cyanide to the ton of cyanide solution, and 5 pounds of lime to the ton of tailing to neutrelize the latent acidity in the latter, resulted in a 90% extraction of the gold in a four day cycle of treatment with a cyanide consumption of 1½ pounds and all the lime to the ton of tailing leached.

Summary of treatment costs and extraction of Page No. 5

Total amount of gold in 30,000 tons tailing		$74,100.00
90% recovery of above amount		66,690.00

Treatment Costs

Cyanide consumption to each ton of tailing treated; 1½ pounds at 16 cts. per pound	$0.24	
Lime used per ton of tailing treated; 5 pounds at ⅜ cts. per pound	0.0375	
Filling each 70 ton leaching tank with tailing; per ton	0.185	
Emptying each 70 ton tank; per ton	0.13	
Pumping solutions per ton of tailing treated..	0.04	
Pumping water from mine for wash and leaching solutions; per ton tailing treated.....	0.06	
Zinc consumption in gold precipitating launders and refining bullion; per ton tailing treated	0.06	
Total cost of treatment per ton of tailing treated	$0.7525	
Total cost of treating 30,000 tons tailing		22,575.00
Total profit in treating 30,000 tons tailing		$44,115.00

The treatment plan for the tailing contemplates starting with three 70-ton leaching tanks in the working order of one being emptied and one being filled every other day while the other two tanks are in process of leaching tailing. This schedule will permit 70 tons per day, and thus cut the time required to complete the operation in half.

Approximate daily and monthly profits shown on Page 6.

Gold value of tailing per ton	$2.478
Gold extracted per ton (90%)	2.23
Gold extracted per day from 35 tons	78.05
Cost of treating 35 tons at $0.7525	26.33
Operating profit per day	51.72
Operating profit per month	$1551.60

A substantial addition to the $44,115.00 net recovery from the 30,000 tons of tailing is assured from the fact that the greater portion of the tailing carry $.09 in silver per ton with silver at $0.27 per ounce. This silver has not been reckoned in the gold content of the tailing, but the greater part of it will be recovered along with the gold.

Also, underlying the smaller (6,000 ton) area of tailing mentioned as adjoining the larger area on its western side, is an undetermined tonnage of tailing that assays $26.90 per ton. This tailing represents some sulphide ore that occurred below water level of the mine. It carried a small percentage of copper, was crushed and run over the amalgam plates by former operators of the mine, but only a small percentage of the gold content adhered to the plates.

It is reported that 400 tons of that ore was run through the 40-stamp mill and out into the tailing. Whether that estimate of the tonnage is right or not, it is certain that this high grade tail tailing shows in the bottom of a number of the test pits which I sunk in the west tailing area. But not being sure of its tonnage as I am of the balance of the tailing, I have not considered its yield in computing the return from the 30,000 tons of tailing in sight. Unquestionably, however, this high grade tailing will add considerably to the total $44,115.00 gold recovery from the entire tailing.

Respectfully submitted,

Tucson, Arizona
September 1, 1931

F. H. Mitchell

HAMILTON, BEAUCHAMP & WOODWORTH
SAN FRANCISCO, CALIF.

7/4/34

REPORT

on

CYANIDE PLANT

at

HARQUA HALA BONANZA MINE

for

MR. G. M. COLVOCORESSES

HAMILTON, BEAUCHAMP & WOODWORTH,
San Francisco, California.

HAMILTON, BEAUCHAMP & WOODWORTH
SAN FRANCISCO, CALIF.

REPORT

on

CYANIDE PLANT

at

HARQUA HALA BONANZA MINE

for

MR. G. M. COLVOCORESSES

Inspection of the plant was made July 4 and 5, 1934. Detail of necessary changes to put the plant in working order, were gone over with Mr. Colvocoresses and George Harbauer.

The plant is arranged for the separation of sand from slime followed by percolation with cyanide solution of the sands in filter bottom tanks, and agitation of slime in Pachuca tanks, preceeding filtration on Oliver filter.

Capacities of sand and slime units appear to be adequate to handle from one hundred to one hundred twenty-five tons original tailing per day. These units seem also to be balanced fairly well in relation to the proportion of sand and slime each unit can treat (assuming the original tailing to be composed of approximately sixty percent slime and forty percent sand).

The old method of feeding the plant was abortive, but the plan now being put in, will be satisfactory.

Plant and test data is incomplete, therefore it is not possible herein to lay out a precise schedule of treatment, showing accurate capacities, extractions and costs for each unit. However,

the general data obtained points decidedly to a profitable operation being developed, and in the absence of detailed test data, the practical thing to do is to start the plant using conditions found successful in other plants of like design and treating similar material, then to work out more exact conditions as the work proceeds.

DISCUSSION ON FLOW-SHEET

Mining

It is the present intention to use a three-quarter yard scraper drawn by a tractor to dump into a hopper feeding a conveyor belt conveying the tailing to a storage bin. The tractor-scraper will be supplemented with a small power shovel or a drag-line loader, loading a truck for removal to the plant.

All mining is to be done during the daytime, particular attention being given to mine sand and slime in proportion to the capacities of the sand and slime treatment sections. This is of great importance to maintaining a proper balance of conditions during subsequent processes for the extraction of the gold.

Storage Bin and Pulping Trommel

Material delivered to the storage bin will be dry.

From the storage bin the tailing will be fed continuously on to a short conveyor belt delivering it to a pulping-screening trommel. The amount of material on the belt should be calibrated so that something approaching correct tonnages may be obtained. Cyanide solution with protective alkalinity will be added at the

trommel. Pulping should be done in a thick pulp. Dilution to run the pulped material to the classifier can be obtained by adding more solution as a wash at the screen section of the trommel. Waste passing over the trommel screen can be dumped with the residue from the sand leaching tanks.

Classification

Pulped tailing from the trommel is received by a 4' 6" x 18' Dorr Duplex Classifier. Each rake of the classifier makes fifteen strokes per minute.

It being highly important to keep sand out of the Pachuca tanks, careful control must be exercised in the operation of the classifier. When installed the box of the classifier was set in concrete preventing the slope being varied. The only adjustments now possible are to build up the back end of the box to create a larger settling pool to promote settlement of the sand, increase dilution and to decrease agitation in the classifier by reducing the number of strokes per minute from fifteen to say twelve.

Dissolving solution used for pulping at the trommel will be alkaline enough to allow adding fresh slaked lime at the sand discharge of the classifier to maintain proper alkalinity for the cyanidation of the sand, and also at the pump sump at the over-flow end of the classifier, to regulate the lime content in the slime treatment. It would be preferable to add milk-of-lime to the slime.

A useful working solution to start would be .03% KCN .2% CaO. Adjustments to these strengths could be made as determined by assays and titrations, the object being to reach and then maintain the critical point in the amounts of cyanide and lime used.

Sand Leaching

Four tanks twenty-one feet diameter by six feet deep, fitted with approved filter bottoms, are available for sand leaching. Each tank has an effective capacity of around seventy-five tons each. On the basis of handling one hundred tons per day of original tailing, containing forty percent sand, practically two days will be required to fill a tank, giving opportunity for a six to eight day treatment cycle should it be needed.

It is proposed to fill the tanks in working solution, distributing the sands by means of the Butters distributor, which should be put in first class working condition.

The procedure in sand leaching will be somewhat as follows:

(1) Sand tank filled with working solution, having drain cock closed.

(2) Sand admitted to tank through Butters distributor. Displaced solution to go either to weak gold sump for reuse as a dissolving solution or to the gold sump for precipitation, according to its value.

(3) After the tank is filled with sand, the drain cock is opened. It will take probably twelve to sixteen hours for the charge to drain. It should then stand four to six hours to allow for absorption of oxygen. After which another dissolving wash is put on, followed by a further period of aeration, and so on until the treatment is complete as determined by assays of residues and solutions.

Time of treatment, number of dissolving washes, length of aerating period, alkalinity and cyanide, and the most convenient disposal of solutions, are matters to be finally decided upon after needed data bearing on these points are accumulated.

Slime Treatment

Over-flow from the classifier is now pumped to an eight foot cone, placed above the Pachuca tanks. The purpose of the cone was evidently to de-water the pulp before it entered the Pachucas. It is very inefficient for this purpose, giving a muddy over-flow, which has to be clarified, as well as a too dilute pulp in the Pachucas. Diaphram pump transfers the pulp from the Pachuca tanks to the Dorr thickener and another,Diaphram pump takes the thickened under-flow to the Oliver filter.

Based on the theory that any finely divided gold would be dissolved during the time interval between the pulping trommel and the cone-over-flow, or at least before it would pass from the Dorr thickener, it was decided to run the cone-over-flow to the Dorr thickener for clarification. It was also decided to run the Pachuca tanks in series with the Dorr thickener, making provisions to avoid short-circuiting of pulp in the Pachucas. The over-flow from the thickener, being used for dissolving washes in sand leaching after it had been made up to strength with lime and cyanide, the main idea in doing this being to use the sand leaching charges to clarify the gold solution before precipitation.

This was the flow of pulp decided upon when at the plant, to start operation with the least delay. However, further consideration, bearing in mind the high grade nature of the solutions from the slime plant, suggest returning to the first flowsheet recommended as the better plan. This would be to pump the slime direct from the classifier over-flow to the Dorr thickener, using the clear over-flow

from the thickener, as dissolving solution in the sand treatment and for dilution at the trommel and classifier, while the thickened pulp discharged from the thickener goes direct to the Pachuca tanks, operated in series and thence to the Oliver filter. It is estimated that the time of contact in the thickener and Pachuca tanks will approximate forty-eight hours, which should be more than sufficient to complete the dissolution of the gold. Filter effluent would then go to clarification and precipitation or in the event it be found expedient, it could be passed as one wash through a sand tank to perfect clarification.

OLIVER FILTER

Except for numerous small holes in the cloth (worn by badly fitting scraper, and may have to be replaced) this machine appears to be in good condition. To obtain proper displacement of dissolved gold from the cake, two more sprays should be added. Canvas apron should be attached to each spray to spread a sheet of wash solution or water over the cake. Barren solution should be used for the sprays. Water lost in sand tanks and filter cake and by evaporation could be made up as a water wash on sand tanks or filter. Disposal of the filter cake by car should be replaced with a conveyor belt as soon as possible to free the plant operator for more important duties.

PRECIPITATION

Solution for precipitation must be free of all foreign matter. Careful attention must be given to clarifying. After clarification the gold solution passes through the de-aerating tank to remove all

dissolved oxygen. Clear and de-aerated solution prevents the formation of "White precipitate" on zinc shaving which interferes so seriously with precipitation of the gold, and adds to cost of clean-up and refining by causing bulky low grade precipitates.

Lead acetate in amount of about .02 pounds per ton of solution should be added to the gold solution before precipitation and may be added before or after clarification and de-aeration. When using zinc dust, it is found more effective to add the lead acetate at the gold storage tank rather than at a point nearer the contact with the zinc. It may also be advantageous precipitating with zinc shaving to add the lead salt back in the circuit from the zinc boxes.

To prevent the solution in the zinc boxes absorbing oxygen, it will be advantageous to leave the white lime film forming on the surface of the solution remain undisturbed.

If the clean-up of the zinc boxes is made every two weeks, there will be somewhere around one hundred to one hundred fifty pounds of precipitate each clean-up. This precipitate before acid treatment will have a value of around $45.00 per pound. After acid treatment, the value would be increased to around $75.00 per pound. No provision has been made for acid treatment of the precipitate. It is advised that for the first few clean-ups, as much of the short zinc as practical be screened and washed out from the sludge, then the sludge put in shape for shipment to the smelter. In the meantime, facilities for complete refining of precipitates at the plant can be arranged.

HAMILTON, BEAUCHAMP & WOODWORTH
SAN FRANCISCO, CALIF.

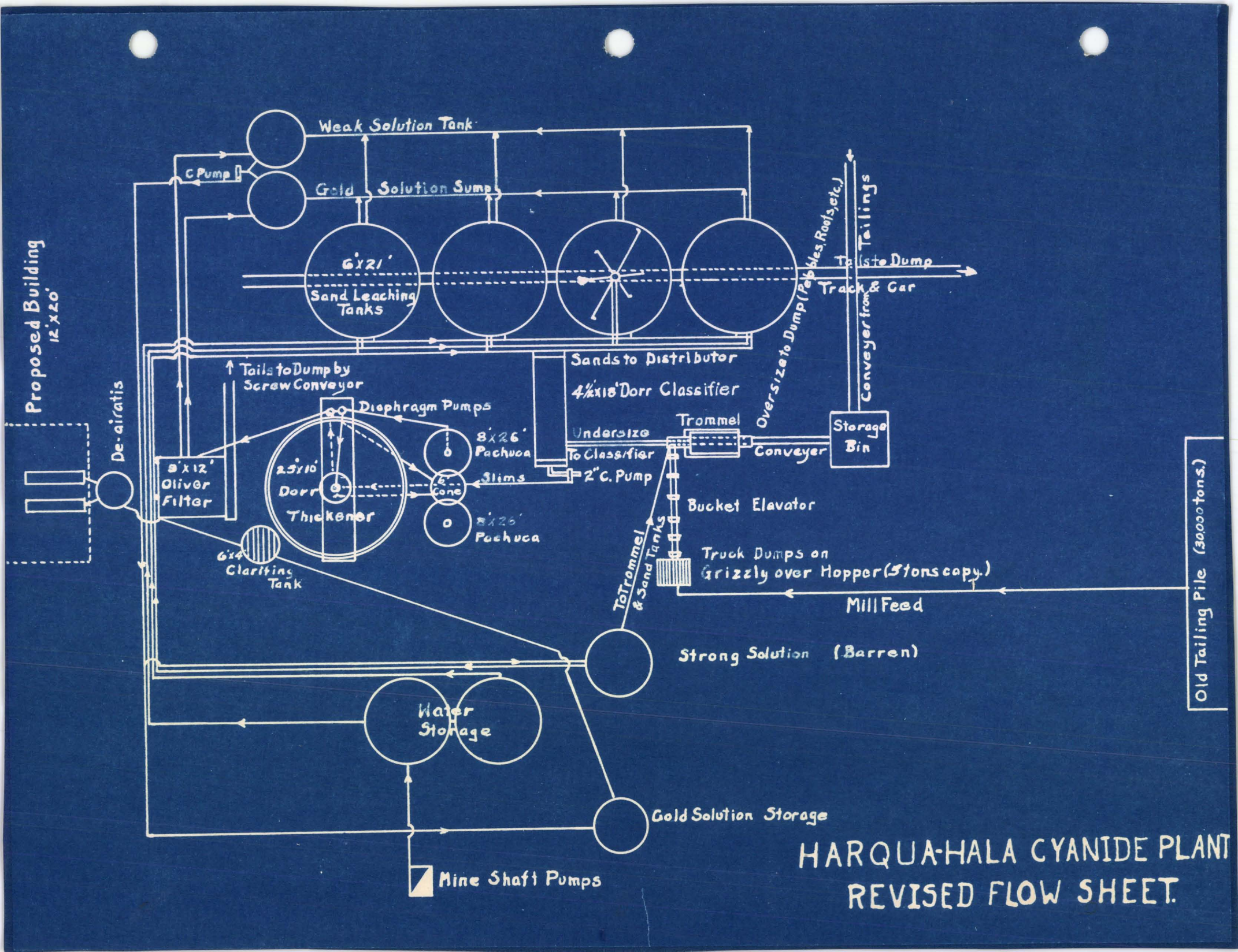
Zinc dust precipitation with collection of the precipitates in double bags, has many advantages over the zinc shaving method, and should be installed as early as possible.

Accurate records of the plant operation are invaluable and the plant should be operated on a balance sheet basis.

Respectfully submitted,

HAMILTON, BEAUCHAMP & WOODWORTH,
By: A. H. Beauchamp

San Francisco, California.
July 12, 1 9 3 4.



HARQUA-HALA CYANIDE PLANT
REVISED FLOW SHEET.

Harqua Hala Tailings file

July 15th, 1941

Mr. E. D. Morton
Eagle Picher Mining Company
P. O. Box 1268
Tucson, Arizona

Dear Morton:

Enclosed herewith your copy of the Lease on the Harqua Hala Tailings, which as you will note has been signed by Donald Martin, President and signatures of both Donald and Walter Martin duly notarized, also they have attached a certificate certifying resolution of the board of directors and a statement regarding the location and record of the mining claims.

I trust that this will be all that you or your attorneys require in this connection but if not please let me know and other documents can be obtained.

I might say that both Donald and Walter Martin were delighted to know that your company was taking over the operation of these tailings and join with me in hoping that these operations will be very profitable.

Sincerely,

Gene

GMC:at
Enc.

OPERATION ACCOUNTS July 1934

A.	Labor		Material		Total	
1- Power & Pumping Plant	189	75	121	88	311	63
2- Digging & Loading Tailings	141	19	2	55	143	74
3- Classifying, tanks & filters	129	00	492	82	621	82
4- Unloading tanks & waste disposal	10	19	—		10	19
5- Zinc boxes & refining clean-up	30	83	13	25	44	08
6- Shipping bullion & selling exp.						
B. MAINTENANCE & REPAIRS						
21- Power & pumping Plant	7	65	30	44	38	09
22- Digging & loading Tailings	—		10	45	10	45
23- Classifying, tanks & filters				31		31
24- Unloading tanks & waste disposal						
25- Zinc boxes, etc.,						
GENERAL						
31- Supervision at Mill	120	00	—		120	00
32- Assaying, testing & engineering	68	50	49	42	117	92
33- Truck & car service	10	00	59	06	69	06
34- Royalty to Owner					61	73
35- Royalty to Hart					300	00
36 - Taxes						
37 - Workmen's Compensation Insurance					253	00
38 - Mill, Office, & Camp	18	00	14	81	32	81
39 - Phoenix Office & Management					47	50
TOTAL						
0 - Preliminary Expense	27	50	—		27	50
00 - Reconditioning Plant	883	26	446	13	1329	39
GRAND TOTAL	1635	87	1241	12	3539	22

Ore milled

Ore treated- None

OPERATIONS ACCOUNT June 1934

A.	Labor	Material	Total
1- Power & Pumping Plant			
2* Digging & Loading Tailings			
3- Classifying, tanks & filters			
4- Unloading tanks & waste disposal.			
5- Zinc boxes & refining clean-up			
6- Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping plant			
22- Digging & loading tailings			
23- Classifying, tanks & filters			
24- Unloading tanks & waste disposal			
25- Zinc boxes, etc.			
GENERAL			
31- Supervision at Mill			
32- Assaying, testing and engineering			
33- Truck & car service			
34- Royalty to owner			
35- Royalty to Hart			
36- Taxes			
37- Workmen's Compensation Insurance			
38- Mill, Office & Camp			
39- Phoenix Office & Management			
TOTAL 0- Preliminary Expense	$ 38.40	$ 49.25	$ 87.65
00- Reconditioning Plant	116.42	70.66	187.08
GRAND TOTAL	$154.82	$119.91	$274.73

Ore milled

OPERATIONS ACCOUNT

July 1934

A.	Labor	Material	Total
1- Power & Pumping Plant	$189.75	$121.88	$311.63
2* Digging & Loading Tailings	141.19	2.55	143.74
3- Classifying, tanks & filters	129.00	492.82	621.82
4- Unloading tanks & waste disposal.	10.19		10.19
5- Zinc boxes & refining clean-up	30.82		
6**Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping plant	$ 7.65	$30.44	$38.09
22- Digging & loading tailings		10.45	10.45
23- Classifying, tanks & filters		.31	.31
24- Unloading tanks & waste disposal			
25- Zinc boxes, etc.			
GENERAL			
31- Supervision at Mill	$120.00		$120.00
32* Assaying, testing and engineering	68.50	$49.42	117.92
33- Truck & car service	10.00	50.06	69.06
34- Royalty to owner			61.73
35- Royalty to Hart			300.00
36- Taxes			
37- Workmen's Compensation Insurance			253.00
38- Mill, Office & Camp	18.00	14.81	32.81
39- Phoenix Office & Management			47.50
TOTAL 0- Preliminary Expense	$27.50		$27.50
00- Reconditioning Plant	$883.26	$446.13	$1329.39
GRAND TOTAL	$1635.87	$1241.12	$3539.22

Ore milled

OPERATIONS ACCOUNT

July 1934

A.	Labor	Material	Total
1- Power & Pumping Plant	$189.75	$121.88	$311.63
2- Digging & Loading Tailings	141.19	2.55	143.74
3- Classifying, tanks & filters	129.00	492.82	621.82
4- Unloading tanks & waste disposal.	10.19		10.19
5- Zinc boxes & refining clean-up	30.82		
6-*Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping plant	$7.65	$30.44	$38.09
22- Digging & loading tailings		10.45	10.45
23- Classifying, tanks & filters		.31	.31
24- Unloading tanks & waste disposal			
25- Zinc boxes, etc.			
GENERAL			
31- Supervision at Mill	$120.00		$120.00
32- Assaying, testing and engineering	68.50	$49.42	117.92
33- Truck & car service	10.00	50.06	69.06
34- Royalty to owner			61.73
35- Royalty to Hart			300.00
36- Taxes			
37- Workmen's Compensation Insurance			253.00
38- Mill, Office & Camp	18.00	14.81	32.81
39- Phoenix Office & Management			~~47.50~~
TOTAL			
0- Preliminary Expense	$27.50		$27.50
00- Reconditioning Plant	$883.26	$446.13	$1329.39
GRAND TOTAL	$1635.87	$1241.12	$3539.22

OPERATIONS ACCOUNT August 1934

A.	Labor	Material	Total
1- Power & Pumping Plant	$410.14		
2- Digging & Loading Tailings	451.13		
3- Classifying, tanks & filters	332.93		
4- Unloading tanks & waste disposal.	123.83		
5- Zinc boxes & refining clean-up	53.16		
6- Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping plant	$155.43		
22- Digging & loading tailings	96.63		
23- Classifying, tanks & filters	11.40		
24- Unloading tanks & waste disposal	11.73		
25- Zinc boxes, etc.			
GENERAL			
31- Supervision at Mill	$335.69		
32- Assaying, testing and engineering	101.56		
33- Truck & car service	12.58		
34- Royalty to owner			
35- Royalty to Hart			
36- Taxes			
37- Workmen's Compensation Insurance			
38- Mill, Office & Camp	38.33		
39- Phoenix Office & Management			$39.00
TOTAL			
0- Preliminary Expense			
00- Reconditioning Plant			
GRAND TOTAL			

OPERATIONS ACCOUNT August 1934

A.	Labor	Material	Total
1- Power & Pumping Plant	$410.14		
2- Digging & Loading Tailings	451.13		
3- Classifying, tanks & filters	332.93		
4- Unloading tanks & waste disposal.	123.83		
5- Zinc boxes & refining clean-up	53.16		
6- Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping plant	$155.43		
22- Digging & loading tailings	96.63		
23- Classifying, tanks & filters	11.40		
24- Unloading tanks & waste disposal	11.73		
25- Zinc boxes, etc.			
GENERAL			
31- Supervision at Mill	$335.69		
32- Assaying, testing and engineering	101.56		
33- Truck & car service	12.58		
34- Royalty to owner			
35- Royalty to Hart			
36- Taxes			
37- Workmen's Compensation Insurance			
38- Mill, Office & Camp	38.33		
39- Phoenix Office & Management			$39.00
TOTAL			
0- Preliminary Expense			
00- Reconditioning Plant			
GRAND TOTAL			

OPERATION ACCOUNTS August. 1934.

A.	Labor	Material	Total
1- Power & Pumping Plant	410 14		
2- Digging & Loading Tailings	451 13		
3- Classifying, tanks & filters	332 93		
4- Unloading tanks & waste disposal	123 83		
5- Zinc boxes & refining clean-up	53 16		
6- Shipping bullion & selling exp.	—		
B. MAINTENANCE & REPAIRS			
21- Power & pumping Plant	155 43		
22- Digging & loading Tailings	96 63		
23- Classifying, tanks & filters	11 40		
24- Unloading tanks & waste disposal	11 73		
25- Zinc boxes, etc.,			
GENERAL			
31- Supervision at Mill	335 69		
32- Assaying, testing & engineering	101 56		
33- Truck & car service	12 58		
34- Royalty to Owner			
35- Royalty to Hart			
36 - Taxes			
37 - Workmen's Compensation Insurance			
38 - Mill, Office, & Camp	38 33		
39 - Phoenix Office & Management			39 00
TOTAL			
0 - Preliminary Expense			
00 - Reconditioning Plant			
GRAND TOTAL			

OPERATION ACCOUNTS Sept. 1934

A.	Labor	Material	Total
1- Power & Pumping Plant	180.00		
2- Digging & Loading Tailings	70 00		
3- Classifying, tanks & filters	97 00		
4- Unloading tanks & waste disposal	20 00		
5- Zinc boxes & refining clean-up	49 75		
6- Shipping bullion & selling exp.			
B. MAINTENANCE & REPAIRS			
21- Power & pumping Plant			
22- Digging & loading Tailings			
23- Classifying, tanks & filters			
24- Unloading tanks & waste disposal			
25- Zinc boxes, etc.,			
GENERAL			
31- Supervision at Mill	112 50		
32- Assaying, testing & engineering	112 50		
33- Truck & car service	8 00		
34- Royalty to Owner			
35- Royalty to Hart			
36 - Taxes			
37 - Workmen's Compensation Insurance			
38 - Mill, Office, & Camp	10 00		
39 - Phoenix Office & Management			24 00
TOTAL			
0 - Preliminary Expense			
00 - Reconditioning Plant			
GRAND TOTAL			

Aug 30-1934

HARQUA HALA TAILINGS MILL

DAILY RECORD

FEED

Red Hill			Sand Pile			Total	
Loads	Tons	Value	Loads	Tons	Value	Tons	Value
no loads hauled							

Trap feed 8 hours Estimated feed 16 tons.

ASSAYS

Red Hill Mill Heads	
Sand Pile Mill Heads	
Slime Tails	.70
Sand Tails	
Pregnant Solution	3 32
Barren Solution	07
Clean up from to	

apparent Recovery

EXPENSES

Men Employed

Staff	Power Plant	Solution	Loading & Unloading	Miscl.	Total
2	1	1			8
		Trap 1	3		

Total Salaries & Wages	43	43
Fuel Oil, 40 gals. @ 10¢ per gal.	4	00
Cyanide 25 # @ 17¢ per #	4	25
Zinc # @ per #	1	50
Gasoline, lubricants, etc.,	2	00
Water 5040 gal @ 4	21	92
Repair Parts and supplies	5	00
Lime 120# @ 1.25	1	50
	83	60

HARQUA HALA TAILINGS MILL

FINAL STATEMENTS OF ACCOUNT FOR JUNE, JULY, AUGUST, & SEPT. 1934

SUMMARY OF RECEIPTS & EXPENDITURES.

RECEIPTS

From shipments # 1--6 incl.------	$5093.05	
Sale of supplies to Miles Carpenter ----------	160.00	
Refund on supplies not used--------	40.88	
Expenses repaid by Hart ----------	65.87	
Refund for Industrial Insurance ---	14.40	
((to be collected)		

EXPENSES

Credited to Hart for supplies & gold in process.		$ 621.93
Operating labor		4905.65
Operating supplies including water		2549.18
Industrial Insurance		253.00
Royalty to Owners		509.30
Royalty to Hart.		1342.72
Accounts still payable. Dec. 15th		
F. A. Beauchamp		100.00 not paid
Pratt-Gilbert		31.90
Cap. Fuel & Feed Co.		61.60
Expenses of G. M. C. for trips and office etc.		200.00
	$5374.20	$10575.28
Advances from personal account of G. M. C. to balance account, personal loss of G. M. C.	$5201.08	
	$10575.28	$10575.28

July 11, 1946

Mr. J. H. Byrd
C/o Byrd Investment Company
Post Office Box 5226
Tucson, Arizona

RE: Harqua Hala

File & bring when Rec'd J. Byrd

Dear Mr. Byrd:

I am in receipt of a copy of your letter of July 9 to Mr. Martin advising him that Harrison Schmitt has decided not to continue with the investigation of the Harqua Hala and in which you also notify Mr. Martin that you wish to have your lease and option contract cancelled.

It is needless to say that I very much regret that the deal with the New Jersey Zinc Company seems to have fallen through and I doubt if it would be of any advantage to attempt to resume negotiations with these people at the present time and under present conditions.

Of course I do not know just what information was obtained at the property by Mr. Schmitt's assistants, but it is self-evident that they could not have made any very thorough investigation such as I had recommended and such as I understood was the original contemplation by Schmitt.

It is my own very strong opinion that the decision of the New Jersey Zinc people was influenced to a very great extent by general conditions effecting the gold industry rather than by any unfavorable disclosures at the mine where they could not possibly have taken more than a very few small samples.

Six months ago things looked much brighter for the operators of gold mines than they do at the present time, and I know of several other investigations that were started and have been discontinued or in some cases development work, which has cost quite a lot of money, has been suspended indefinitely pending some change in the general outlook.

Many people thought at one time that a new and better price would be fixed for gold after some of the international conferences had been held, or that the United States Government would permit the gold miners to sell and produce on an open market which whenever it has been established at all appears to reach some $50.00 to $70.00 an ounce.

Unfortunately neither of these developments has actually occurred and meanwhile the price of base metals and most everything else has been changed and the scale of wages which the gold mines must meet has also taken a jump.

I am very much afraid that mining capital is not likely to be attracted to the development or operation of any gold mines unless these are exceptionally rich or until the outlook for the price of gold actually becomes more favorable and no one can foretell when anything of that kind will come about.

None the less I continue to believe that the world's need for gold will sooner or later bring about a greatly increased demand for that metal which can only be met by a much larger production from the gold mines than can be expected while the price level continues as at present.

I sincerely hope that both you and Mr. Martin will eventually be in a position to profit by interest in the Harqua Hala for I feel that a substantial body of low grade ore will someday be developed and that the ore could be mined and treated with profit whenever the selling price bore a more normal ratio to the production costs.

Needless to say that I shall be only too glad to be of any further assistance to either or both of you gentlemen in regard to this property and I much appreciated the confidence which you placed in my report and advice, and my only regret is that conditions beyond the control of any one of us seemed to have rendered such advice of little value.

Yours very truly,

GMC

GMC:IM
cc: Donald M. Martin

a 7/11/46

July 9, 1946

Mr. Donald M. Martin
44 North First Avenue
Phoenix, Arizona

Dear Mr. Martin:

Harrison Schmitt writes me that he cannot see enough probability of low-grade ore to justify exploration for it on the Harqua Hala, and the same statement is made regarding the development of enough high-grade ore to justify an operation. He states that he regrets that he was unable to be with the engineers during the examination, but had to go to British Columbia on a rush job for his company during that time. I have written to him for more information which I will forward to you if he feels like sending it to me.

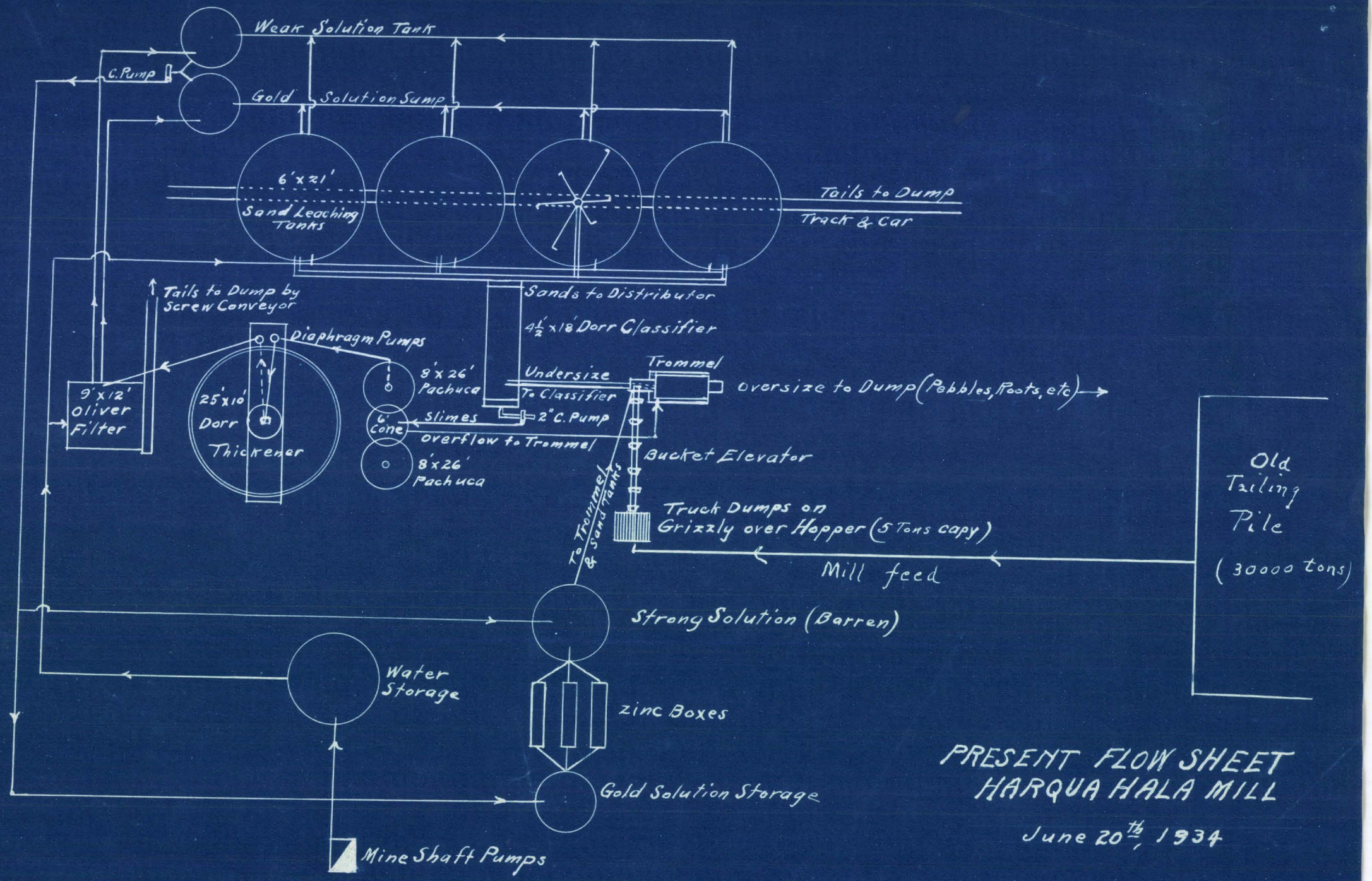
In the meantime, I wish to have you cancel my contract, because we do not feel that we--without RFC help which we were unable to get--can afford to undertake an extensive program of development.

I want to thank you and Mr. Colvocorresses for your cooperation, courtesy and responsiveness. I am mailing a copy of this letter to Mr. Colvocorresses. I hope to have the pleasure of continued acquaintance with you both, and am, with personal regards,

Yours very truly,

J. H. Byrd

JHB/hc


Weak Solution Tank
C. Pump
Gold Solution Sump
6'x21'
Sand Leaching Tanks
Tails to Dump
Track & Car
Tails to Dump by Screw Conveyor
Sands to Distributor
4½'x18' Dorr Classifier
Diaphragm Pumps
9'x12' Oliver Filter
25'x10' Dorr Thickener
8'x26' Pachuca
Undersize
To Classifier
Trommel
Oversize to Dump (Pebbles, Roots, etc)
6' Cone
Slimes
2" C. Pump
Overflow to Trommel
8'x26' Pachuca
Bucket Elevator
To Trommel & Sand Tanks
Truck Dumps on Grizzly over Hopper (5 Tons capy)
Mill feed
Old Tailing Pile (30000 tons)
Strong Solution (Barren)
Water Storage
Zinc Boxes
Gold Solution Storage
Mine Shaft Pumps
PRESENT FLOW SHEET
HARQUA HALA MILL
June 20th, 1934

June 22, 1934.

Bonanza & Golden Eagle Mining Company,
Phoenix, Arizona.

Attention: Mr. Walter T. Martin, Sec'y.

Gentlemen:

Confirming our conversation of yesterday and in connection with the Agreement of this date between W. L. Hart and me, of which copy is attached hereto, I will ask you, if satisfactory, to sign a copy of this letter indicating your approval of same.

I understand that the contract between your Company and W. L. Hart, dated December 12, 1932, is still valid and in full force and effect, and that there has been no default todate on the part of W.L. Hart nor any reason for you to declare a forfeiture of said contract. I further understand that you are familiar with the terms of the Agreement of this date between W. L. Hart and me, of which copy is attached hereto, and that this said Agreement is made with your consent and approval, but without prejudicing any of your rights under your previous agreement with W. L. Hart. I further understand that you are willing to allow me a reasonable time without actual milling operations, to re-arrange the milling plant at Harqua Hala in order to operate same in an efficient manner.

I Understand that you recognize the validity and priority of certain conditional sales contracts by which W. L. Hart purchased certain machinery and equipment from Vermeersch, Inc., of Phoenix, and his action in placing this encumbered equipment upon your property and that you do not consider this to be any violation of the terms of your Agreement with W. L. Hart and that you are willing that I should purchase and take assignment of the said conditional sales contracts.

I will further ask that in the event that you should find it necessary to notify W. L. Hart that the covenants or agreements in your contracts with him are not being performed as provided for in the said contract of December 12, 1932, that you will, whenever notifying Mr. Hart of such non-performance, send to me a copy of this notification at 1108 Luhrs Tower, Phoenix, Arizona.

Yours very truly,

G. M. Colvocoresses

G. M. Colvocoresses.

GMC/HC

Accepted without waiving any rights against W. L. Hart

~~Accepted:~~ Bonanza & Golden Eagle Mining Co.
by Walter T. Martin, Sec'y

AGREEMENT OF LEASE AND OPTION TO PURCHASE

This AGREEMENT, made and entered into this 23rd day of June 1934, by and between W. L. HART of Akron, Ohio, hereinafter called FIRST PARTY and G. M. COLVOCORESSES of Phoenix, Arizona, hereinafter called SECOND PARTY, Witnesseth:-

WHEREAS, FIRST PARTY now holds a lease and purchase contract dated December 12, 1932, from the Bonanza and Golden Eagle Mining Company, lawful owners on a certain pile of gold bearing tailings located at the Harqua Hala Bonanza Mine, Yuma County, Arizona, and hereinafter sometimes referred to as the OWNERS; also, rights to use and occupy certain lands and buildings in their vicinity and to use water from the mine, a copy of which contract and copies of the letters interpreting and modifying it are attached hereto as EXHIBIT A, and made a part hereof, and

WHEREAS, said FIRST PARTY by virtue of the said contract (EXHIBIT A) has erected a mill and installed other equipment for the treatment of the said tailings and has operated the same up to this time, but is now desirous of discontinuing such operations, and

WHEREAS, SECOND PARTY, being familiar with the tailings and the property and equipment of FIRST PARTY and with the contract which FIRST PARTY holds with the OWNERS, is desirous of taking over the said property and contract (EXHIBIT A) with the intention of vigorously prosecuting the treatment of the remaining tailings and of exercising the privileges and fulfilling the obligations of FIRST PARTY under his contract with the OWNERS of the tailings.

NOW, THEREFORE, in consideration of these premises and of the mutual agreements and rentals hereinafter contained and provided for, FIRST PARTY hereby lets and demises and SECOND PARTY hereby hires all of the right, title and interest of FIRST PARTY in the said contract with the OWNER of the tailings which

is attached hereto as EXHIBIT A, and also all of the buildings, plant, equipment, structures, pipe lines, material, supplies, assignments of insurance policies and other contracts, and all other property of whatever kind belonging to FIRST PARTY now located at or near the Harqua Hala Bonanza Mine and/or used in connection with the past operation of FIRST PARTY in treating the said tailings, under the following terms and conditions:-

ARTICLE I.

FIRST PARTY hereby represents and covenants that the contract with the OWNER, as modified by the attached letters, (EXHIBIT A) is valid and in good standing and free of all liens and encumbrances and that all obligations have been met and that this transfer of rights is made in a legal and valid manner and with the full approval of the OWNER and all other parties in interest and such consent and approval of the OWNERS and/or others is given in writing and attached to this agreement as EXHIBIT B.

FIRST PARTY further represents that all the leased property, equipment and material is now free and clear of all encumbrances except as stated in ARTICLE IV hereof, and that he will keep the same free from all other liens and attachments arising out of, or claimed to have arisen out of any act or omission on his part and that all bills for labor employed and material purchased except as set forth in ARTICLE IV, and taxes or dues have been paid in full to-date.

ARTICLE II.

SECOND PARTY, for his account and at his expense will immediately enter upon and take over physical possession of all of the leased property (subject to the rights of the OWNER THEREOF) and will promptly proceed to recondition the plant and equipment as may be required and to put the same into efficient operation and to substitute or add new equipment which latter shall remain his property subject to the rights of the OWNERS and thereafter throughout the term of the contract with the OWNERS, and such subsequent contracts or extension as may be procured, or until

all of the commercially valuable tailings have been treated, will operate as continuously as may be possible, using his best efforts and employing high grade technical skill to treat efficiently and economically the largest daily tonnage of tailings that can be handled by the present equipment with such additions and alterations as he may make, which tonnage subsequent to July 1934, shall not be less than fifteen hundred tons (1500) per month, except as provided in ARTICLE XII hereof and subsequent to August 1934, not less than two thousand tons (2000) per month except as provided in ARTICLE XII hereof. SECOND PARTY shall also endeavor to recover the highest percentage of gold and silver that may be profitably obtainable and market the resultant bullion and/or other valuable products to best advantage, subject to such restrictions as are now or may be imposed by the Federal Government or other legally constituted authority. All of these operations shall be under the direct control and supervision of SECOND PARTY and his employees and conducted at his expense and the proceeds and payments for all bullion and/or other shipments shall go to SECOND PARTY except as specified in ARTICLE III.

ARTICLE III.

From the net Mint return and/or other proceeds from the sales of bullion and/or other products derived from the treatment of the said leased tailings, SECOND PARTY will pay or cause to be paid to the OWNER the balance of the purchase price fixed in EXHIBIT A which said balance now amounts to approximately two thousand nine hundred and five dollars ($2,905.00) and is to be paid by allocating to the OWNERS ten percent (10%) of the net Mint or Smelter returns until this payment is completed, and thereafter SECOND PARTY will pay in the same manner to FIRST PARTY the sum of approximately one thousand and ninety-five dollars ($1,095.00) which FIRST PARTY has already paid to the OWNERS on account of the purchase price.

The payments above stipulated, or any unpaid portion thereof may be made in cash at any time during the term of this AGREEMENT.

ARTICLE IV.

BOTH PARTIES hereto recognize that FIRST PARTY has purchased certain machinery and equipment from VERMEERSCH, INC., of Phoenix and has only partially paid for the same and that the said VERMEERSCH, INC., now holds conditional sales contracts on this and other property of FIRST PARTY which show an unpaid balance of Nineteen hundred, nineteen dollars, and fifty five cents ($1,919.55) including principal and interest to-date. SECOND PARTY will promptly complete all payments due under these sales contracts so as to be assured of the use and possession of this equipment and it is hereby expressly agreed and stipulated that upon SECOND PARTY making this payment and taking the assignment of these contracts with full consent and approval of FIRST PARTY, he shall thereafter be entitled to fully reimburse himself from the first monies which would otherwise be due to FIRST PARTY under the terms of ARTICLES V AND VI hereof for the amount so paid together with interest at 8% per annum to actual date of repayment and together with all costs and expenses of this transaction. Upon the completion of this repayment the equipment and machinery affected by these sales contracts and/or other liens of VERMEERSCH, INC., shall become the property of FIRST PARTY subject to the terms of this AGREEMENT and rights of the OWNERS under the terms of EXHIBIT A.

ARTICLE V.

It is recognized by both parties that there is at present a substantial amount of gold in process in the plant, including the gold in the zinc boxes and solutions, which cannot be marketed immediately without serious loss, but which will form a part of the next shipment of bullion and when such shipment is made by SECOND PARTY an honest effort will be made to determine the approximate value of the gold which has been partially recovered at the expense of FIRST PARTY and payment of this amount, as may then be determined, as well as payment for operating supplies at cost, such as cyanide, zinc, oils, etc., which are

now on hand and which will be used by SECOND PARTY in subsequent operations, will be credited by SECOND PARTY to FIRST PARTY under the terms of ARTICLE IV hereof.

ARTICLE VI.

From the net Mint returns and/or other proceeds from the sale of bullion and/or other products derived from the treatment of the said tailings, SECOND PARTY will pay or credit as per ARTICLE IV hereof to FIRST PARTY as consideration for this AGREEMENT and as rental of the plant and equipment thirty percent (30%) of all such proceeds throughout the terms of this AGREEMENT. Such payments or credits are to be made promptly upon receipt by SECOND PARTY of returns for each shipment of bullion and/or other product derived from the treatment of the said tailings.

ARTICLE VII.

After the date of this AGREEMENT, SECOND PARTY shall assume all charges and obligations connected with the care and protection of the property involved and with the operation of same and shall save FIRST PARTY harmless from any claim of liability arising thereafter in this connection and shall post and keep posted on the property legal notice to that effect.

The operations of SECOND PARTY shall at all times be open to inspection by the FIRST PARTY or his AGENT to satisfy himself that the terms of this AGREEMENT are being carried out and copies of all records and operating books of SECOND PARTY covering these operations, as well as of all settlement sheets and returns from the Mint or other purchasers of the product of these operations will be furnished to FIRST PARTY and copies of the settlement sheets will also be furnished to the OWNER.

ARTICLE VIII.

BOTH PARTIES hereto will cooperate towards securing an extension of the present contract with the OWNER of the tailings and also an extension of the contract for water from the mine and any other extensions or modifications of existing agreements which

may mutually be deemed to be advantageous.

ARTICLE IX.

If, at any time prior to the completion of the treatment of the tailings or to the exercise of the OPTION contained in ARTICLE X hereof, SECOND PARTY shall find or believe that no further similar operations can be conducted with profit, SECOND PARTY may notify FIRST PARTY in writing to that effect and thirty days thereafter may relinquish this AGREEMENT and return the plant and equipment to FIRST PARTY in as good condition as it now is, ordinary wear and tear and damage by the elements or by causes beyond the control of FIRST PARTY excepted, and thereafter this AGREEMENT shall cease and terminate and there shall be no further obligations to either party hereunder except that SECOND PARTY shall not be released from payment of any obligations incurred to FIRST PARTY or others while this AGREEMENT was in force and effect.

ARTICLE X.

Until November 1, 1934, exclusive option is hereby granted to SECOND PARTY to purchase outright from FIRST PARTY all of his right, title, ownership and interest in the contract with the OWNERS and all of the plant, equipment, property, machinery, tools, supplies and property of every description located at Harqua Hala or used in connection with these operations for the sum of thirty thousand dollars ($30,000.00) in lawful currency of the United States, less any and all amounts which may theretofore have been paid to the OWNER and paid or credited to FIRST PARTY by SECOND PARTY under the terms of ARTICLES III, IV, V, and VI hereof. Such payment, if made, shall cover the full purchase price of the remaining tailings from the OWNER so that no further rental or royalty will be paid by SECOND PARTY either to the OWNER or to FIRST PARTY and shall also effect the outright purchase for SECOND PARTY and vest clear title in him of all of the other rights of FIRST PARTY in the contract with the OWNERS (EXHIBIT A)

and all of the plant, structures, machinery, tools, supplies of FIRST PARTY, subject, however, to the terms of ARTICLE XI. Upon the exercising of this OPTION and the payment by SECOND PARTY to FIRST PARTY of the purchase price herein stipulated, this AGREEMENT shall cease and terminate with no further obligation thereunder to either party, except as provided in ARTICLE XI hereof, but SECOND PARTY shall still be bound by the terms of the AGREEMENT with the OWNER, (EXHIBIT A).

ARTICLE XI.

If the option provided for in ARTICLE X is made and the purchase completed, SECOND PARTY shall continue to operate as before, but shall keep a careful record of all of his expenditures and profits subsequent to that date and SECOND PARTY undertakes that if and when his net receipts from the operation of the Harqua Hala Tailings shall have reimbursed him for all his expenditures including interest at 8% per annum and a reasonable compensation for personal services connected with these operations, both prior and subsequent to the date of exercising this option, and including the purchase payment made under ARTICLE X hereof, that then and in that event he will thereafter pay to FIRST PARTY 10% of all subsequent net profits accruing to him as a further consideration for this AGREEMENT.

ARTICLE XII.

The AGREEMENTS of SECOND PARTY with reference to continuous and efficient conditioning and operation of the leased plant and property are subject to prevention or delay by acts of nature, war, riots, fires, drought, strikes, Government regulation, financial panic and all other causes of force majeure beyond the reasonable control of SECOND PARTY, but it shall be the obligation of SECOND PARTY to endeavor to improve or remedy such causes of delay or suspension of operations as speedily as may be possible and thereafter to resume operation promptly and efficiently.

ARTICLE XIII.

It is further agreed by the PARTIES herein that in the event that said SECOND PARTY shall fail or refuse to perform any of the covenants or agreements contained in this AGREEMENT at the time herein provided, said FIRST PARTY may address a note to G. M. COLVOCORESSES, 1108 Luhrs Tower, Phoenix, Arizona, pointing out wherein such covenants and agreements are not being performed and the said SECOND PARTY shall have ten days (10) from the date of said notice in which to perform the covenants in accordance with this AGREEMENT and if upon the expiration of said ten days said SECOND PARTY has not performed in accordance of this agreement, said FIRST PARTY shall have the right to declare this AGREEMENT at an end and to remove the said SECOND PARTY and his AGENTS, SUCCESSORS, or ASSIGNS from the premises and all payments made hereunder shall be retained by FIRST PARTY as liquidated damages. It is, however, fully understood that the effect of all notices given in accordance with the above provision shall be contingent upon the existing facts actually complained of by said FIRST PARTY.

IN WITNESS WHEREOF the PARTIES hereto have executed these presents, in duplicate, the day and year first above written.

WITNESS: Margaret T. Berry

W. L. Hart
First Party

WITNESS: Helen Colquitt

G. M. Colvocoresses
Second Party

C
O
P
Y

Exhibit A

C
O
P
Y

Phoenix, Arizona.
November 1, 1933.

Mr. W. L. Hart,
Phoenix, Arizona.

Dear Sir:

Referring to that part of our agreement with you of December 12, 1932, regarding our right to revoke permission to you to use water from the mine workings, this will advise you that we will not exercise our right of revocation.

Yours very truly,

BONANZA AND GOLDEN EAGLE MINING COMPANY

(Signed)
By Walter T. Martin,
Secretary

WTM:S

(1)

AGREEMENT

THIS AGREEMENT, made and entered into this 12th day of December, 1932, by and between BONANZA AND GOLDEN EAGLE MINING COMPANY, a corporation organized and existing under the laws of the State of Arizona, party of the first part, and W. L. Hart, of Akron, Ohio, party of the second part,

WITNESSETH:

That WHEREAS, the first party is the owner of the following mining claims situate about seven miles from Harrisburg, Arizona, to wit:

Consolidated Bonanza Mining Claim (Patented)
Narrow Gage Placer Mining Claim (Patented)
North Pole Mining Claim
Wedge Mining Claim

and certain real and personal property which has been acquired and used in connection with the above described claim; and

WHEREAS, there situate on the above described real property dumps of tailings derived from former workings of said claims which are believed to contain gold and other valuable minerals in quantities sufficient to permit of the extraction thereof at a profit; and

WHEREAS, the first party has heretofore, on the 26th day of April, 1930, entered into an agreement for the working of said tailings with one Frank H. Mitchell, which agreement has been extended from time to time and is now in full force and effect until the 26th day of August, 1933; and

WHEREAS, it is the desire of the said second party hereto to be granted the right and privilege to work said tailings; and

WHEREAS, the said first party is desirous of granting to the second party the right to enter upon said dumps and the lands adjacent thereto for the purpose of working said tailings and extracting valuable minerals therefrom.

NOW, THEREFORE, it is hereby covenanted and agreed between said parties as follows, to wit:

Said first party agrees that said second party may enter on the above described property after the 26th day of August, 1933, which is the date of the expiration of that certain agreement entered into by and between the said first party hereto and one Frank H. Mitchell on the 26th day of April, 1930, and extended by subsequent agreements to and including the 26th day of August, 1933, for the purpose of working said dumps of tailings by the extraction of valuable minerals therefrom.

Said first party further agrees that the second party shall be entitled to the use of any of the buildings on the above described mining property so long as they are not used by the said first party or anyone undertaking to operate said mining property under lease or agreement with the said first party. If said first party shall at any time require the use of said buildings, or any of them, for operating said mining property or for any other reason, it shall give notice in writing to the said second party of its need for such buildings either for itself or for those undertaking to operate said mining property under it, and in such event said second party agrees to give up possession of said buildings, or such part thereof as may be required by first party, within thirty (30) days after receiving such written notice.

It is further agreed by the said first party that the second party shall, during the life of this agreement, have the free use of any and all of the old cyanide equipment now located on the property of the first party, but upon the termination of this agreement the said second party shall leave all of such equipment upon the premises hereinabove described in as good condition as they now are, usual wear and tear excepted.

Said first party agrees that the said second party may use in his operations the water from the mine workings on said property but reserves unto itself the right to revoke the right and permission to use said water at any time, provided that the said second party shall be permitted to actually operate his plant and equipment for a period of at least thirty (30) days prior to the revocation of such permission to use such water, and in the event the said first party does revoke the permission to use water the payments hereinafter provided to be made by the said second party shall cease; provided, that in the event that the revocation of the permit to use water from the mines is effected by reason of a sale of said premises, or for any reason, and the said second party can secure the water from the purchaser of the mining property or from any other source free of charge so as to enable the said second party to continue his operations, the said second party shall continue to make the payments hereinafter provided for; and in the event that the purchaser of said mines makes a charge for the use of said water to the said second party, the said first party agrees that such charge may be deducted from the payments to be made by the said second party as hereinafter provided, but in no event shall such deductions exceed the total amount of the payments to be made by the said second party to the first party under the terms of this agreement. In the event the second party procures water from any other source than from the purchaser or lessee of the mining property, and a charge is made therefor, the said second party shall pay all of such water charges out of his own funds, and the payments hereinafter provided for shall continue; otherwise this agreement shall immediately terminate.

The said second party agrees to pay for the right to work said tailings the total sum of Four Thousand Dollars ($4,000.00), payable as follows, to wit:

$1,000.00 upon the execution of these presents,
and the balance of
$3,000.00 as follows:

Second party agrees to ship all precipitates or bullion extracted from the aforesaid tailings to a mint or smelter selected by him and to notify the said first party of all shipments when made, and to cause said mint or smelter to deposit to the account of the said first party, at such bank as the said first party may designate, ten percent (10%) of all net mint or smelter returns from such shipment. The term "net mint or smelter returns" as herein used is hereby defined to mean the total amount paid by the mint or smelter after the expenses deducted by such mint or smelter, and other deductions of the freight or express for shipping such precipitates or bullion from the plant to the mint or smelter.

In the event that the ten percent (10%) of the returns from the mint or smelter herein provided to be paid to the said first party shall not be sufficient to pay the full sum of $3,000.00 said second party agrees to pay the balance in cash at the time he ceases to operate on said property; and until the full amount of Four Thousand Dollars ($4,000.00) shall have been paid said first party shall have a first lien upon all of the property and equipment upon said premises belonging to the said second party.

Said second party agrees to construct, at his own expense, a

plant capable of working said tailings, and to construct all of the works necessary for the operation of said plant, and to complete said plant and said incidental works and have the same in operation not later than the 26th day of October, 1933, and thereafter to dilligently and continuously work said tailing dumps in the manner herein provided so long as it shall be profitable to extract valuable minerals therefrom, but in no event shall this agreement extend longer than February 26th, 1935.

For the purpose of carrying out the ~~obligations imposed upon him, by~~ term of this agreement, the ~~second party~~ shall be entitled to enter upon the aforesaid dumps and so much land adjacent thereto as is reasonably necessary for the purpose of erecting the plant for the treatment of said tailings and for the operation of the same, and for depositing the tailings produced by the operation of the plant so to be erected.

It is understood and agreed, however, that in all the above described work and operations the second party shall so limit ~~his possession of said mining property~~, and ~~so~~ conduct his operations as not to interfere with the working of the ~~above described mining~~ property, and will so deposit the tailings from his said plant at such point and in such manner as not to interfere with ~~the~~ any future operations ~~of the said mining property~~ on.

This agreement is limited to the dumps of tailings on the mining property hereinbefore described, and does not in any way authorize or permit ~~second party~~ to develop or work the said mining property or any of the old waste dumps, and first party shall not be liable in any manner or to any extent to laborers and others employed by second party, or to persons who may furnish materials or merchandise to second party, and second party shall, on or before beginning operations under this agreement, post a notice at all places where he carries on operations and notify all laborers whom he employs and all persons from whom he buys materials or merchandise, that he is authorized only to work the tailings on the dumps hereinbefore described, and is not authorized or permitted in any way to work or develop the mining property upon which said dumps are situate.

It is further agreed that a notice of nonliability, such as is provided by Section 2029 of the 1928 Revised Code of Arizona, will be posted and recorded, and the second party agrees to keep said notice posted upon said property as provided by said Section 2029, Revised Code of Arizona, 1928.

It is agreed by the parties hereto that the terms of this agreement shall commence on the 27th day of August, 1933, and shall expire on the 26th day of February, 1935.

It is futher agreed by the parties hereto that in the event the said second party shall fail or refuse to perform any of the covenants or agreements contained in this indenture at the time and in the manner herein provided, said first party shall address a notice to W. L. Hart, Salome, Arizona, pointing out wherein such covenants or agreements are not being performed, and the said second party shall have fifteen (15) days from the date of the said notice in which to perform the covenant in accordance with this agreement, and if before the expiration of said fifteen (15) days said second party has not performed in accordance with this indenture said first party shall have the right to declare this agreement at an end and to remove the said second party and his agents, successors or assigns from the premises, and all payments made hereunder shall be retained by first party as liquidated damages, and if there is unpaid balance of the Four Thousand Dollars ($4,000.00) it shall become immediately due and payable.

It is agreed by the parties hereto that if the said second party shall have fully completed extracting all valuable minerals from the said tailings dumps in the manner hereinbefore provided, or shall have paid the full sum of Four Thousand Dollars ($4,000.00) to the said first party and shall have ceased operations for any other purpose, said second party shall be permitted to remove from said premises all of the machinery and equipment placed on the above described mining claims by the said second party.

This agreement shall not be assigned by the second party without the written consent of the first party having been first obtained.

This agreement shall be binding upon the heirs, executors, administrators and assigns of the parties hereto.

IN WITNESS WHEREOF, the said first party has caused these presents to be executed by its duly authorized officers and its corporate seal to be hereunto affixed, and said second party has hereunto placed his hand the day and year first written above.

BONANZA & GOLDEN EAGLE MINING CO.

By

Original Duplicate Cy.

Dr. G. Hard

to

J. L. C.

Hargua Hala Tarling

451 North Citrus Ave.
Los Angeles.
Calif.

AGREEMENT OF LEASE

THIS AGREEMENT, made and entered into this first day of April, 1941, by and between BONANZA AND GOLDEN EAGLE MINING COMPANY, a corporation organized and existing under the laws of the State of Arizona, hereinafter called the LESSOR and Verne W. Winters, of Virginia City, Nevada, hereinafter called the LESSEE.

WITNESSETH:

That WHEREAS, the LESSOR is the owner of the following mining claims situate in the Ellsworth Mining District, Yuma County, Arizona, to wit:

Gold Mountain	(Patented)
Gold Hill	(Patented)
Narrow Gage Placer	(Patented)
North Pole	
Wedge	

and certain real and personal property located thereon including dumps of mill tailings accumulated from previous operations, which are believed to contain values sufficient to justify their extraction; and

WHEREAS, it is the desire of the LESSEE to be granted the right and privilege to work and process the said mill tailings only but not the mine or the dumps of raw ore located on the property.

NOW, THEREFORE, in consideration of the payment of the sum of $500.00 (Five hundred dollars) to the LESSOR as an advance royalty or rental, receipt of which is hereby acknowledged, and of the royalties, rents and other considerations herein set forth the above named LESSOR AND LESSEE have agreed and do hereby agree as follows:

ARTICLE I

The LESSOR hereby leases and lets and the LESSEE hereby hires, subject to the terms and conditions hereinafter set forth, all and every part of the said mill tailings and the right of use and occupancy thereof to have and to hold for a period of three

years from this date until midnight of March 31st, 1944, subject to prior termination as herein provided.

For the purpose of carrying out the terms of this agreement, the LESSEE shall be entitled to enter upon the aforesaid tailings and so much land adjacent thereto as is reasonably necessary for the purpose of erecting the plant for the treatment of said tailings and for the operation of the same, and for depositing the tailings produced by the operation of the plant so to be erected.

It is understood and agreed, however, that in all the above descrived operations the LESSEE shall so limit and conduct his work as not to interfere with the present or future working of the mine or dumps.

This agreement is limited to the mill tailings only and does not in any way authorize or permit the LESSEE to develop or work the mining property for the extraction of ore, nor to treat any of the ore or waste dumps.

ARTICLE II

LESSEE shall have a period of Six (6) months from date hereof to install a processing plant and start shipments of the resulting valuable products to a smelter or mint subject to payment of the 10% royalty provided in Article V hereof. LESSEE shall have the further right to install, erect and maintain such machinery, tools, equipment, added housing facilities and other necessary requirements needed in the conduct of the business, and provided all royalties and/or rents due LESSOR, as hereinafter provided, shall have been paid, the LESSEE shall have full title to such equipment as he may place upon the leased premises at his expense and the right and permission to remove all such personal property without written consent of LESSOR: but such right of removal shall not extent to pipe lines, tracks, buildings or other fixed structures attached to the property and classed as permanent improvements.

ARTICLE III

LESSEE shall have right to use the present camp buildings for housing and/or other purposes, rent free, during the term of this lease, subject to cancellation of this right on sixty (60) days notice, in event that the mine itself is operated by the LESSOR or sold to or operated by other parties, however, provision will be made for the LESSEE to retain use of one of the cabins for housing his crew, not to exceed five (5) men.

The above right of use shall not extend to the so called Pachuca tanks, Oliver filter and Hadsel mill which are ~~not~~ located on these premises but are not the property of the Lessor.

Upon the expiration of this agreement or its cancellation as herein provided the LESSEE shall peaceably vacate the leased premises leaving all buildings, structures and equipment in as good condition as they now are, ordinary wear and tear excepted.

ARTICLE IV

Included in this lease agreement is the use of the Consolidated Bonanza five-acre Mill Site on Centennial Wash at Harrisburg, now owned by the LESSOR, on which is located a water well, also the use of a pipe line (the condition of which is not guaranteed by LESSOR - repairs to be made at LESSEE'S expense) and a reservoir, and it is agreed that LESSEE shall have right to install a pump and use the pipe line and reservoir with water from well for the term of this lease, unless the mine itself is operated by LESSOR or is sold to or operated by other parties, in any of which events up to 25,000 gallons of water per day will be reserved for use of this tailings lease, with the understanding that LESSEE shall pay for the actual cost of pumping the required amount of water to the tailings plant. LESSEE shall have further right, if so desired, to pump and use water from the Harqua Hala Bonanza Mine itself provided such an operation does not interfere with any actual mining work that may be undertaken.

ARTICLE V

Throughout the term of this lease, the LESSEE shall have the right to extract values from any or all or any part of said mill tailings and to ship the products to a mint or smelter. On the net smelter and/or mint returns of all products derived from the said tailings, the LESSEE will pay to the LESSOR a royalty of Ten Per Cent (10%) of the net smelter and/or mint returns, as hereinafter defined but in any event, the minimum royalty or rental to be paid by LESSEE during the term of this Agreement subsequent to October 1st, 1941 shall be $200.00 per month, payable in advance on the first day of each and every calendar month.

The net smelter and/or mint returns within the meaning of this lease shall be the correct returns as shown by the liquidation sheets furnished to LESSEE by the purchaser of the output of the leased property. Said returns shall be considered as the actual payment made by the purchasers of any products from the leased property after the said purchaser has deducted from the value of the shipments the railway freight or express, the usual minting or smelting charges, and deductions. Each purchaser of any part of the output from this property shall be instructed to send to the LESSOR or its Agent a carbon copy of each liquidation sheet at the same time that the payment for any lot of bullion, concentrate, or other product is made to the LESSEE, and payment of 10% royalty is to be made by the LESSEE to the LESSOR within five (5) days after the receipt of each payment by the LESSEE except when such payment shall have already been made in compliance with the terms of Article VI. It is understood that the LESSEE will use diligence to secure the best smelting or purchase terms obtainable for the output from the leased tailings.

ARTICLE VI

The $500.00 paid by the LESSEE to the LESSOR upon the execution of this Agreement is an advance royalty or rental which shall be forfeited to the LESSOR if the earned royalty as above

stipulated does not equal or exceed the said sum prior to December 15th, 1941, by which date the said advance payment will have been absorbed by the minimum rental or royalty stipulated in Article V hereof as applicable to the months of October and November and the first half of December, 1941.

On December 15th, 1941 a further advance rental payment of $100.00 shall be made to the LESSOR and thereafter on the first day of each calendar month, beginning with January, 1942, the LESSEE shall pay the minimum advance royalty or rental due for that month.

Against each advance payment there shall be credited the earned royalty payable during the said calendar month, it being understood and agreed that any excess of earned royalty payable during any one month beyond the advance payment shall be paid in cash as provided in Article V.

ARTICLE VII

Throughout the term of this Lease, the LESSEE will comply with all the present or future laws of the State of Arizona and of the United States with respect to the operations involved and conform to the Workmen's Compensation Law of the State, carrying such Workmen's Compensation Insurance as shall protect the LESSOR from any claims for injury or damages arising out of the operation of the leased property. Notices to the effect that the LESSEE and not the LESSOR will be responsible for the payment of all bills for labor, material or other claims in connection with the operation under this lease and for any accident or injury to workmen or others, shall be posted and kept posted on the property as provided in Section 3029 of the Revised Code of Arizona, 1928.

ARTICLE VIII

During the life of this lease all work hereunder shall be under the exclusive direction and for the exclusive charge of the LESSEE, but the LESSOR or its authorized Agent, shall have access to any or all of these operations at all reasonable times for the

purpose of determining whether or not the terms of this lease and good practice are being conformed with by the LESSEE and the operations so conducted as to work no harm or injury to any portions of the premises not covered by this lease.

ARTICLE IX

Time is of the essence of this Agreement and the term hereof is intended to be for the full three year period but the LESSEE may at any time quit and surrender the leased premises upon giving the LESSOR thirty (30) days notice in writing of his intention to do so. This lease shall thereupon terminate and LESSEE shall be discharged from all further obligations hereunder, but not from any obligation in favor of the LESSOR that may theretofore have accrued under the terms hereof, and as a guarantee for the payment of which the LESSOR shall hold a first and prior lien upon all personal property placed by the LESSEE upon the leased premises until such obligations have been fully discharged.

If LESSEE shall fail, neglect, or refuse to make any payment when due hereunder, or if LESSEE shall default in any of his payments, promises, and agreements herein, then and in that event and at any time thereafter the LESSOR may, at its election, declare a forfeiture of and an end to this Agreement and at the end of sixty (60) days after giving such notice and provided that such failure or default has not previously been corrected the LESSOR may enter upon and repossess the leased premises and the LESSEE upon demand shall immediately and peaceably surrender possession thereof to the LESSOR.

ARTICLE X

During the term of this lease the LESSEE agrees to promptly pay all Federal, State and local taxes assessed against the

leased tailings for the values processed and recovered therefrom and all taxes assessed against the real or personal property of the LESSEE employed in conjunction with these operations.

This agreement shall extend to and be binding upon the heirs, assigns, administrators, executors, of each of the parties hereto.

IN WITNESS WHEREOF, the said parties hereto have hereunto set their hands and seals on day and date first written above.

_____
LESSOR

BY_____

_____
LESSEE

slimes progress in one direction and the cyanide solution in the opposite. After the solution containing the gold is discharged from the slime tanks it runs into filter tanks. Merrill-Crowe precipitation is used.

W. J. Franklin is in charge of the operation. A total of fifteen men are employed. Julius C. Ingersoll, consulting engineer for the Snyder interests, designed the plant.

ployers through organized labor unions.

The most striking result of the survey is the relatively small proportion of employees found to be dealing with employers through organized labor unions. Second is the indication of progress made by employee representation plans, particularly among large industrial companies where some form of collective bargaining is necessary. Third, if the survey had been extended to the large number of small companies in the country, it is likely that individual bargain-

Precipitate Treatment

At Jackson, California . . . Amador Metals Develops Economical Procedure for Making 990 Fine Bullion

S. E. Woodworth

December 9th, 1941

Mr. Walter Martin
44 North First Ave.
Phoenix, Arizona

File

Re: Harqua Hala Tailings

Dear Mr. Martin:

As I mentioned in conversation I found an opportunity to visit the Harqua Hala Mine on the 6th inst. and noted with interest the operation of the plant which Winters has installed and which seems to be very compact and economical. According to his statements it is also very efficient and he claims to be making a high percentage of gold recovery, although he did not give me any detailed figure in that respect. At the present time he is treating about 25 tons per day scraping up the remnant of the higher grade tailings which was left in the low ground to the north of the old mill and tailings pile but I do not expect that he could continue in that section very much longer and he has already sampled the large tailings pile and tells me that while it is pretty low grade he plans to continue treating at least some of the material, but previously he hopes to enlarge his plant so that he can handle up to 50 tons per day.

I understand that no tests have yet been run on any ore from thedumps or taken from the mine, but this matter has been discussed between Winteres and Morton and I feel confident that they will try out the operation of the plant on low grade ore provided it continues to give satisfaction in the treatment of the tailings.

Winters told me that the material from the lower dump which he is now treating averages around $3.50 per ton, which seems pretty high, and he had figured that the large pile of tailings would probably run about $1.75 per ton, although he did not yet have sufficient information to make this preliminary estimate of any particular value.

The present plant seems to have produced a considerable tonnage of flotation concentrates and they are still considering the best means of treating these concentrates for the recovery of the gold contained. I understand that no shipments have yet been made to date and therefore no earned royalty is due, but you will doubtless recall that in accordance with the terms of the contract of April 1, 1941, Winters should pay you $100.00 as minimum rental or royalty on the 15th of this month and in like manner the sum of $200.00 on the first of January and each month thereafter.

I would like to suggest that it might be in order to request that Winters should make up a little statement either on the 15th or 31st of this month showing what tonnage of tailings he has actually treated so that you will be able to follow his operations more closely in future and similar statements should be made at the end of each calendar month. Feel quite sure that Winters will have no objection to conforming to this request even though it is not a specific obligation of his contract.

Yours very truly,

GMC:DF

GMC

RECORD OF HARQUA HALA SHIPMENTS OF PRECIPITATE 1934

NO.	DATE	SHIPPED TO	NET DRY WEIGHT #	OZ. GOLD.	VALUE	OZ. SILVER	VALUE	GROSS VALUE GOLD & SILVER	NET VALUE
#1	7/23	U. S. Co.	555.58	20.050	$ 672.22	15.27	$ 9.81	$ 682.03	$ 617.28
#2	8/7	A. S.& R.	89.20	5.160	171.73	8.41	5.48	177.20	155.24
#3	8/22	A. S.&nR.	79.70	27.840	900.11	31.19	18.72	918.84	896.78
#4	9/4	A. S.& R.	106.30	54.364	1822.75	42.63	25.56	1848.31	1824.14
#5	9/15	U. S. Co.	43.88	13.743	460.08	10.54	6.76	466.84	450.57
#6	9/25	U. S. Co.	301.35	33.990	1163.35	20.85	13.13	1179.48	1149.04
TOTAL			1176.01	155.147	$5193.24	128.89	$79.46	$5272.70	$5093.05

Form C.O. 77 8-20-34 10M

FINAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

#5

Salt Lake City, Utah, Oct. 2, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz.
Gold Producers License #S.F.13-446 SP.Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver .641 25 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26	481.5	4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Sacks	
Pulps shippers acct.	1.00
Net Weight	46.00
Less H^2O 4.6 %	2.12

METAL VALUE		
Gold 100% @	20,986	.41
Silver 100% @ .641 25	308	.76
Copper		
Lead		
Zinc		
Total Metal Value	21,295	17
Less 4 % of value of silver	12	35
Gross Value	21,282	82
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88 Payment for .02194 tons @ 21,278 22 per ton 466 84

Freight advanced @ per ton

~~Assay Charges~~ Express charges 6.27

Sampling Charges
Assay Chgs. } & Handling 10.00 16 27

450 57

Former pay 444 07

Checked by

Approved by Net Payment 6 50

Form C.O. 77 8-20-34 10M

#6

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

FINAL SETTLEMENT
1786-A

Salt Lake City, Utah, Oct. 11, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz. SP.Salome,Ariz.
Gold Producers License #S.F.13-446

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver .64125 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12	138.35	2.5	.5	1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less 2 boxes	86.00
Total Wet Weight	308.50
Less Sacks shippers pulps	1.00
Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @ 33.7804	7,773	55
Silver 100% @ 64125	88	72
Copper		
Lead		
Zinc		
Total Metal Value	7,862	27
Less 4 % of value of silver	3	55
Gross Value	7,858	72
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @	7,827	97	per ton	1179	48
Freight advanced @	per ton					
~~Assay Charges~~ Express charges				20.44		
Sampling Charges } Assay Chgs. } & Handling				10.00	30	44
					1149	04
				Former pay	1136	21
Checked by						
Approved by				Net Payment	12	83

Form C.O. 77 8-20-34 10M

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

FINAL SETTLEMENT

1786-A

Salt Lake City, Utah, Oct. 11, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz. SP.Salome,Ariz.

Gold Producers License #S.F.15-446

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver .64125 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12	138.35	2.5	.5	1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less 2 boxes	86.00
Total Wet Weight	308.50
Less Sacks	1.00
Less shippers pulps	
Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @ 35.7604	7,773	55
Silver 100% @ 64125	88	72
Copper		
Lead		
Zinc		
Total Metal Value	7,862	27
Less 4 % of value of silver	3	55
Gross Value	7,858	72
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @ 7,827 97 per ton				1179	48
Freight advanced @ per ton						
Assay Charges Express charges		20.44				
Sampling Charges } Assay Chgs. } & Handling		10.00			30	44
					1149	04
	Former pay				1136	21
Checked by						
Approved by	Net Payment				12	83

Form C.O. 77 8-20-34 10M

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

FINAL SETTLEMENT

1786-A

Salt Lake City, Utah, Oct. 11, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz. SP.Salome,Ariz.

Gold Producers License #S.F.13-446

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver .64125 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12	138.35	2.5	.5	1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less 2 boxes	86.00
Total Wet Weight	308.50
Less Sacks	1.00
Less shippers pulps	
Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @ 33.7904	7,773	55
Silver 100% @ .64125	88	72
Copper		
Lead		
Zinc		
Total Metal Value	7,862	27
Less 4 % of value of silver	3	55
Gross Value	7,858	72
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @	7,827	97	per ton	1179	48
Freight advanced @ per ton						
Assay Charges Express charges				20.44		
Sampling Charges } Assay Chgs. } & Handling				10.00	30	44
					1149	04
				Former pay	1136	21
Checked by						
Approved by				Net Payment	12	83

Form C.O. 77 8-20-34 10M

UNITED STATES SMELTING REFINING AND MINING COMPANY

#6

PROVISIONAL SETTLEMENT NINTH FLOOR NEWHOUSE BUILDING

1786-A

Salt Lake City, Utah, Oct. 4, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz.
Gold Producers License #S.F.13-446 SP.Salome, Ariz.

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver GOLD :34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12		2.5		1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less boxes	86.00
Total Wet Weight	308.50
Less ship- Sacks	1.00
pers pulps Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @33.7804	7773	55
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	7773	55
Less % of value of silver		
Gross Value		
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @ 7742 80 per ton			1166	65
Freight advanced @	per ton				
~~Assay Charges~~ Express charges		20.44			
Sampling Charges)		10.00		30	44
Assay Chgs.) & Handling					
Checked by					
Approved by	Net Payment			1136	21

Form C. 8-20-34 10M

#6

UNITED STATES SMELTING REFINING AND MINING COMPANY

PROVISIONAL SETTLEMENT NINTH FLOOR NEWHOUSE BUILDING

1786-A

Salt Lake City, Utah, Oct. 4, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz.
Gold Producers License #S.F.13-446 Sp.Salome, Ariz.

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver GOLD :34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12		2.5		1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less boxes	86.00
Total Wet Weight	308.50
Less shippers pulps Sacks	1.00
Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @33.7804	7773	.55
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	7773	55
Less % of value of silver		
Gross Value		
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @ 7742 80 per ton		1166	65
Freight advanced @	per ton			
~~Assay Charge~~	Express charges	20.44		
Sampling Charges)		10.00	30	44
Assay Chgs.) & Handling				
Checked by				
Approved by	Net Payment		1136	21

Form C.O. 77 8-20-34 10M

In Hand

6

UNITED STATES SMELTING REFINING AND MINING COMPANY

PROVISIONAL SETTLEMENT NINTH FLOOR NEWHOUSE BUILDING

1786-A

Salt Lake City, Utah, Oct. 4, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz. Sr. Salome, Ariz.

Gold Producers License #S.F.13-446

Ore Precipitates Lot No. 3 Class

Sampled by Received 9-27 Sampled 9-29 Assayed 10-1

Metal Quotations—Silver GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	230.12		2.5		1.0	.2	71.1	.2	2.2	

CAR NOS.	WET WEIGHT
Express	
	394.50
Less boxes	86.00
Total Wet Weight	308.50
Less ship-Sacks pulps	1.00
Net Weight	307.50
Less H^2O 2.0 %	6.15

METAL VALUE		
Gold 100% @33.7804	7773	55
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	7773	55
Less % of value of silver		
Gross Value		
Less Working Charge	30	75

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 301.35	Payment for .150675 tons @ 7742 80 per ton	1166	65
Freight advanced @ per ton			
~~Assay Charges~~ Express charges	20.44		
Sampling Charges)	10.00	30	44
Assay Chgs.) & Handling			
Checked by			
Approved by	Net Payment	1136	21

Form C.O. 77 8-20-34 10M

Mr. Hunt

FINAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

Salt Lake City, Utah, Oct. 2, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz.
Gold Producers License #S.F.13-446 SP.Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver .64125 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26	451.5	4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Pulps Sacks	
Shippers acct.	1.00
Net Weight	46.00
Less H^2O 4.6 %	2.12

METAL VALUE		
Gold 100% @	20,986	.41
Silver 100% @ .64125	308	.76
Copper		
Lead		
Zinc		
Total Metal Value	21,295	17
Less 4 % of value of silver	12	35
Gross Value	21,282	82
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88 Payment for .02194 tons @ 21,278 22 per ton 466 84

Freight advanced @ per ton

~~Assay Charges~~ Express charges 6.27

Sampling Charges
Assay Chgs. & Handling 10.00 16 27

450 57

Former pay 444 07

Checked by

Approved by Net Payment 6 50

Form C.O. 77 6-30-34 .5M

#1

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

Final Settlement
1622-A

Salt Lake City, Utah, August 11,1934

Pay G.M.Colvocoresses, 1108 Luhrs Tower, Phoenix, Ariz. S.P. Salome,Ariz.
Gold License # S.F.13-446

Ore Precipitates *Lot No.* 1 *Class*

Sampled by *Received* 7-23 *Sampled* 7-27 *Assayed* 7-28

Gold: 34.9125

Metal Quotations—Silver .64125 *Copper, N. Y.* *Lead, N. Y.* *Zinc*

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										Wet Lead
Umpire										
Settlement Assay	72.17	55.05			6.2	.8	63.5	.3		1.8

CAR NOS.	WET WEIGHT
Express	
Total Weight	628.00
Less Drum Box	67.5
Total Wet Weight	560.50
Less Pulp Sacks Sam.P.	1.00
Net Weight	559.50
Less H^2O 0.7 %	3.92

METAL VALUE		
Gold 100% @ 33.5304	2419	89
Silver 100% @ .64125	35	30
Copper		
Lead		
Zinc		
Total Metal Value	2455	19
Less 4 % of value of silver	1	41
Gross Value	2453	78
Less Working Charge	89	52

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs.	555.58	Payment for .27779 tons @	2364	26 per ton	656 77
Freight advanced @	per ton				
Assay Charges)					
Sampling Charges)	and handling			10.00	
Express charges				29.49	39 49
Checked by					
Approved by			Net Payment		617 28

Form C.O. 77 6-30-34 .5M

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

#1

Final Settlement
1622-A

Salt Lake City, Utah, August 11,1934

Pay G.M.Colvocoresses, 1108 Luhrs Tower, Phoenix, Ariz. S.P. Salome,Ariz.
Gold License # S.F.13-446

Ore Precipitates Lot No. 1 Class

Sampled by Received 7-23 Sampled 7-27 Assayed 7-28
Gold: 34.9125

Metal Quotations—Silver .64125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										Wet Lead
Umpire										
Settlement Assay	72.17	55.05			6.2	.8	63.5	.5		1.8

CAR NOS.	WET WEIGHT
Express	
Total Weight	628.00
Less Drum Box	67.5
Total Wet Weight	560.50
Less Pulp Sacks Sam.P.	1.00
Net Weight	559.50
Less H²O 0.7 %	3.92

METAL VALUE		
Gold 100% @ 33.5304	2419	89
Silver 100% @ .64125	35	30
Copper		
Lead		
Zinc		
Total Metal Value	2455	19
Less 4 % of value of silver	1	41
Gross Value	2453	78
Less Working Charge	89	52

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs.	555.58	Payment for .27779 tons @	2364	26	per ton	656 77
Freight advanced @		per ton				
Assay Charges						
Sampling Charges	and handling				10.00	
Express charges					29.49	39 49
Checked by						
Approved by					Net Payment	617 28

San Francisco, Calif. August 22, 1934

RETURNS OF Zinc Shorts RECEIVED OF G.M. Colvocoresses, Salome, Arizona

By

AMERICAN SMELTING & REFINING CO.

SELBY SMELTING WORKS
405 MONTGOMERY ST.

#2

SELBY LOT 4079

Mark EXPRESS

Arrived 8/9/34

1 Box

Sacks weighing gross	159	lbs.
Tare	42½	lbs.
	116½	lbs.
Moisture 23.4 %	27.3	lbs.
Samples		lbs.
NET DRY WEIGHT	89.2	lbs.

ASSAYS and ANALYSIS		
Gold	115.95	ozs. per ton
Silver	190.75	ozs. per ton
Lead		%
Copper (wet)		%
Insol.		%
Iron		%
Zinc		%
Sulphur		%
Arsenic		%
Antimony		%

Check issued to:
G. M. Colvocoresses,
1108 Luhrs Tower
Phoenix, Arizona

PERCENTAGES and PRICES	DEBITS	CREDITS
Less — %@ $33.270665		3858 66
Less 5 %@ 64 1/8 -1 - 63 1/8		114 39
Less %@ per lb. Less		
Less units @ per lb. Less		
Base Charge		
Totals		
Value per Ton		3973 05
Value of 89.2 lbs. @ 3973.05 per ton		177 20
Sampling and Assaying	10 00	
Reducing	5 00	
Burning, Grinding and Sifting		
~~Freight~~ Express	6 96	
Totals	21 96	177 20
NET PROCEEDS		$155 24

IMPORTANT!

If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process.

American Smelting & Refining Co.

FORM 8 10M 4-34

San Francisco, Calif. September 7th, 1934

RETURNS OF Precipitates RECEIVED OF Harqua Hala Tailings Mill
Phoenix, Arizona

By

AMERICAN SMELTING & REFINING CO.

SELBY SMELTING WORKS
405 MONTGOMERY ST.

#3

SELBY LOT 4265

Mark

Express

Arrived 8/23/34

1 Box	Sacks weighing gross	130.5	lbs.
	Tare	36.5 94	lbs.
			lbs.
	Moisture 15.2 %	14.3	lbs.
	Samples		lbs.
	NET DRY WEIGHT	79.7	lbs.

ASSAYS and ANALYSIS			PERCENTAGES and PRICES	DEBITS	CREDITS
Gold	673.68	ozs. per ton	Less %@ 33.528665		22587 59
Silver	783.75	ozs. per ton	Less 5 %@ 64-1/8¢ - 1 63-1/8¢		470 00
Lead		%	Less %@ per lb. Less		
Copper (wet)		%	Less units @ per lb. Less		
Insol.		%			
Iron		%			
Zinc		%			
Sulphur		%			
Arsenic		%			
Antimony		%			
			Base Charge		
			Totals		
			Value per Ton		23057 59
			Value of 79.7 lbs. @ 23057.59 per ton		918 84
			Sampling and Assaying	10 00	
			Reducing	5 00	
			Burning, Grinding and Sifting		
			Freight Express	7 06	
			Totals	22 06	
			NET PROCEEDS		896 78

check issued to:
G. M. Coluocoresses
1107 Luhrs Tower
Phoenix, Arizona

.03985

IMPORTANT!
If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process.
American Smelting & Refining Co.

FORM 8 10M 4-34

To be paid upon receipt of Gold Affidavit 363.19

TO BE PAID UPON RECEIPT BY US OF PROPERLY EXECUTED AFFIDAVIT WHICH WILL QUALIFY THE SILVER CONTENT OF THIS SHIPMENT FOR SALE TO THE U. S. GOVERNMENT

32 ounces @ 95% Ozs. @ (64-1/8¢ ~~49625¢~~) 14500¢ 4 30 367 49

529 29

San Francisco, Calif. September 21, 1934

RETURNS OF Precipitates

RECEIVED OF G.M. Colvocoresses
Salome, Arizona

By

AMERICAN SMELTING & REFINING CO.

SELBY SMELTING WORKS
405 MONTGOMERY ST.

#4

SELBY LOT 4382

Mark Hargua Hala Tailing Mill — 1 Box — EXPRESS

Arrived 9/4/34

Sacks weighing gross		lbs.
Tare	147	lbs.
	38.5	lbs.
	108.5	lbs.
Moisture % 2.0	2.2	lbs.
Samples		lbs.
NET DRY WEIGHT	106.3	lbs.

ASSAYS and ANALYSIS		PERCENTAGES and PRICES	DEBITS	CREDITS
Gold	ozs. per ton	Less %@		
Silver 1022.84	ozs. per ton	Less — %@ $33.528665		34294.46
Lead 802.05	%	Less 5 %@ 64 1/8 — 1 per lb. Less 63 1/8		480 98
Copper (wet)	%	Less units @ per lb. Less		
Insol.	%			
Iron	%			
Zinc	%			
Sulphur	%			
Arsenic	%			
Antimony	%			
		Base Charge		
		Totals		34775.44
		Value per Ton		
		Value of lbs. @ per ton		34775.44
		Sampling and Assaying 106.3 34775.44		1848.31
		Reducing	10 00	
		Burning, Grinding and Sifting	5 00	
		Freight Express	9 17	
		Totals		
		NET PROCEEDS	24 17	1848 31
				$1824.14

Check to:
G.M. Colvocorresses
1107 Luhrs Tower
Phoenix, Arizona

IMPORTANT!

If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process.

American Smelting & Refining Co.

FORM 8 10M 4-34

San Francisco, Calif. September 21, 1934

RETURNS OF Precipitates

RECEIVED OF G.M. Colvocoresses
Salome, Arizona

#4

By

AMERICAN SMELTING & REFINING CO.

SELBY SMELTING WORKS
405 MONTGOMERY ST.

SELBY LOT 4382

Mark Hargua Hala Tailing Mill
EXPRESS

1 Box

Sacks weighing gross	147	lbs.
Tare	38.5	lbs.
	108.5	lbs.
Moisture 2.0 %	2.2	lbs.
Samples		lbs.
NET DRY WEIGHT	106.3	lbs.

Arrived 9/6/34

ASSAYS and ANALYSIS		PERCENTAGES and PRICES	DEBITS	CREDITS
Gold 1022.84	ozs. per ton	Less — %@ $33.528665		34294. 46
Silver 802.05	ozs. per ton	Less 5 %@ 64 1/8 – 1 63 1/8		480 98
Lead	%	Less %@ per lb. Less		
Copper (wet)	%	Less units @ per lb. Less		
Insol.	%			
Iron	%			
Zinc	%			
Sulphur	%			
Arsenic	%			
Antimony	%			
		Base Charge		34775. 44
		Totals		34775.44
		Value per Ton		34775.44
		Value of 106.3 lbs. @34775.44 per ton		1848.31
		Sampling and Assaying	10 00	
		Reducing	5 00	
		Burning, Grinding and Sifting		
		Freight Express	9 17	
		Totals	24 17	1848 31
		NET PROCEEDS		$1824.14

Check to:
G.M. Colvocorresses
1107 Luhrs Tower
Phoenix, Arizona

IMPORTANT!

If not advised to the contrary within days from date we shall assume that returns are satisfactory and the product covered by this statement will be placed in process.

American Smelting & Refining Co.

FORM 8 10M 4-34

Form C.O. 77 8-20-34 10M

PROVISIONAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

#5

Salt Lake City, Utah, Sept. 25, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Arizona
Gold Producers License #S.F.13-466 SP. Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26		4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Less Sacks	
~~Shippers acct.~~	1.00
Net Weight	46.00
Less H²O 4.6 %	2.12

METAL VALUE		
Gold 100% @ 33.7804	20,986	41
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	20,986	41
Less % of value of silver		
Gross Value		
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88	Payment for .02194 tons @	20,981	81 per ton	460 34
Freight advanced @ per ton				
~~Assay Charges~~ Express charges			6.27	
Sampling Charges } Assay charges } & handling			10.00	16 27
Checked by				
Approved by		Net Payment		444 07

Form C.O. 77 8-20-34 10M

#5

FINAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

Salt Lake City, Utah, Oct. 2, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Ariz.
Gold Producers License #S.F.13-446 SP.Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver .64125 GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26	481.5	4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Sacks Pulps	
Shippers acct.	1.00
Net Weight	46.00
Less H^2O 4.6 %	2.12

METAL VALUE		
Gold 100% @	20,986	.41
Silver 100% @ .64125	308	.76
Copper		
Lead		
Zinc		
Total Metal Value	21,295	17
Less 4 % of value of silver	12	35
Gross Value	21,282	82
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88 Payment for .02194 tons @ 21,278 | 22 | per ton 466 84

Freight advanced @ per ton

~~Assay Charges~~ Express charges 6.27

Sampling Charges
Assay Chgs. } & Handling 10.00 16 27

450 57

Former pay 444 07

Checked by

Approved by Net Payment 6 50

Form C.O. 77 8-20-34 10M

#5

PROVISIONAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

Salt Lake City, Utah, Sept. 25, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Arizona
Gold Producers License #S.F.13-466 SP. Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26		4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Less Sacks	
~~Shippers acct.~~	1.00
Net Weight	46.00
Less H^2O 4.6 %	2.12

METAL VALUE		
Gold 100% @ 33.7804	20,986	41
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	20,986	41
Less % of value of silver		
Gross Value		
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88	Payment for .02194 tons @	20,981	81 per ton	460 34
Freight advanced @ per ton				
~~Assay Charges~~ Express charges			6.27	
Sampling Charges) Assay charges) & handling			10.00	16 27
Checked by				
Approved by		Net Payment		444 07

Form C.O. 77 8-20-34 10M

PROVISIONAL SETTLEMENT
1756-A

UNITED STATES SMELTING REFINING AND MINING COMPANY

NINTH FLOOR NEWHOUSE BUILDING

Salt Lake City, Utah, Sept. 25, 1934

Pay G. M. COLVOCORESSES 1108 Luhrs Tower, Phoenix, Arizona
Gold Producers License #S.F.13-466 SP. Salome, Ariz.

Ore Precipitates Lot No. 2 Class

Sampled by Received 9-17 Sampled 9-21 Assayed 9-22

Metal Quotations—Silver GOLD:34.9125 Copper, N. Y. Lead, N. Y. Zinc

ASSAYS	GOLD OZS. PER TON	SILVER OZS. PER TON	PER CENT COPPER WET	PER CENT LEAD	PER CENT INSOLUBLE	PER CENT IRON	PER CENT ZINC	PER CENT SULPHUR	PER CENT LIME	PER CENT
U. S. S. Co.										
Umpire										
Settlement Assay	621.26		4.7		6.2	.7	50.5	.4	5.9	

CAR NOS.	WET WEIGHT
Express	
	86.00
Less 1 box	39.00
Total Wet Weight	47.00
Less Sacks	
~~Shippers acct.~~	~~1.00~~
Net Weight	46.00
Less H^2O 4.6 %	2.12

METAL VALUE		
Gold 100% @ 33.7804	20,986	41
Silver 100% @		
Copper		
Lead		
Zinc		
Total Metal Value	20,986	41
Less % of value of silver		
Gross Value		
Less Working Charge	4	60

WORKING CHARGE		
Treatment		
Insoluble		
Zinc		
Sulphur		
Speiss		
Total Debit		
Iron		
Net Working Charge		

Dry Weight, lbs. 43.88 Payment for .02194 tons @ 20,981 81 per ton 460 34

Freight advanced @ per ton			
~~Assay Charges~~ Express charges	6.27		
Sampling Charges			
~~Assay charges~~ & handling	~~10.00~~	~~16~~	~~27~~

Checked by

Approved by Net Payment 444 07

Samples (from Hart's Record)

Crude tailing.

	Date	Au	Ag.	Val $
Red dump (upper) E & W side - 3/4.	3/4	0.16	—	6.60
Mill heads (grab.) 3/15.	3/15	0.16		6.60
" " " 3/16 (1 P.M.	3/16	0.20		7.00
" " " 3/16 (3 P.M.)	3/16	0.22		7.70
" " " from belt 3/	3/21	0.13		4.55
Red dump, Combined sample	3/22	0.21		7.35
Mill heads	3/25	0.11		3.85
" "	4/5	0.14		4.90
Sample from Canyon (?) Sand	4/6	0.15		5.25
" " North side "	4/17	0.08		2.80
" " South "	4/17	0.07		2.45
" " North Slime	4/17	0.10	0.30	3.70
" " South "	4/17	0.10	0.26	3.65
Mill head. (Tails 0.05.	4/16	0.11	3.85	3.85
" "	4/17	0.12	4.20	4.20

Aver of mill heads from sample $5.33

Aver of red dump $6.97

Aver of lower sands $3.50

" " " slimes. $3.67

Precipitate Aver of 4 samples	4/17	196.57	$3.44 per lb.
Shot zinc Aver of 4 samp.	4/18	100.2	1.75
Precip. #3 low	4/15	119.9	2.10
"	"	89.6	1.57
"	"	68.7	1.20
"	"	62.9	1.10
"	"	45.6	0.78
Shot zinc (1 to low		176.68	3.09

Aver fall precip = 1.70 per lb
Shot zinc = 2.42

Novel Scraper Practice

Makes Cyanidation of Low-Grade Tailings Profitable At Randsburg

Soap Flotation

A Study of the Action of Depressing Gels

John Mark Patek

Trends and Developments In the Industry

Gold value of tailing per ton.....		$ 2.478
" " extracted " ".....	$2.353 (95%)	
" " " from 60 tons.....	141.24	
Cost of treatment per ton...	$0.6575	
" " " 60 tons.....	39.45	
Net profit per day.....	$101.79	
Net Profit per 30-day month.....	$3,053.70	

A substantial addition to the $45,886.23 net recovery from the 27,046 tons of tailing is assured from the fact that the greater portion of the tailing carry ten cents in silver per ton of tailing, with silver at 30 cents per ounce. This silver has not been reckoned in the gold content of the tailing, but the greater part of it will be recovered along with the gold.

Also, underlying the smaller area of tailing mentioned as adjoining the larger area on its western side, there is an indeterminate tonnage of tailing that assays $26.90 a ton. This tailing representing some sulphide ore below water level of the mine and carrying a small percentage of copper, was crushed and run across the amalgam plates by former operators of the mine, but it would not plate.

It is reported that 400 tons of that ore was run through the 40-stamp mill and out into the tailing. Whether that estimate of the tonnage is correct or not, it is certain that this high grade tailing shows in the bottom of a number of the test pits which I sunk in the west tailing area. But, not being sure of its total tonnage, as I am of the balance of the tailing, I have not considered its yield in computing the return from the 27,046 tons of tailing measured up. Unquestionably, however, this high grade tailing will add a considerable amount to the total $45,886.23 gold recovery from the entire tailing.

Respectfully submitted,

Salome, Arizona,
May 1, 1931.

(Signed F. W. Mitchell,
c/o Greene & Griffith
Homebuilders Building,
124 N. 1st Avenue,
Phoenix, Arizona.

Mitchell's Samples & Report

ASSAYS OF GOLD MILL TAILING LYING BELOW OLD 40-STAMP MILL AT BONANZA MINE AT HARQUA-HALA, ARIZONA.

- - - - - - - - - - -

Assays per foot-ton top sands

Pit No.	Depth-feet	Gold Value
00	2	$ 4.40
0	1	2.00
1	2	3.60
2	3	6.00
3	3-8"	6.95
4	3	4.20
5	2-2"	2.80
6	1-6"	1.95
7	1-4"	1.72
8	1	2.80
9	1-9"	5.25
10	4"	.48
13	4	15.20
14	2-8"	6.03
15	1	2.00
16	1-6"	4.95
17	10"	2.33
18	3-5"	6.84
20	6-6"	11.22
21	2-6"	5.00
22	12	21.60
23	5-8"	10.18
"	3-4"	13.98
"	1	3.40
24	2	2.60
25	1	1.50
26	1	3.20
27	3-6"	12.60
28	3-2"	5.07
29	4-2"	10.84
30	6	10.80
31	2-8"	4.42
33	5-6"	9.90
35	1-3"	2.25
36	3-9"	13.17
37	6	8.40
38	2	3.20
40	1-7"	3.52
42	5	14.00
44	2	4.40
45	3-4"	12.65
46	6	14.40
Totals	127	$281.80

Top Sands (continued)

Pit No.	Depth-feet	Gold Value
51	3-4"	$ 19.09
52	2-4"	6.52
53	4-10"	16.49
55	9"	1.02
56	4"	10.80
57	5-6"	17.60
58	3-4"	6.99
59	1	1.20
63	1-8"	7.30
64	3-3"	6.50
65	3	12.00
66	1	1.90
68	4	13.60
69	1	3.20
70	8"	2.11
71	1-6"	4.80
72	1-2"	4.68
74	3-5"	8.89
75	1	2.70
76	1	2.60
77	3-5"	8.20
78	1-4"	2.92
79	2-6"	6.20
80	2-2"	2.60
81	1-6"	3.00
West Pits 1	1	1.80
2	1-8"	4.64
3	2-2"	8.68
4	3-4"	9.32
5	2-2"	6.94
6	1-4"	2.66
7	2	4.80
8	2-3"	3.60
9	1-10"	3.33
10	1	1.60
11	3	9.60
12	1-6"	5.40
13	1-3"	2.75
14	10"	2.72
15	1-2"	2.92
16	9"	2.10
17	2-6"	4.50
18	8"	1.05
19	1-8"	2.65
Totals	90-7"	$253.97

Top Sands - continued

Pit No.	Depth-feet	Gold Value
20	2-5"	$5.39
21	1-10"	$3.33
22	3-8"	7.32
23	1-10"	3.33
24	1-10"	2.96
25	2-6"	5.75
26	1	2.80
27	4	7.20
28	4-8"	7.45
29	3-4"	4.99
30	2-11"	5.84
31	2-5"	4.90
32	3-4"	7.32
39	8-4"	14.12
40	9-4"	18.12
41	4-10"	10.69
43	7	14.30
44	4-5"	14.91
45	3-3"	6.52
47	7-1"	17.82
48	4-8"	9.15
49	3-5"	5.86
51	3-7"	7.13
52	2-9"	6.62
Totals	89	$199.97
"	127	281.80
"	90-7"	253.97
	306-7"	$735.74

Average value of top sands per ton.....$2.30

Top Slimes

Pit No.	Depth-feet	Gold value
10	9"	$ 0.97
11	2	4.20
12	1-4"	2.12
19	4-4"	9.52
32	1-5"	3.48
34	6-6"	11.70
39	1-7"	3.84
41	5-2"	11.37
43	2.10"	10.26
47	3-4"	8.65
48	3-2"	5.07
49	3-1"	5.58
50	2-5"	4.65
55	6"	.80
60	1	1.20
61	9"	.82
62	1-10"	6.93
73	11"	1.67
34	2-6"	14.50
35	4	12.80
36	4-5"	17.80
37	3-5"	6.90
38	3-6"	5.60
42	3-3"	7.80
50	2	4.80
46	2-2"	3.47
Totals	70	$166.50

Average value of top slimes per ton.....$2.37

Middle sands & slimes.

Pit No.	Depth-feet	Gold Value
7 Sa	1-4"	$ 2.26
12 "	2-9"	4.40
31 Sl	3-3"	5.20
34 Sa	2-9"	8.80
38 Sl	1-5"	2.61
43 Sa	1	1.75
Totals	12-5"	$25.42

Average value middle tailing per ton.....$ 2.03

Bottom sands

Pit No.	Depth-feet	Gold Value
10	1	$ 3.40
11	10"	2.32
17	3"	1.30
21	1	3.00
25	4-2"	20.00
31	10"	2.38
38	2	4.20
39	1-7"	3.48
47	5-2"	10.34
61	1	1.20
78	1-10"	4.44
25	5"	2.16
27	4-4"	6.92
34	1-10"	3.70
35	8"	4.08
36	1-1	4.32
38	9"	1.74
Totals	29	$ 79.04

Average value bottom sands per ton.....$2.72

Bottom Slimes

Pit No.	Depth-feet	Gold Value
3	4"	$ 0.62
4	6"	1.40
5	4"	.46
6	6"	1.60
7	1-2"	3.51
12	1	4.20
14	3	9.60
15	5-5"	18.50
17	10"	4.42
21	1-8"	5.04
25	7	22.40
28	1	1.60
30	10"	1.53
33	5	19.50
34	4-3"	14.87
40	4-6"	13.50
43	1-4"	3.72
52	11"	1.76
66	1-7"	3.15
78	10"	2.04
Totals	42	$133.43

Average value of bottom slimes per ton.....$3.17

Total depth of all sands and slimes measured and assayed from the 133 test pits sunk in the tailing area:

Feet	Composite Value
460	$1140.13

Average value of all tailing per ton.....$2.478

Total depth of 133 pits sunk in tailing area.....460 feet

Average depth of entire tailing area.....3,455 feet

The tailing lies in two areas: the larger lying to the northeast of the mill, and a smaller section immediately adjoining the larger one on its western edge.

The area of the larger portion is 467 feet in length and 318 feet wide, and contains 148,506 square feet.

The smaller section is 169 feet long and 94 feet wide, and contains 15,886 square feet.

The combined square feet of the two tailing areas is 164,392, which, multiplied by the average depth of 3,455 feet, gives a total of 567,974 cubic feet of tailing in the two areas.

A number of carefully measured and weighed samples of the sands and slimes of the tailing averaged 95.24 pounds per cubic foot dry weight, making almost exactly 21 cubic feet of the tailing to the ton of 2000 pounds.

Since the tailing contains 567,974 cubic feet of sands and slimes, the total tonnage of tailing available for treatment is 567,974 divided by the 21 cubic feet contained in one ton, which is a total of 27,046 tons.

As the average value per ton of the tailing in gold is $2.478, the total amount of gold in the 27,046 tons is $67,019.98.

Leaching tests of composite samples of the tailing extending over six weeks and using 2½ pounds of sodium cyanide to the ton of cyanide solution, and 5 pounds of lime to the ton of tailing to neutralize the latent acidity in the latter, resulted in a 95% extraction of the gold in a four-day treatment cycle with a cyanide consumption of 1½ pounds and all the lime to the ton of tailing leached.

Summary of treatment costs and extraction on following page:

Total amount of gold in 27,046 tons.....		$67,019.98
95% recovery of above amount.....		$63,668.98
Cyanide consumption to each ton of tailing treated: 1½ pounds at 16 cents a pound.....	$0.24	
Cost of lime used per ton of tailing treated (5 pounds at 3/4¢ per pound)	.0375	
Cost of filling each 60-ton leaching tank per day with tailing at per ton of tailing.....	.08	
Cost of emptying each 60-ton leaching tank per day at per ton of tailing.....	.10	
Cost of gas and oil in small gasoline engines running conveyor belts used in filling and emptying the 60-ton leaching tanks, per ton of tailing handled.....	.10	
Cost of pumping solutions per ton of tailing.....	.02	
Cost of pumping water from mine for wash and leaching solutions, per ton of tailing treated.....	.06	
Cost of zinc consumption in gold precipitating launders, per ton of tailing treated	.02	
	$0.6575	
Total cost of treating the 27,046 tons of tailing		$17,782.75
Total profit in treating " " " " "		$45,886.23

The treatment plan for the tailing contemplates the use of six 60-ton leaching tanks in the working order of one being emptied and one being filled each 24-hour day, while the other four tanks are in process of leaching tailing. This schedule will permit 60 tons of tailing to be treated every 24 hours and will run through the entire 27,046 tons of tailing in 450 days, or a little less than 15 months.

Approximate daily and monthly profits shown on following page:

METALLURGICAL STATEMENT

CYANIDE PLANT

July,1934.

Tons to date Gross Value
Tons for July

Less Cumulative Residue ----------

TOTAL DEBITS:

Bullion previously credited ----------

Bullion delivered in October

Bullion Gold
Silver

TOTAL CREDITS:

Balance

Balance

Credits:
Unprecipitated Solution $
Sand under treatment
Slime under treatment
Slag on hand

Balance after crediting gold in process $

NOTE: Bullion based on Mine returns.

MISCELLANEOUS METALLURGICAL DATA

CYANDIE PLANT

July ---------- 1934

		SAND PLANT	SLIME PLANT	MILL TAILS
Solution Precipitated				
Total ----------	Tons			
Per ton or Ore ----------	Tons			
Pounds of Zinc Dust				
Total ----------	Lbs.			
Per 24 hour ton of solution ----------	Lbs.	-------	-------	
Assay of Pregnant Solution---	$	-------	-------	
Assay of Barren Solution-----	$	-------	-------	
Precipitation efficiency ----	%	-------	-------	

Total value of dissolved gold going to Oliver Filter per ton of Slime ---------- $

Soluble loss per ton of slime-$

Washing efficiency ---------- %

Titration of dissolving solution
- Free KCN---------- %
- Total KCN---------- %
- Lime---------- %

Consumption of Major supplies

Sodium Cyanide
- Total ----------Lbs.
- Per ton of Ore -------Lbs.

Lime
- Total ---------- Lbs.
- Per ton of Ore ------- Lbs.

Zinc Dust
- Total ---------- Lbs.
- Per ton of Ore ------- Lbs.
- Per ton of Solution -- Lbs.

Lead Acetate
- Total ---------- Lbs.
- Per ton of Ore ------- Lbs.
- Per ton of Solution -- Lbs.

RECOVERY SHEET

CYANIDE PLANT

July, 1934

	SAND PLANT	SLIME PLANT	MILL TAILS
Mill Tailings treated ---- Tons			
Head Assay			
Gold ---------- $			
Loss per Ton of Ore			
Washed residue ------ $			
Soluble loss -------- $	-------		------
Barren Solution ----- $	-------		------
Total Loss ---------- $			
Theoretical Recovery ----- %			

	Au.	Ag.
Bullion Recovered -------- $		
Bullion Recovered -------- %		

Fine Gold Recovered ------ Oz.
Fine Silver Recovered ---- Oz.

Fine Bullion Recovered --- Oz.

Fineness of Bullion ------ Au.
" " " ------ Ag.
" " " ------ Total

NOTE: Based on plant assays of bullion.

Notes re Operation of Winters Plant treating Harqua Hala Tailings.
12/6/41

Plant now tuned up and operating regularly, treating about 25 tons per day, all of which has so far been taken from the shallow pile in the low ground on north side of the old mill and main dump. This material said to assay about $3.50 per ton but not more than a few hundred tons left.

Tails are reclaimed by a little tractor with scraper attached and dragged to one of two tanks each about 40' by 6' wide and 6' deep into which tails are dumped through a 1" movable grizzly which is dragged along from time to time so as to distribute the feed and move about the thick pulp in the tank which amounts to about 25 tons of tails when filled with about 11 tons of weak cyanide solution (about 1# K cy. per ton of ore) and 3# to 4# of powdered charcoal per ton which is spread or bedded in thin layers as the tank is being filled and sinks as soon as it is wet through.

Leaching time now about 24 hours but Winters thinks that this could be reduced which would increase the capacity of the plant and by putting in more tank capacity he believes that 50 tons per day might be treated. The tailings now being treated average about 50% sands and 50% slimes (-200 mesh)

The tanks are emptied of the pulp by a small bucket elevator which lifts the feed to a shaking screen when the stones and chips etc. are removed and it then goes to a 6 cell Denver Sub A Flotation Machine from which the tails go to waste and the cyanide solution is found to be practically barren.

The concentrates (which contain about 50% of slimes and the charcoal) are discharged on two flat-bottomed bins with filter bottoms where they are sun dried and then picked up by hand and patted into

small cakes which further dry and solidify and are burned in an incinerator which leaves the slime and ash in which the gold is contained.

Concentrates might also be shipped to a smelter if treatment charge was satisfactory but at present it is proposed to melt down the burned residue with a flux and to use lead as a collector after which this could be cupelled as in a laboratory to produce a gold bullion.

Winters has sampled the big pile of tails and thinks that it will average about 1.75 but he finds that there is an enrichment near the top due to capillary action (?) and wind erosion and usually the top one foot will run $4.00, the next foot nearly $8.00 and the balance (some 12') only 1.20 or less, with no enrichment at bottom of pile.

He plans to treat this big dump or at least the upper 2 or 3 ft. of it.

His costs should be very low as he operates the plant with only one regular helper and a second man employed part time to clean up and handle the concentrates.

COSTS may be estimated:

	per day	per ton
Labor	$12.50	$0.50
Cyanide & Charcoal	6.25	0.25
Fuel for gas engine	2.50	0.10
Maintenance and repairs	5.00	0.20
Handling & shipping conc. etc. & miscellaneous		0.45
Plus 10% royalty		$1.50 per ton
		0.30

which should yield a nice profit if he is recovering even 80% of $3.50 but it does not appear that there will be much margin in treating the big dump. If this process were to be applied to low grade ore with a mining cost of 50¢ and a crushing and grinding cost of

25¢ plus extra cyanide etc. the total cost would probably be in the order of $2.50 per ton which would mean that the average value of the ore should be at least $4.00 in order that a satisfactory profit could be realized and therefore it is questionable if there would be any advantage in using the Chapman process as compared to standard practice, but this question merits further study and present plant is a very interesting experiment in which the main drawback seems to be found in the difficulty and expense of cheaply producing bullion from the concentrates.

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Cyanide & Charcoal	6.25	0.25
Fuel for gas engine	2.50	0.10
Maintenance and repairs	5.00	0.20
Handling & shipping conc. etc. & miscellaneous		0.45
Plus 10 % royalty		$1.50 per ton
		6.30

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HARQUA HALA MILL

SAND LEACHING (dry fill of 30 tons tailings per day)

Revised 9/27

Assumed value-- 30 tons @ $3.50 per ton-- $105.00

Assumed recovery with allowance for solution losses, etc.(73%)

	$77.50
Less royalty to owner	7.50
Net recovery	$70.00

Expenses	Per day	
Labor		
1 Superintendent, assayer, etc.	$7.50	
1 Engineer and Solution man	5.00	
1 Truck Driver etc.	4.00	
1 Cat Driver etc.	4.00	
1 Shoveller to level tanks etc.	3.60	
Emptying tanks (2 men)	9.00	
	33.10	
Workmens Insurance 5%	1.60	
	$34.70	
TOTAL LABOR		$34.70
SUPPLIES etc.		
Rental truck and tank for water	$2.00	
45# cyanide @ 17¢	7.65	
120# lime @ $1.25	1.50	
Zinc	.75	
Fuel oil 15 gal. @ 9¢	1.35	
Deisel Lub. Oil 1½ gal @ 60¢	0.90	
Gasoline for tractor and truck 20 gals @ 18¢	3.60	
Oil, grease etc.	1.00	
Repairs to equipment	3.00	
Cost of water at Salome	0.55	
Assay and office supplies	0.50	
Rails and ties for sand track	1.00	
Express and treatment of clean up	1.50	
Miscellaneous	2.00	
	27.30	
Total expenses		$27.30
		$62.00

Net profit-- $8.00 per day

HARQUA HALA TAILINGS MILL

Aug. 31st, '34

Sample	AT's Taken	Total Wt. Beads	Ozs/Ton	Value Ton Gold at $35.00	Number Loads.
Mill Heads 8/25	2	.32	.16	$5.60	13
Red Hill 8/26	2	.32	.16	5.60	7
Red Hill 8/28-29	2	.28	.14	4.90	16
Mill Heads					
Sands					
Sands					
Slime Tails 8/24-25-26	2	.04	.02	.70	
Slime Tails 8/27-28-29	2	.06	.03	1.05	
Preg. Sol. 8/24-25	10	1.08	.108	3.78	
Preg. Sol. 8/26	10	.75	.075	2.62	
Preg. Sol. 8/27-28	10	1.03	.103	3.60	
Barren Sol. 8/24-25	10	.02	.002	.07	
Barren Sol. 8/26	10	.03	.003	.105	
Barren Sol. 8/27-28	10	tr	tr	.00	
Preg Sol. 8/30	10	.95	.095	3.32	
Barren Sol 8/30	10	.02	.002	.07	
East Red Hill-Lower	2	.06	.03	1.05	
" " " Upper	2	.06	.03	1.05	

Precipitate Treatment

At Jackson, California . . . Amador Metals Develops Economical Procedure for Making 990 Fine Bullion

S. E. Woodworth

Hamilton, Beauchamp & Woodworth, San Francisco

THE METHOD of treating cyanide precipitates at the plant of the Amador Metals Reduction Company, as in so many plants, is the result of intensive study to develop a standard procedure that would produce a marketable bullion at least expense and difficulty, and at the same time reduce slag losses to a minimum. A brief description of the process, therefore, should be of interest to the gold metallurgist and mill operator at large.

The Amador plant at present is treating about 8,000 tons a month of carbonaceous or graphitic tailing from the mill of the Argonaut Mining Company at Jackson, averaging $0.93 per ton. Precipitation is accomplished by zinc dust, fed to the Crowe solution circuit through a Merrill cone by a screw feeder. The de-aërated solution then passes to the suction of a centrifugal pump which discharges into a set of precipitation filter bags immersed in barren solution. This pump has a hydrostatic head of about 4 ft. upon its suction, because the Crowe tower is so placed that its discharge acts through a vacuum leg to give this effective head. No difficulty is experienced with oxidation of the de-aërated solution due to leaking of the solution-lubricated pump stuffing gland. Double precipitation bags are used. The outside bag is made of No. 12 duck and is 5¼ in. in diameter and 36 ft. long, with a sewed-in flat bottom. Effective filtering area is 4 sq.ft. The inside bag is slightly larger, so as to avoid all strain, and is made of the finest woven sheeting. With this arrangement 3.2 tons of solution per square foot of effective filtering surface can be precipitated a day at a maximum pressure of 4 lb. per square inch. The values of the solutions handled and consumption of major chemicals used are given in the accompanying table.

Cyanide consumption is chiefly accounted for by the fact that milling and collecting are done in water, which necessitates the elimination of a large quantity of barren solution. About 2.1 tons of solution are precipitated per ton of ore. Nearly 1 ton of barren solution is wasted for every ton of ore treated. Most of the lime is used for settlement purposes, although some small amount of 20-mesh granulated lime is charged with the sands as the tanks fill.

Clean-up Procedure

When cleaning up, each bag assembly is transferred to a lead-lined acid tank equipped with a mechanical agitator and there opened. Because the bags are lashed to cast-iron heads by twine, the contents are easily removed and the bags turned inside out and washed. The precipitate is treated with sulphuric acid. When no further action takes place, a filter aid known as "Hyflo" (a special brand of diatomaceous earth) is added in quantity equal to about 8 per cent of the weight of the precipitate under treatment, and the solids are allowed to settle. Clear liquor is decanted to a vacuum filter and the acid tank filled with boiling water. These contents are again agitated, then allowed to settle, and the clear liquor is decanted. After this solution has passed through the filter, the sludge is transferred to the same filter. The filter cover, composed of very fine sheeting which is placed over the filter paper laid on the permanent filter cloth calked into the periphery of the tub, is also given a light coating of "Hyflo" as soon as it is placed in position. This makes the sheeting impervious to precipitate. Prior to the use of this material it was difficult at times either to settle the precipitate or to filter the liquor. No attempt is made to remove all the soluble sulphates by washing with water before or during filtration, as the time cannot be spared.

No difficulty is encountered with the sulphates in melting, for this is done in a refractory-lined crucible which yields a bullion averaging 990 fine. As a result of experimentation by the staff with oxidizing slags in pots lined with various refractory materials, the Joseph Dixon Crucible Company, of Jersey City, N. J., became interested in the problem and developed, and is now manufacturing, pots lined with a material designated as J-50 refractory lining for use with a niter-manganese-lead-silicate flux. The slag loss with a high oxidizing flux, when used in these crucibles, should not exceed $0.10 per pound. Fusion is made in No. 125 pots, which are lifted from the furnace by tongs and block and tackle. To facilitate pouring the contents of the crucible, the tongs have a lug welded to the back of each clasping member, which lugs act as trunnions the moment they rest in the notched ends of the two uprights of the stand into which the crucible has been lowered. The mold rests on a carriage that can be moved forward for convenience of the melter.

Precipitate, after drying, is moistened with a water spray, mixed with flux, and finally forced through a screen so that all lumps are broken and a uniform mixture is assured. The moisture content of the mixture is just sufficient to avoid dusting. The pot is filled from a scoop, and as the charge melts and settles, more fluxed precipitate is added until the pot is well filled with a molten mass. Then the liquid sulphates float-

Value of Solutions—Consumption of Chemicals

		Dollars per Ton Solution
Average pregnant solution		$0.32
Average barren solution		0.0053
Precipitation efficiency	98.36 per cent	
Ratio gold to silver	3.34 to 1	

	Per Ton Ore	Per Ton Solution	Per Oz., Fine Bullion	Strength of Solution, per Cent
Zinc dust, lb.	0.0835	0.04559	2.260	
Lead acetate, lb.	0.00805	0.00415	0.161	
Sodium cyanide, lb.	0.233			0.025 — 0.02KCN
Lime, lb.	2.54			0.025 — 0.02CaO
Coal tar, gal.	0.244			
Water, tons	2.89			
Electric power, kw.-hr.	6.08			

ing on top of the slag are ladled into a conical mold and allowed to cool. They contain no gold or silver. Should any slag be ladled into these molds through carelessness, it sinks to the bottom of the cone and is saved when the solidified sulphate is rejected. If any fluxed precipitate remains, it is charged on top of the slag, and when melted the molten sulphates are removed before pouring.

Sampling

After thoroughly stirring the slag above the molten metal with an iron rod, a sample is taken and chilled in water and then bucked and panned. The quantity of prills observed indicates whether the charge is ready to be poured. When ready, the pot is removed and the slag and metal are poured into a bar mold, the overflowing slag being caught in a pan placed under it. As soon as the bar has cooled sufficiently, it is taken from the mold, then placed in water, where the slag is removed, and cleaned in the conventional manner. This is the finished bar and is not remelted prior to shipping. General practice at many plants is to pour the bullion into a conical mold, and then remelt or refine the bar if necessary. As no matte is made at the Amador plant, because of the high niter flux used, a remelting of the bars is unnecessary.

The economy of making and shipping high-grade bullion has often been questioned. Experience at the Amador plant has shown the practice to be both efficient and economical. Whether the precipitate be acid-treated or melted without previous treatment, the fineness of the bullion, if the charge be melted in a suitable refractory-lined pot or furnace with a highly oxidizing flux, does not change materially. However, the cost of melting untreated precipitate is greatly increased, owing to its larger bulk, which necessitates more fuel, labor, and flux. The quantity of flux used is based upon a percentage of the weight of the dried acid-treated precipitate as follows: Silica, including the filter aid, 12½ per cent; borax, powdered, 25 per cent; manganese dioxide, 2 per cent; fluorspar, 5 per cent; and crude niter, 40 per cent.

A Profit on Slag

Usually, the quantity of slag and fused sulphates formed is about half the weight of precipitate and has a value varying from $0.08 to $0.15 per pound. The assay of the slag may seem to be somewhat high, but over a year's run, producing bullion averaging slightly less than 990 fine in gold and silver, only 0.004 per cent of the value is retained in the slag and a large part of this is recovered at the smelter to which a yearly shipment is made. Incidentally, the yearly accumulation of assay slag and cupels is shipped profitably at the same time, chiefly for its lead content, although payment is obtained for the small amount of contained gold and silver.

The saving that can be effected by shipping very fine bullion can best be illustrated by a concrete example. For instance, take a 1,000-oz. bar of 700 fineness in gold and silver. The smelter "bar charge" will be $0.04 per ounce. In addition to this there is an alloy charge, and a charge based upon the number of fine ounces. For this comparison, these last two charges need not enter into the calculation. In the case of the 1,000-oz. bar, the "bar charge" would be $40, or $0.0571 per fine ounce of bullion. If this same quantity of fine bullion had been contained in a bar of 985 fineness, the bar would have weighed 710.6 oz. In this case the "bar charge" would have totaled $28.42, or $0.0406 per ounce of fine bullion. This shows a saving of $11.58 per bar, or $0.0165 per fine ounce of bullion. Another saving that would accrue to the shipper is the difference in shipping charges, which are based not upon value only but on weight as well.

If low-grade bullion is shipped, the smelter often penalizes the shipper when in its opinion the bar does not look uniform in composition or matte is attached to it. In such cases, lead is added to the bar and it is remelted to obtain a homogeneous sample. When this is done the regular "bar charge" is applied to the resultant weight of the remelted bar. Obviously, the increase in cost in shipping such bullion depends on the quantity of lead added.

Cost of Flux

As to cost of flux, there is no great difference between that of the high-niter mixture and that of the conventional sodium carbonate flux. An increased cost, however, is incurred for the refractory-lined J-50 crucibles. Using No. 125 pots, the additional charge over the plumbago crucible would be $6.25 per pot. As each pot withstands six to ten clean-ups, this additional cost per ounce of fine bullion is only a small item. Fuel consumption and melting time are about the same using either flux. Theoretically, the refractory-lined pot should require more time and fuel, as the walls are somewhat thicker and the heat transfer is slower. The difference, however, is so slight that it has not been noticed. Practically no liner corrosion takes place when using the flux described. The life of the pot depends on the degree of cracking, which can largely be controlled by slow, careful heating and cooling.

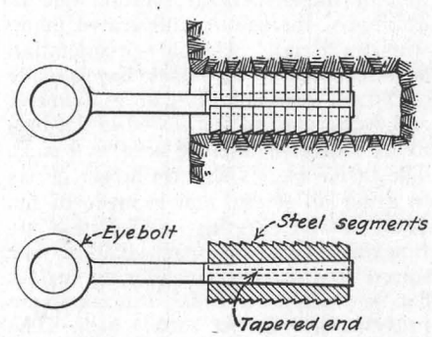
As soon as the last bar has been poured, the pot is returned to the furnace and allowed to cool with it. Failure of a pot liner while melting, which happens only when the pot has been used for too many heats, is apparent by the dense, white sulphur fumes driven off during violent boiling of the charge. This is caused by the interaction of the molten mass and the plumbago crucible. Under such conditions the charge should be transferred to another pot immediately.

Insurance is carried under a marine policy covering the value of the precipitate for all risks, from the time it is formed in the pipes leading to the bags until it is delivered to the smelter or mint. The cost of this policy is about 10c. per $100 value, the rate depending on the risk.

Self-adjusting Scraper-Block Eyebolt

AN IMPORTANT CONSIDERATION in underground scraping, to insure continuous operation at minimum cost, is to provide a practicable and simple tailblock eyebolt. Depending on the nature of the ground, two methods are employed. In soft ground the bolt is either cemented in, or suspended from, a boom or sprag-braced between the last cap and the breast, whereas in normal ground Lewis wedges are used to hold the eyebolt in place in the rock at the face.

Obviously, much time is consumed when a change of location is made, and often the bolt cannot be recovered, causing extra expense. This can be successfully overcome, in normal or hard ground, by using the simple eyebolt shown in the accompanying sketch. It consists, essentially, of the bolt proper,



containing a tapered tail, and two tempered steel segments. Pressure exerted at the eye of the bolt forces the segments against the wall of the opening, thus anchoring the bolt securely to the breast. A few blows of the hammer suffice to retire the taper to loosen the segments, after which the device can be extracted from the hole without difficulty.

HARQUA HALA GOLD MINING COMPANY, LTD.

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EXTRACTS FROM REPORT OF MR. THOS D. MURPHY, ASST. MANAGER
ON CYANIDE OPERATION - July 1 1895 to June 30, 1896.
Plant Started July 7 1895. Ran 281 days. 152.06

1895	Tons per day Tonnage	Assay Val. Pulp(heads)	Assay Val. Residue (Tails)	Val.per ton saved	% extracted	Bullion Realized
July	1,678	4.61	1.04	3.57	.76	$3,336
August	2,872	3.78	.87	2.91	.77	4,896
September	3,974	4.08	.78	3.30	.80	7,677
October	3,738	4.27	.69	3.58	.83	12,233
November	4,142	4.25	.62	3.63	.85	13,614
December	4,054	4.26	.74	3.52	.83	13,258
January	4,210	4.66	.74	3.92	.84	15,809
February	3,980	4.41	.84	3.57	.80	12,052
March	2,896	4.24	1.23	3.01	.71	4,672
April	3,000	4.43	1.81	2.62	.59	6,660
May	4,068	4.13	1.40	2.73	.66	6,555
June	4,118	3.36	1.17	2.19	.65	7,422
Totals	42,730	4.20		3.21	.76%	$ 108,189

"Considerable copper was encountered in the new tailing and poor results were obtained for a time, but they have since improved and prospects are now more hopeful for the future, as the copper portion of the tailing is fairly well worked out. I would estimate that there are 30,000 tons of good working material still on hand, or eight months run.".

Present value $7.35 which should represent the Red Hill.

"The slimes in the old bed were run in spots instead of being distributed as they were in the new bed. Some waste has occurred this way as it is impossible with our facilities to handle all the slimes, and with these and the low grade copper mixed tailings the original estimate will be cut down ~~to~~ about 20,000 tons."

ANALYSIS OF COSTS

Labour	Cents per Ton T	Supplies	Cents per Ton
Supt. & Forman	7.29	Cyanide of Potash	26.63
Experts	3.32	Fuel	12.87
Shift boss & Helpers	8.04	Lime	4.40
Assayer & Melter	3.92	Zinc	0.61
Fireman & Mine Pumpers	5.63	Sundries	1.55
Signal, Tailing & Scraper men	7.06	Tramway & Engin repr.	1.18
Stable, Watchman Blacksmith, Wood Piler	5.38	Packing, Waste & Lubricants	.66
		Assay Office	2.42
		Freight & Express	3.84
		Telegraph & Postage	.76
		Stables	5.06
	54.58¢		59.98¢
Total 23,320.31		Total 25,631.67	

Labour	.5458
Supplies	.5998
	1.1456

SMITH-EMERY COMPANY
Chemists-Engineers
920 Santee Street
Los Angeles, Calif.

Order No. 143486-94 Date October 5, 1933.

W. L. Hart,
387 North Second Avenue,
Phoenix, Arizona

REPORT

Our Mr. W. C. Bass, in company with Mr. Charles P. Lynch, examined the tailing dump at the Bonanza Mine about eight miles South from Salome, Arizona. The purpose of this examination was to determine if these tailings could be cyanided at a profit; what method should be used, and the approximate cost of operation and of the necessary plant. The quantity and value of the tailings has been previously estimated as 30,000 tons of an average gold value of approximately $2.50 per ton (gold at $20.07 per ounce), and we are informed that this has been checked over by yourself and others and is accepted as correct. (now $4.375

We took nine samples from the dump primarily for the purpose of determining the physical condition of the material. These samples were taken from the side of pits dug through the depth of the dump. The approximate location of these pits is indicated on the blue-print map you submitted. These samples were assayed and are reported herewith under Laboratory Certificates Nos. 143486-143494. The average of the assays is $2.81 per ton in gold at $20.67 per ounce. The assay report describes the depth of the samples taken. (4.90

Percolation Tests

Percolation Tests were made on the samples of tailings taken by putting them in glass tubes of two inch diameter and about five feet high. A perforated rubber stopper was fitted to the bottom and a glass wool filler medium was placed above the stopper.

An inspection of Samples Nos. 1, 2, and 9 showed them to be largely slimes and it was self evident that this material could not be leached. In the other samples, lumps of slimes remained as such mixed with the dry sand. Observation of this condition together with the fact that in the dump slime strata occur interbedded with cleaner sand, suggests the possibility of separating the lumps of slime by screening on a shaking screen, using a comparatively coarse screen of 10 to 14 mesh. This screening would thus remove that part of the slimes which remained as lumps and break up the remainder of the slimes, and ultimately mix them with the sands, thus putting the material into a good condition for leaching. The screening would also remove roots and other foreign material from the product. We have accordingly conducted our percolation tests and have planned our method of treatment with a view of screening, as above described.

The Percolation Tests gave results as follows:

Sample	Slimes Removed on 14 mesh screen	Percolation Rate: Saturation through sands	Percolation Rate: Drop of Supernatant solution
No. 3	32%	1 inch per hr.	0.3 inch per hour
Nos. 4 & 5 (combined)	14%	2 " " "	0.7 " " "
No. 6	26%	4 " " "	1.3 " " "
No. 7	8%	5 " " "	1.6 " " "
No. 8	4%	10 " " "	3.3 " " "

The conclusions from the above tests and investigations are as follows:

Material represented by Samples Nos. 1, 2, and 3, from the Eastern end of the dump (near the high dump of cyanided tailings) cannot be leached. This represents a lot of material for Hole No. 1 was 12 feet deep and Hole No. 3 was 8 feet deep.

Material represented by Samples Nos. 4, 5, and 6 could be leached only very slowly. But if mixed with material such as samples Nos. 7 and 8, a satisfactory leach could be obtained. Samples Nos. 4, 5, and 6 are from the central portion of the larger dump where the material is about four feet deep.

Material represented by Samples Nos. 7 and 8 is readily leached. Sample No. 7 was from the Western end of the larger dump and the hole was four feet deep. Sample No. 8 was from the center of the smaller, more elevated dump at the West end. The hole was seven and one-half feet deep, but the bottom of the dump was not reached.

Sample No. 8 was tested by cyanide leaching and the results are reported by the accompanying certificate. The test showed that this material leached readily and gave an extraction of $3.82 per ton, or 88%.

Sample No. 9, from a hole about fifty feet North of Sample No. 8, was mostly slimes. It is evident that such material could not be leached. A cyanide agitation test on this sample showed an extraction of $1.24 per ton, or 85%.

It is evident that this dump carries variable values, from about $1.00 to $5.00 per ton; that it has a variable physical condition, from sands (mostly minus 40 mesh) to slimes; and that its depth varies from one foot to twelve feet or more.

We believe that cyanide leaching is feasible, if the slime lumps are screened out from the average material, and the areas of the dump where slimes predominate are left untouched. The proportion of the dump which can then be leached we estimate roughly as two-thirds of the whole. The profitable treatment by leaching is contingent upon the present higher price for gold.

The proposed method of handling is as follows: The material is to be moved to the plant either by scraping up to a central loading

point with a tractor and small scraper where it is dumped into a truck and hauled to the plant; or, preferably by using a larger wheeled scraper of one ton or more capacity, in which it is hauled direct to the plant. The material can be dumped over a horizontal grizzly at the edge of the upper stone wall, and dropped into a shallow inclined bin or platform below. From here it can be raked or drawn on to the head of a shaking screen. Hand feeding is used here because of the necessity of regulating the feed to the screen. From the screen the oversize (slime lumps, roots, etc.) runs to a tram car, in which it can be run a short distance to the dump. The principal part of the product which passes through the screen is carried by an elevator to a small bin located above the level of the tanks and just North of the North end of the row of leaching tanks. This bin can be small, of a capacity of two or three carloads. It is proposed to have a car track on a trestle about eight feet above the top of the leaching tanks and running lengthwise over the center line of the row of three tanks. Cars loaded from the bin will be trammed and dumped into any tank being filled. A better arrangement would be to have a travelling belt with tripper in place of the car tramway, but this involves too high a cost unless of course, it would be possible to get suitable second-hand equipment cheaply.

The tanks will be unloaded by dumping the tailings through two trap doors in the tank bottoms into tram cars in a tunnel beneath the tanks.

We list below equipment for the plant which can be obtained here, together with costs. This can be a basis from which to work in looking up second-hand equipment nearer to your property.

TANKS: (new, of galvanized iron, installed on your foundations or beds)

1.	Water storage, 12' dia. x 10' deep, cone cover - - - - -	$178.00
1.	Barren solution, 12' x 10', cone cover - - - - - - - - - -	178.00
3.	Leaching, 24' x 6' -	825.00
1.	Strong solution, 10' x 6", cone cover - - - - - - - - - -	82.00
1.	Weak solution, 14' x 8", cone cover - - - - - - - - - -	212.00
1.	Sump, 16' x 6", cone cover - - - - - - - - - - - - - - - -	212.00
	Cost of painting inside of above tanks with P.&B. Paint - -	200.00
	Filter Bottoms -	210.00
	Total - - - - - -	$2097.00

		New	Secondhand
1.	15 H.P. 4 cylinder LeRoy gasoline engine belt driven to a 10 K.W. Altenator, with instrument board - - - - - - - - - - - - -		$550.00
1.	30 ft. Elevator with 8" x 5" buckets (not cased) - - - - - - - - - - - - - - - -	$185.00	
	3 H.P. Motor - - - - - - - - - - - - - - - -	50.00	
1.	Shaking screen - - - - - - - - - - - - - - -	300.00	
1.	Cletrac Tractor with 5' Wheeled Scraper -		450.00
1.	2" Centrifugal Pump direct connected to 3 H.P. Motor - - - - - - - - - - - - - - - -	150.00	

(Con't.)

	New	Secondhand
1. 3" x 4" Myers Duplex Pump driven with 3 H.P. Motor (12 G.P.M., 350' Head) -	$152.00	
568' of 2" pipe - - - - - - - - - - - - - - - -	99.00	
Pipe Fittings - - - - - - - - - - - - - - - - -	107.60	
Pipe Tools and other tools- - - - - - - - - -	150.00	
Freight on above machinery, etc.- - - - - -	160.00	
TOTAL - - - - - -	$1350.60	$1000.00

We list below other necessary items with estimated costs.

	Estimated Cost
Preparing bases for tanks ----------	$200.00
Concrete reinforcement of upper stone wall for bin ----------	150.00
Bin ----------	100.00
Installation of machinery & mine pump and bin ----------	400.00
Trestle (requires 4000 B.ft. of timber) over leaching tanks ----------	400.00
Wiring ----------	50.00
Pipe installation ----------	200.00
Cost of shed over gas engine, etc. ------	300.00
Assay equipment ----------	300.00
Engineering (additional) ----------	300.00
Contingencies ----------	350.00
TOTAL ----------	$2750.00
GRAND TOTAL -----	7197.60

We have figured on using some of the light pipe (casing) at the mine for the water line, but for most of the solution piping would use standard pipe and fittings.

For the operation of the leaching plant we suggest the following plan:

The three leaching tanks (capacity 90 tons of tailing) will permit a four-day cycle of treatment if a tank is filled every other day and one discharged every other day. This work can probably be done by three men. In loading the tanks one man would handle the tractor and scraper, one man feed the shaking screen, and one man tram to the tank. The next day these men would unload the next tank.

The leaching and assaying would be handled by the man in charge, assisted by a helper who was a mechanic and general handy man. The helper would operate the gas engine and the mine pump, make any alterations in piping, repairing, etc. The main work would be done on the day shift, being so arranged that the percolation of the solutions would need but little attention at other times and no attention at night.

Estimated Cost of Operation: (45 tons per day)

	Per Day	Per Ton
3 men loading and unloading tanks ----------	$13.00	
1 mechanic ----------	5.00	
1 superintendent ----------	8.50	
Fuel, etc. for engine and tractor ----------	7.00	
General Expense ----------	5.00	
	$38.50	$0.85
Sodium cyanide ---------- @ 16¢ per lb.		0.27
Zinc ---------- Shaw @ 18½¢ per lb.		0.15
Lime ---------- @ 12.00 per ton (?)		0.03
		$1.30

If the average value of the tailing is taken at .12 Troy ounces gold, this gives a value at $20.67 of $2.48. But, at the present price of $31.80 per ounce, the value of the tailing would be $3.82. If we figure on an extraction in the leaching plant of 75% there would be recovered $2.86 per ton.

We have given some consideration to an alternate method of treatment in which the slimes would be separated from the sands in a Dorr Classifier, and the slimes treated separately in an agitator, then settled in a Dorr thickener and washed on an Oliver Filter. This would increase the cost of plant by at least $6000.00, using second-hand equipment, and the cost of operation to about $1.50 per ton. We believe that under present conditions the leaching plant is a preferable investment with its lower first cost and less complicated operation. If later conditions turn out to be favorable, such as an increase in the price of gold, the water supply is found adequate for an increased tonnage, and working conditions generally proved, then it might be desirable to put in the slime plant, even though its cost would be somewhat greater than if installed at present.

Respectfully submitted,

(Signed)

CHEMICAL & METALLURGICAL ENGINEERS

Might be well to screen and slimes & handle only sands as found as they remained in charge and to treat slimes

Finty says that mill can recover 80% values in the sands & 88% in the slimes. Reagents 1.5# KCN per ton & 2# of lime

Note re shortage of water (?)

SMITH-EMERY COMPANY
Chemical Engineers and Chemists
920 Santee Street
Los Angeles

Laboratory
No. 143493-4

Date October 5, 1933.

Sample Tailing

Received 9-28-33

Submitted by W.L. Hart
387 North Second Avenue
Phoenix, Arizona

Marked Sample Nos. 8 and 9
Sampled by Smith-Emery Co.
September 27, 1933, for
Bonanza Mine Dump.

REPORT OF CYANIDE TESTS

Percolation Test:

Sample No. 8 was cyanided by leaching after 4% of slimes lumps were removed by screening on a 14 mesh screen.

Height of column leached ----------	4 feet
Lime added per ton ----------	5 lbs.
Sodium cyanide in solution per ton ----	2.7 lbs.
Ratio of solution to ore ----------	1 : 2/3
Rate of Percolation, per hour ---------	10 inches
Rate of saturation of sands, per hr.---	3.3 inches

The solution was passed through the charge and drained twice in 48 hours. During the next 48 hours it was given two washes with water, each wash being equal to one-quarter the weight of the ore.

ASSAYS

	Gold	
	Ounces	Value at $20.67 per oz.
Heads ----------	0.21	$4.34
Discharged Tailing -------	0.025	0.52
Tailing sample after further washes ----------	0.15	0.31

Extraction:
Gold ----------$3.82 per ton, or 88.0%

Cyanide consumption = .9 lbs. sodium cyanide per ton of tailing.
Protective alkalinity in final cyanide solution = 2.3 lbs. per ton.

A sample of the solution taken after passing the ore once was assayed and it showed an extraction in solution of $3.72 per ton.

This material leached readily and the time of treatment could be reduced, probably to two days.

A careful determination for copper showed that the original tailing contained 0.086% and the final cyanide solution had dissolved 0.023%. This is not enough to seriously effect the treatment. While the copper content might gradually accumulate in the solutions, the worst result that might be expected would be that occasionally a fouled solution would have to be thrown away.

W. L. Hart,-2. Lab. Nos. 143493-4

AGITATION TEST

Sample No. 9, which was mostly slimes, was cyanided by agitating eight hours with two parts of solution containing 1.3 lbs. of sodium cyanide per ton of solution. lime was added in an amount equivalent to five pounds per ton of tailing.

An extraction was obtained of $1.24 per ton, or 85%. The cyanide consumption is 0.6 lb. per ton of tailing.

Respectfully submitted,

CHEMISTS AND ENGINEERS

SMITH-EMERY COMPANY
Chemical Engineers and Chemists
920 Santee Street
Los Angeles

Laboratory
No. 143485

Date October 6, 1933

Sample water

Received 9-28-33

Submitted by W.L. Hart
387 N. 2nd Avenue
Phoenix, Arizona

Marked From Bonanza Mine, Ariz.
Sampled by Smith-Emery Co.

DETERMINATIONS

	Grains per Gallon
Total Solids (at approximately 105° C) --	63.76
Copper (Cu) ----------	None
Arsenic (As) ----------	None
Heavy Metals ----------	None

COMPARATIVE CYANIDE CONSUMPTION TEST

A small cyanide test was run using this water and your sample No. 8.

The cyanide consumption was no greater than that obtained when using ordinary water.

Respectfully submitted,

(Signed)

CHEMISTS AND ENGINEERS

SMITH-EMERY COMPANY
Assayers and Metallurgical Engineers
920 Santee Street
Los Angeles

Gold, @ $20.67 per oz.
Silver, @ $ .40 per oz.

Sample Tailings, Sampled by Smith-Emery
Sept. 27, 1933.

Deposited by W.L. Hart

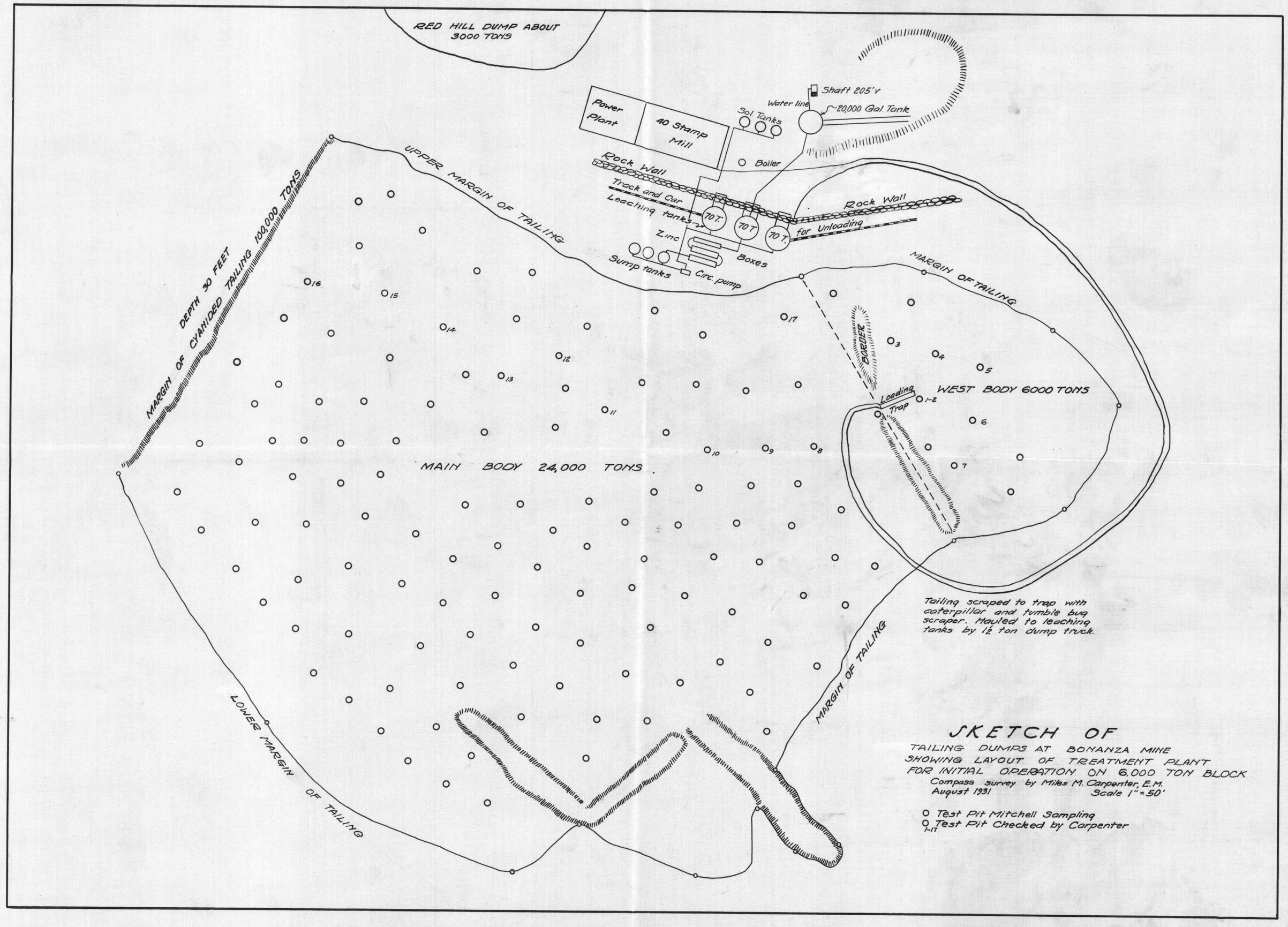
Date October 5, 1933.

Number	Mark	Per Ton of 2000 lbs. Gold Ounces	Gold Value	Silver Ounces	Silver Value	Copper %	Lead %	Zinc %
	From Bonanza Mine Dump							
143486	No. 1 Hole 12' deep, Slimes from 2' to 9' 6" ----------	0.18	$3.72	0.47	$0.19			
143487	No. 2 Hole 30" deep, mostly slimes -----	0.26	5.37	0.43	0.17			
143488	No. 3 Hole 8' deep, mostly sand to 3' depth Below Slime and sand strata about 50-50 --	0.14	2.89	0.43	0.17			
143489	No. 4 Hole 4' deep, mostly sand ---------	0.055	1.13	0.28	0.11			
143490	No. 5 Hole 30" deep 30% sand strata -----	0.07	1.45	0.28	0.11			
143491	No. 6 Hole 4' deep, mostly sand ---------	0.13	2.69	0.40	0.16			
143492	No. 7 Hole 4' deep, mostly sand --------	0.11	2.27	0.42	0.17			
143493	No. 8 Hole 7' 6" deep Mostly sand but with some finely alminated strata ----------	0.21	4.34	0.32	0.13			
143494	No. 9 Hole 3' deep, Mostly slime -------	0.07	1.45	0.25	0.10			

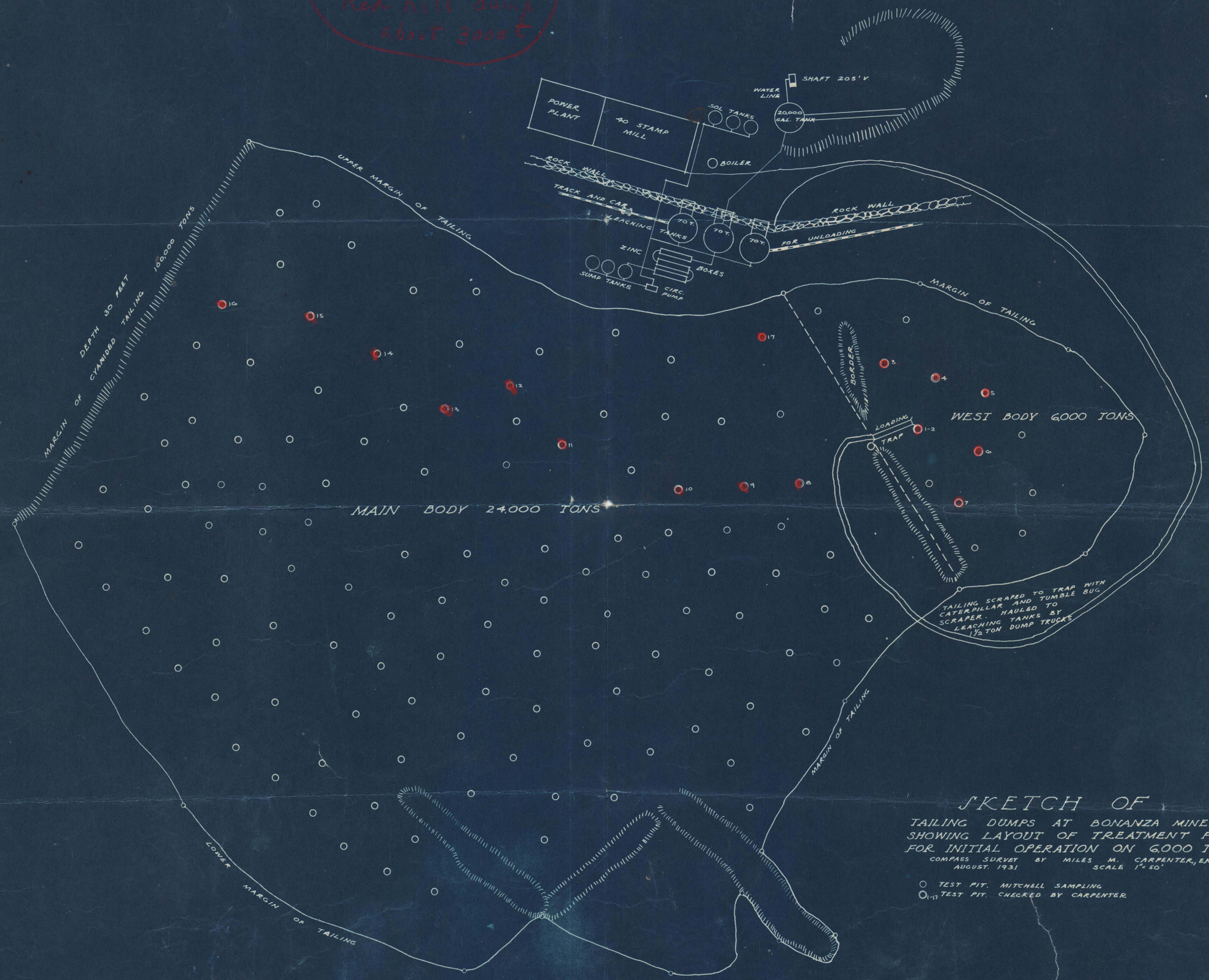
Respectfully submitted,

(Signed)

ASSAYERS AND METALLURGISTS


RED HILL DUMP ABOUT 3000 TONS
Power Plant
40 Stamp Mill
Sol. Tanks
Water line
Shaft 205'±
20,000 Gal. Tank
Boiler
Rock Wall
Track and Car
Leaching tanks
70 T.
70 T.
70 T.
Rock Wall
for Unloading
Zinc
Boxes
Sump tanks
Circ. pump
UPPER MARGIN OF TAILING
MARGIN OF TAILING
DEPTH 30 FEET
MARGIN OF CYANIDED TAILING 100,000 TONS
BORDER
Loading Trap
WEST BODY 6000 TONS
MAIN BODY 24,000 TONS
MARGIN OF TAILING
LOWER MARGIN OF TAILING
TRIM LINE
Tailing scraped to trap with caterpillar and tumble bug scraper. Hauled to leaching tanks by 1½ ton dump truck.
SKETCH OF
TAILING DUMPS AT BONANZA MINE
SHOWING LAYOUT OF TREATMENT PLANT
FOR INITIAL OPERATION ON 6,000 TON BLOCK
Compass survey by Miles M. Carpenter, E.M.
August 1931
Scale 1" = 50'
Test Pit Mitchell Sampling
Test Pit Checked by Carpenter

Red hill dump
about 3000 t



SKETCH OF

TAILING DUMPS AT BONANZA MINE
SHOWING LAYOUT OF TREATMENT PLANT
FOR INITIAL OPERATION ON 6,000 TON BLOCK

COMPASS SURVEY BY MILES M. CARPENTER, E.M.
AUGUST. 1931 SCALE 1" = 50'

○ TEST PIT. MITCHELL SAMPLING
○ 1-17 TEST PIT. CHECKED BY CARPENTER

Horpea Hau
file