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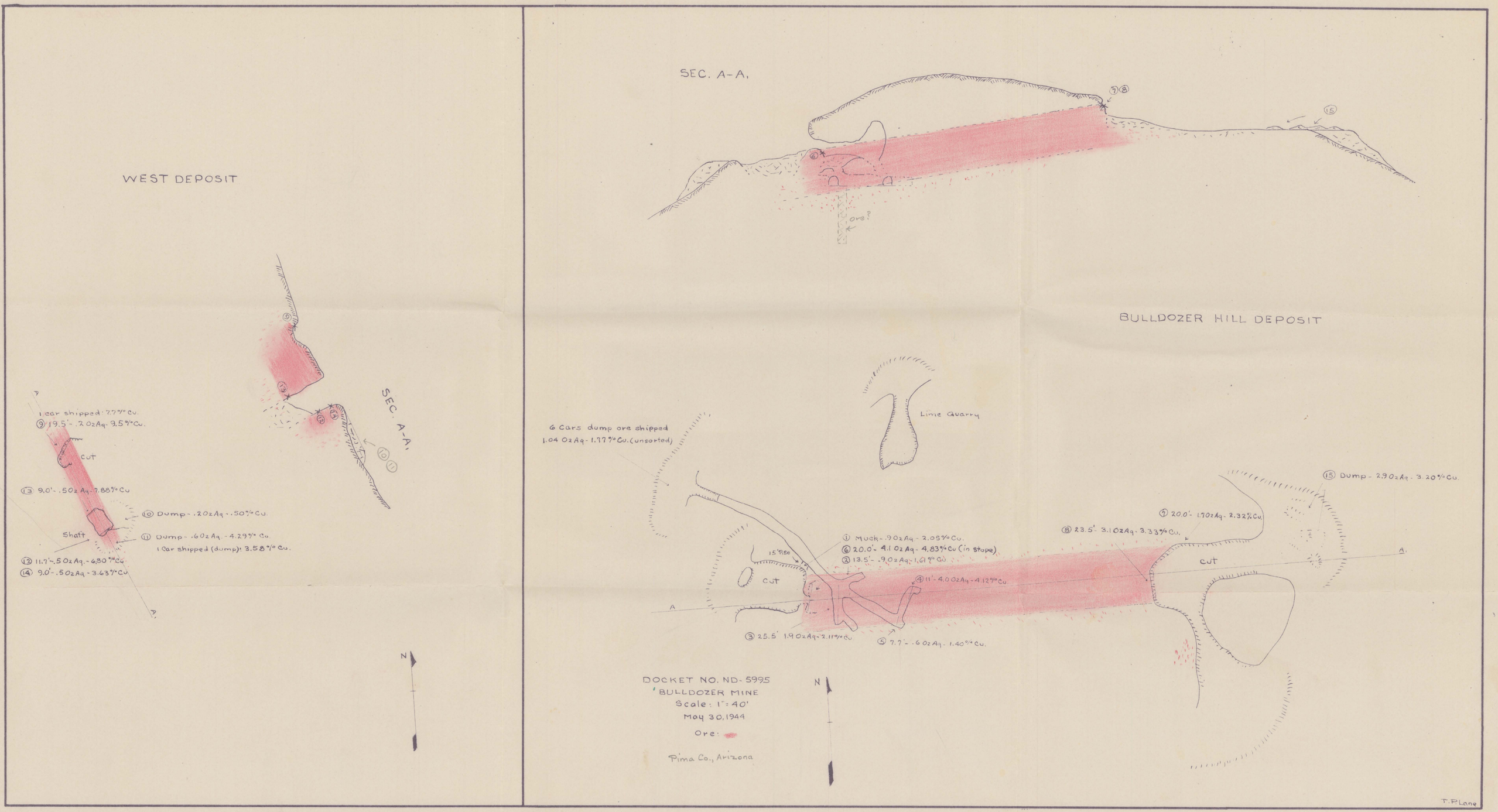
SEC. A-A.
7 8
15
6
ore?
BULLDOZER HILL DEPOSIT
Lime Quarry
6 Cars dump ore shipped
1.04 OzAg - 1.77 % Cu. (unsorted)
15 Dump - 2.9 OzAg - 3.20 % Cu.
7 20.0' - 1.7 OzAg - 2.32 % Cu.
8 23.5' - 3.1 OzAg - 3.33 % Cu.
1 Muck - .9 OzAg - 2.05 % Cu.
6 20.0' - 4.1 OzAg - 4.83 % Cu (in stope)
2 13.5' - .9 OzAg - 1.61 % Cu.
15' Rise
4 11' - 4.0 OzAg - 4.12 % Cu.
3 25.5' 1.9 OzAg - 2.11 % Cu.
5 7.7' - .6 OzAg - 1.40 % Cu.
cut
cut
A
A'
N
WEST DEPOSIT
SEC. A-A'
1 car shipped: 7.7 % Cu.
9 19.5' - .7 OzAg - 9.5 % Cu.
cut
13 9.0' - .5 OzAg - 7.88 % Cu
10 Dump - .2 OzAg - .50 % Cu.
Shaft
11 Dump - .6 OzAg - 4.29 % Cu.
1 Car shipped (dump): 3.58 % Cu.
12 11.7' - .5 OzAg - 4.80 % Cu
14 9.0' - .5 OzAg - 3.63 % Cu
A
A'
N
DOCKET NO. ND-5995
BULLDOZER MINE
Scale: 1" = 40'
May 30, 1944
Ore:
Pima Co., Arizona
T. P. Lane

RECONSTRUCTION FINANCE CORPORATION

WASHINGTON

325 Heard Bldg.
Phoenix, Arizona
June 27, 1944

GOHRING - Supervising Engineer - Mining Section RFC - 325 Heard Bldg.

Re: Sherwood B. Owens (Bulldozer Mine) Docket No. ND-5995

Pursuant to your request I am commenting as follows upon the questions contained in Mr. Rait's letter, dated June 21, regarding the proposed stripping and mining operations at the Bulldozer Hill deposit:

~~The proposed method of mining proposes to alternate strips and mine one.~~

~~plus~~

~~the ground which not hard~~

~~The ground is not hard but and is considerable fractured and ought therefore to break easily and yet stand sufficiently firmly to permit safely carrying the cut a safety to the indicated depth of the ore. The stripping will have to be carried 30 foot wall.~~

The ground is not hard and is much fractured and ~~ought~~ will therefore break out easily. At the same time it is sufficiently firm to permit with safety, carrying a vertical cut wall up to a height of 35 ft ~~depth~~ which is the apparent ~~maximum~~ ~~thickness of the overburden and somewhat less than the indicated thickness of the ore body~~ ~~+ the proposed~~ procedure is ~~therefore would~~ to carry a cut to ~~a~~ the depth of the overburden with vertical or nearly vertical walls, and with a width exceeding the width of the ~~ore~~ ore body by an amount which will ~~shelf or bench~~ provide a shelf or bench ~~at the top of the ore body~~ on each side of the cut at the top of the ore body. When the overburden is removed the ore would ~~then~~ be broken

by benching onto the cut in the flow of a ore, the face of the ~~which~~ ore cut being advanced down the gentle slope of the ore body. It would probably be advisable to ~~perform the stripping and mining jobs in alternation~~ alternately strip waste and mine ore, ~~keeping~~ maintaining the stripping operation well ahead of the ore mining operation. I have illustrated the proposed method by the attached sketches showing sections at each end of the ore body and at the point of heaviest overburden. This latter point occurs near the crown of the hill with the thickness of the overburden decreasing toward each end of the ore body and laterally down the hill on one side. I note that I projected

my section A-A, incorrectly from the plan on my original map called attention to the fact that this is consistent on the attached sketch. The length of the ore block is 235 feet instead of 200, and this consistent length and making the same allowance for material to be stripped, results in the new estimate of ore available in the block as previously made of (300,000 tons) and for material to be stripped 12,414 tons

It is not possible to calculate exactly the amount of stripping which would be required because of the fact that the presently visible boundaries of the ore show ~~where visible~~ while fairly definite ~~but~~ are not sharp, and in a large part of the deposit the boundaries are necessarily approximate projections. ~~The sketches show a ratio of stripped material to ore of about 2:1 in the section of greatest thickness of overburden, and a and at the upper end and at the lower end.~~

~~The sketches show that the~~

Mr. The sketches show that in the section of greatest thickness of overburden approximately 2 tons of waste will have to be removed for each ton of ore recovered. The ratios of waste to ore in the sections at the upper and lower end of the cut would be .34 and 1.14 : 1 respectively. By averaging all the sections it will be seen that the ratio of stripped material to material in the ore block would be 1.31 : 1 or 25,660 tons. However since a portion of the material in the ore block would not be recovered as ore the ratio of stripping to ore produced would be approximately $\frac{25,660}{12,418}$ or 2.11 Cost for breaking for waste and ore would be about the same and since the breaking would be a bench operation with a bench face of good height the duty per machine shift would be high. Some of the waste material in the shallow portion of the overburden could be stacked on the surface outside the cut and would be handled at somewhat less cost than the ore. Most of overburden from would have to be transported a short distance out of the cut and the cost for handling this material would exceed the cost for handling ore by the amount of the transportation cost (Ore haulage cost is estimated separately from mining cost).

In order to produce an amount of 50 tons of ore per day it would be necessary to remove approximately 150 tons of material per day.

~~In order to produce an average daily tonnage of 50 tons it would be necessary~~

~~My estimate of $1.50 per ton of ore shipped includes the cost of the stamp operation. This estimates that 1 machine~~ ~~machine shift~~ ~~in the cut will load the material at a cost~~

MP It is estimated that one machine, and ~~part of the time~~ occasionally 2 machines, in the cut will supply the broken material to the shovel and that, ~~with~~ including the shovel operator, ~~two~~ a crew of 3 men ~~would~~ will be able to ~~handle the job nicely make the~~ strip the necessary waste and produce an average of 50 tons of ore per day. This is not a high duty for this type of operation and nature of ground. ~~and it seems likely that the~~ ~~above total of~~ ~~will be exceeded.~~

MP ~~I estimate in my report a mining cost of $1.50 per ton of ore shipped based upon a~~ based upon ~~a~~ production rate of 50 tons of ore per day. The daily cost ~~this~~ estimate would be $75.00 classified as follows:

~~$1.50 per ton. The daily cost of 50 tons would be $75.00, the cost being about as follows:~~

1 Shovel operator	$ 12.00	
2 Miners @ 7.50	15.00	
	27.00	
Ins. at 10%	2.70	
Total labor		$ 29.70
Supplies & maintenance		30.00
Supervision and general		15.00
		$ 74.70

based upon only the 4 premium for copper,

Admittedly, the operation would be highly marginal, ~~based upon only the 4 premium for copper~~ Mr. P. I have assumed that dilution would not be great and would be offset by selection, and some sorting (with the shovel). I have assumed also that the ore ~~blocks~~ would be found to be continuous ~~one~~ between the end of the stoped area and the upper or east cut and that the grade of ore in this picture of the ore body would be about the same as in the balance of the workings in which sampling was possible. Obviously if either ~~any~~ of these assumptions proved to be incorrect in only small degree or if the rather closely figured cost proved too low on the unfavorable side, the narrow indicated margin of profit would be wiped out.

Upon reviewing the subject it seems to me that a decision to grant a loan would depend upon whether the urgency of need for copper ~~was~~ is sufficiently great to justify the risk of possible subsidization of the project in the amount of the loan, or a portion of it. In this connection I would call ~~attention~~ to the fact that over half of the amount of the loan would be expended for used machinery of a type which commands a high salvage value. The possible loss or amount of subsidization would therefore, except in the ~~reasonable~~ event that the assumptions and estimates are very much out of line ~~be quite~~ be small relative to the amount of metal produced.

(7)

unless it is because of a recently greatly lessened need for copper.

It is unfortunate that the Quota Committee has refused to grant a special premium to this project. When viewed in the relation of probable output to expenditure of labor and critical materials the project would seem to be far more eligible to receive a special price consideration than many less marginal producers who receive maximum premiums for operations which are conducted at relatively high labor and supply cost.

T. P. Lane

P

It is unfortunate that the Quota Committee has refused to grant a special copper premium price to this project and I presume that the reason is to be found in a recent lessening of need for copper. When considered in the relation between probable output and the expenditure of labor and critical materials the project would seem to be far more eligible to receive a special premium than many less marginal producers who receive maximum premiums. With a special premium I am sure that this would be a successful enterprise and would produce a large amount of copper.

Mr P

At a 10¢ special premium the dump ore could be profitably shipped and the break-even point

T. P. Lane

on the Bulldozer Hill ore would be well under 2% Copper.

Queen & Freeland

Lot	Tons	Oz Au p.t.	Oz Au Tot.	Oz Ag P/T.	Oz Ag Tot	Cu %	Cu Tot
1	47.51	.02	95.02	4.16	197.64	1.62	76.97
2	47.38	.03	142.14	5.81	275.28	2.02	95.71
3	52.61	.03	157.83	5.01	263.58	1.93	101.54
4	52.30	.03	156.90	4.31	225.41	1.69	88.39
5	59.07	.03	177.21	3.43	202.61	1.52	89.79
6	57.12	.03	171.36	3.97	226.77	1.58	90.25
7	57.33	.03	171.99	3.33	190.91	1.52	87.14
8	45.16	.02	90.32	2.58	116.51	1.36	61.42
9	51.21	.017	87.06	2.13	109.08	1.11	56.84
10	50.82	.015	76.23	1.99	101.13	1.15	58.44
11	53.17	.017	90.39	1.89	100.49	1.05	55.83
12	52.37	.012	62.84	1.31	68.60	.86	45.04
13	55.21	.01	55.21	1.54	85.02	1.01	55.76
14	52.92	.02	105.84	2.31	122.24	1.09	57.68
15	47.97	.03	143.91	3.05	146.31	1.41	67.64
16	52.34	.02	104.68	2.94	153.88	1.53	80.08
17	53.25	.03	159.75	3.70	197.03	1.63	86.80
18	53.26	.03	159.78	3.65	194.40	1.55	82.55
19	50.76	.027	137.05	3.27	165.99	1.47	74.62
20	55.26	.022	121.57	3.30	182.36	1.46	80.68
21	51.02	.026	132.65	3.86	196.94	1.60	81.63
22	49.19	.03	147.57	3.68	181.02	1.63	80.18
23	53.57	.03	160.71	3.16	169.28	1.46	78.21
24	54.39	.021	114.22	3.18	172.96	1.48	80.50
25	53.69	.018	96.64	2.79	149.80	1.28	68.72
			3118.87		4194.24		1882.41
	1358.84						
		.023			3.09		1.39

~~I would comment upon the content~~

Gohn

Re: "Shenandoah"
Docket No ND-5995

Pursuant to your request I am commenting as follows upon the questions contained in Mr. Rait's letter, dated June 21, regarding the captioned docket.

~~Stripping~~

It is not possible to calculate exactly the amount of stripping which would be required on the Bulldozer Hill deposit because of the fact that the presently visible boundaries of the ore body are while fairly definite are not shown. According to my measurements the maximum thickness of barren material under the crest of the hill would be about 30 ft (possibly 35 ft.), at the east end about 5 ft., and at the west end 16 to 20 ft. The average thickness would be about 20 feet, possibly 25 feet. If this latter figure was used together with the indicated width of the underlying ore body the stock of waste to be stripped would contain approximately

$$\frac{25 \times 30 \times 150}{12.5} = 9000 \text{ tons}$$

or slightly under the estimated available tonnage of the ore body (10,000). If human some allowance is made for the necessity to slope the sides of the cut near the surface it will be seen that the amount of material stripped would be somewhat larger than the above figure and the ratio of stripped material to ore would be somewhat greater than 1:1

~~The method of mining proposes to alternately strip waste and mine ore. The waste is to be hauled down to the top of the ore, ~~and~~ a considerable portion of waste, near the surface, would be ~~piled aside~~ stacked on either side of the cut by power shovel and the balance would be broken onto the floor of the cut, ~~and~~ loaded by the shovel and trucked ~~a short distance out of the cut.~~ a short distance out of the cut.~~

~~The method of mining proposes to alternately bench waste and ore onto the floor of the cut, the top of which would advance down the slope of the ore body. Some of the waste, near the surface, could be stacked on the surface on either side of the cut.~~

H The ~~proposed~~ method of mining proposes to bench the waste down to the ore and bench the ore onto the ~~bottom~~ floor of the cut. The stripping and ore breaking operations would be carried on alternately and the face of the cut would advance ~~on~~ down (~~up~~) the slope of the ore ~~shoots~~ body beginning in the present cuts at ~~each end of the deposit~~ the east end of the ore body. A portion of the stripped material would be ac stacked by the power shovel on the surface on ~~each~~ each side of the cut and the deeper waste material would be broken onto the floor of the cut, ~~and~~ loaded by the shovel

and transported a short distance out of the cut. The cost for ~~stripping~~ handling the deeper waste would be greater than for handling ore because of the need for transporting the ~~material~~ waste away from the cut (cost for hauling ore is estimated separately from mining). This greater cost because of this factor would be offset to some extent ~~by the fact that a part of the waste material, near the surface, need be handled at less cost~~

by the fact that stacking of a part of the waste material, near the surface, would be less costly than loading ore in the cut. The cost for breaking waste and ore would be about the same, ~~since~~ altogether, the cost for handling the stripped material would ~~not greatly~~ probably slightly exceed ~~mining cost~~. the cost for mining and loading ore.

~~Any estimate of a mining cost of $1.50 per ton of ore included the cost of stripping~~

The ground is not hard and is fractured and therefore ~~shattered~~ and ought to ~~to drill and~~ break easily and yet stand sufficiently firmly to permit carrying the cut safely to the indicated depth of the ore body. Breaking to a bench face of ~~4~~ fair height would give a high duty per machine shift and it is probable that one machine shift would break sufficient ore and waste (somewhat over 100 tons per day) to maintain an average production of 50 tons of ore per day. ~~It~~ → ~~estimate of $1.50 per ton of ore or 75 per day seems to me to be reasonable.~~

Mr P

My estimated mining cost of $1.50 per ton of ore shipped includes the cost of stripping, and it seems to me that $75.00 per day as a cost for both operations ~~is reasonable~~. would, with a sustained operation, be ~~reasonable~~ ~~a reasonable~~ a reasonable estimate.

Admittedly the operation would be highly ~~marginal~~ marginal with ~~no premium~~ only the "A" premium for copper. I have assumed that dilution would not be large and would be offset by selection, and sorting (with ~~aid of~~ the drill). I have assumed also that the ore block between the end of the stope and the upper or cross cut will average about the same as the balance of the ~~ore~~ workings in which ~~ore~~ sampling was possible. Obviously if either of these assumptions proved to be ~~only slightly~~ incorrect in only a small degree on the ~~Obviously these assumptions would not need to be~~

~~a slightly unfavorable~~

unfavorable side the ~~small~~ narrow indicated profit margin ~~would~~ would be ~~wiped~~ wiped out.

~~margin~~

~~Obviously these assumptions would need to be only slightly incorrect on the unfavorable side to~~

Upon reviewing the ~~matter~~ subject it would seem to me that ~~the decision to grant~~ a decision to grant the ~~of a~~ loan would depend upon which the urgency of need for copper were sufficiently great ~~to~~ justify the risk of possible subsidization of the ~~operation~~ project in the amount of the loan, or a portion of it. In this connection I would point to the fact that ~~somewhat~~ over half of the amount of the loan would be expended for used machinery (of a type) which commands a high salvage value. The possible loss ~~or~~ amount of subsidization would therefore, except in the ~~unprobable~~ event that the estimates are very ~~bad~~ much in error, be quite small ~~as compared~~ relative to the amount of metal produced.

~~Yours truly~~

T. P. Lam

Bill:

I think this should be sent air mail

T. P. L.

---

325 Heard Bldg
Phoenix, Arizona
June 27, 1944

GOHRING - Supervising Engineer - Mining Section RFC - 325 Heard Bldg.

Re: Sherwood B. Owens (Bulldozer Mine)
Docket No. ND-5995

Pursuant to your request I am commenting as follows upon the questions contained in Mr. Rait's letter, dated June 21, regarding the proposed stripping and mining operations at the Bulldozer Hill deposit:

The ground is not hard and is much fractured and will therefore break out easily. At the same time it is sufficiently firm to permit, with safety, carrying a vertical cut wall up to a height of 35 ft. which is the apparent maximum thickness of the overburden and somewhat less than the indicated thickness of the ore body. The proposed procedure is to carry a cut to the depth of the overburden with vertical or nearly vertical walls, and with a width exceeding the width of the ore body by an amount which will provide a shelf or bench on each side of the cut at the top of the ore body. When the overburden is removed the ore would be broken by benching onto the floor of a cut in the ore, the face of the ore cut being advanced down the gentle slope of the ore body. It would probably be advisable to alternately strip waste and mine ore, maintaining the stripping job well ahead of the ore mining operation. I have illustrated the proposed method by the attached sketch showing sections at each end of the ore body and at the point of heaviest overburden. This latter point occurs near the crown of the hill with the thickness of the overburden decreasing toward each end of the ore body and laterally down the hill on one side. I note that I projected my section A - A, incorrectly from the plan on my original map and call attention to the fact that this is corrected on the attached sketch. The length of the ore block is 235 feet instead of 200, and using this corrected length and making the same allowances previously made for ore already extracted (2000 tons) and for material to be discarded (30%) the new estimate of ore available in the block is 12,418 tons.

It is not possible to calculate exactly the amount of stripping which would be required because of the fact that the presently visible boundaries of the ore shoot while fairly definite are not sharp, and in a large part of the deposit the boundaries are necessarily approximate projections. The sketches show that in the sections of greatest thickness of overburden approximately two tons of waste will have to be

removed for each ton of ore recovered. The ratios of waste to ore in the sections at the upper and lower end of the ore would be .34 and 1.14: 1 respectively. By averaging all the sections it will be seen that the ratio of stripped material to material in the ore block would be 1.31:1 or 25,660 tons. However since a portion of the material in the ore block would not be recovered as ore the ratio of stripping to ore produced would be approximately $\frac{25,660}{12,418}$ or 2.11. Therefore to produce an average of 50 tons of ore per day it would be necessary to handle an average of approximately 150 tons of material per day.

Cost for breaking would be about the same for waste and ore and since the breaking would be a bench operation with a bench face of good height the duty per machine shift would be high. Some of the waste material in the shallow portion of the overburden could be stacked on the surface outside the cut and would be handled at somewhat less cost than the ore. Most of overburden however would have to be transported a short distance out of the cut and the cost for handling this material would exceed the cost for handling ore by the amount of the transportation cost. (Ore haulage cost is estimated separately from mining cost.)

It is estimated that one machine, and occasionally two machines, in the cut will supply the broken material to the shovel and that, including the shovel operator, a crew of 3 men will be able to strip the necessary waste and produce an average of 50 tons of ore per day. This is not a high duty for this type of operation and nature of ground. I estimated in my report a mining cost of $1.50 per ton of ore shipped based upon a production rate of 50 tons of ore per day. The daily cost then would be $75.00 classified as follows:

1 Shovel operator	$12.00	
2 Miners @ $7.50	15.00	
	27.00	
Ins. at 10%	2.70	
Total labor		$29.70
Supplies and maintenance		30.00
Supervision and general		15.00
		$74.70

Admittedly, based upon only the A premium for copper, the operation would be highly marginal. I have assumed that dilution would not be great and would be offset by selection, and some sorting (with the shovel). I have assumed also that the ore would be found to be continuous between the end of the stoped area and the upper or east cut and that the grade of ore in this portion of the ore body would be about the same as in the balance of the workings in which sampling was possible.

Obviously if either of these assumptions proved to be incorrect in only small degree on the unfavorable side, or if the rather closely figured cost estimates proved too low, the narrow indicated margin of profit would be wiped out.

Upon reviewing the subject it seems to me that a decision to grant a loan would depend upon whether the urgency of need for copper is sufficiently great to justify the risk of possible subsidization of the project in the amount of the loan, or a portion of it. In this connection I would call attention to the fact that over half of the amount of the loan would be expended for used machinery of a type which commands a high salvage value. The possible loss or amount of subsidization would therefore, except in the event that the assumptions and estimates are very much out of line, be small relative to the amount of metal produced.

It is unfortunate that the Quota Committee has refused to grant a special copper premium price to this project and I presume that the reason is to be found in a recent lessening of need for copper. When considered in the relation between output and the expenditure of labor and critical materials the project would seem to be far more eligible to receive a special premium than many less marginal producers who currently receive maximum premiums. With a special premium I am sure that this would be a successful enterprise and would produce a large amount of copper. At a 10¢ special premium the dump ore could be profitably shipped and the break-even point on the Bulldozer Hill ore would be well under 2% copper.

T. P. Lane
Supervising Engineer

bkb

325 Heard Building
Phoenix, Arizona
May 30, 1944

TULLY Ass't Chief - Mining Division- Washington

Re: Sherwood B. Owens - Docket No. ND-5995

I am enclosing herewith two copies of my supervising engineer's report on the captioned docket together with a copy of the application.

I would suggest that the Premium Quota Committee be contacted to learn the premium status with regard to this property. I have pointed out in my report that the Quota Committee has under consideration the applicant's request for a special copper premium. The indicated margin of profit on the 5¢ premium alone is rather narrow and the granting of a special premium would provide more surety for a successful operation and, more importantly, would result in a very much greater ultimate production of copper from the property. In the event that the Washington office of R. F. C. concurs in my opinions and recommendations a statement to this effect to the Quota Committee might assist that committee in reaching a decision regarding a special premium.

TRAVIS P. LANE
Supervising Engineer

TPL:ep
Encs.

COPY

325 Heard Building
Phoenix, Arizona
September 25, 1944

Mr. Sherwood B. Owens
P. O. Box 769
Tucson, Arizona

Re: Sherwood B. Owens
(Bulldozer Mine)
Docket No. M-5955

Dear Mr. Owens:

This will acknowledge receipt of your letter dated September 23rd. I am glad to learn that development of your west deposit looks favorable to you, and to note that your recent car shipment from there ran 5.29% copper.

I have referred your request for reconsideration of your loan application to our Washington office. I feel rather certain, however, that Washington would make no decision further than that already expressed unless you actually obtained the special premium on copper which you expect. And of course, as I told you the other day, I am not able to predict whether even with an additional price for your copper Washington would consider the copper situation sufficiently critical at the present time to justify granting a loan.

Regards.

T. P. Lane, Supervising
Engineer

TPL-bkb

bcc - D. M. Rait

No. 185 La

Phoenix, Arizona,

May 12, 1944.

CHAS. A. DIEHL

ARIZONA ASSAY OFFICE

Phone 3-4001 | 815 North First Street | P. O. Box 1148

This Certifies *That samples submitted for assay by* Mr. T.P.Lane. *contain as follows per ton of 2000 lbs. Avoir.*

No.	OWENS B MARKS Width	SILVER Ounces	SILVER Tenths	VALUE (Oz.)	GOLD Ounces	GOLD Hundths	VALUE (Oz.)	TOTAL VALUE Of Gold and Silver	% PERCENTAGE % COPPER	REMARKS
1	Muck		.9			.01	$.35		2.05	
2	13' 6"		.9		Trace		—		1.61	
3	25' 3"	1.	9			.01	$.35		2.11	
4	11' 0"	4.	0			.01	$.35		4.12	
5	7' 8"		.6			.01	$.35		1.40	
6	20' 0"	4.	1			.01	$.35		4.83	
7	20' 0"	1.	7		Trace		—		2.32	
8	23'5"	3.	1			.02	$.70		3.33	
9	19' 5"		.2		Trace		—		9.50	
10	Dump		.2			.02	$.70		.50	
11	Dump		.6		Trace		—		4.29	
12	11'8"		.5			.01	$.35		6.80	
13	9'0"		.5		Trace		—		7.88	
14	9'0"		.5		Trace		—		3.63	
15	Dump	2.	9		Trace		—		3.20	

Charges $ 30.00

Assayer ARIZONA ASSAY OFFICE

BAD

RECONSTRUCTION FINANCE CORPORATION
MINING DIVISION
REPORT OF SUPERVISING ENGINEER

Docket No. ND-5995
Date Authorized for Exam Rec'd
May 6, 1944
Date of Examination - May 9, 1944
Date of Report - May 30, 1944

1. NAME AND ADDRESS OF APPLICANT

Sherwood B. Owens
Box 769, Tucson, Arizona Correspondent: Same

2. CHARACTER OF PROJECT

The purpose of the loan is to provide funds for equipment and initial working capital for mining a copper deposit.

3. LOCATION OF MINE

The property is located in T 18 South, R. 15 East in the Helvetia Mining district, Pima County, Arizona. The mine is 33 miles by road southerly from Tucson. The nearest rail point is Sahuarita , 18 miles south by paved highway from Tucson and 15 miles from the mine by good dirt road with a few moderate grades.

4. APPLICANT

The applicant is a comparatively young man. He conducts a profitable trucking business in Tucson and previous to coming to Tucson two years ago he was engaged in oil field trucking and oil production for many years in Texas. He had no mining experience previous to his coming to Tucson. He is now operating the Papago Chief Mine, southwest of Tucson, under RFC loan (Owens & Freeland - Docket No. ND 8449). The project has been conducted in an efficient manner but has been unprofitable because of the disappointingly low values in the dump material shipped. He and his partner applied for an additional loan with which to develop the mine and a report with respect to the application was forwarded to RFC Washington on May 13, 1944.

Mr. Owens is an aggressive and thoroughly competent business man and the proposed development would undoubtedly be conducted in an efficient manner under his direction.

5. LOAN REQUESTED

$15,000

6. DESCRIPTION OF PROJECT

A. General Features

1. There is no mill on the property nor mine appurtenances, and there are no mine workings which are not confined within applicant's ownership.

2. The proposed project would comply with State compensation and safety-first statutes.

3. There are no apparent legal discrepancies in the project.

4. There are no impeded right-of-way facilities.

5. There is no liklihood of surface or sub-surface trespass during the project.

B. Existing Development

1. The mine is opened by cuts, a tunnel, and several comparatively shallow shafts.

   a. The applicant furnishes a rough claim map and a sketch of the workings. The sketch which accompanies this report was made from a compass and tape survey of the workings.
   b. Formation samples were cut with pick and moil and gathered on canvas. Dump and muck were taken by shovel.
   c. The principal workings were mostly accessible and in good condition.
   d. General Features of Deposit, etc.
   The property consists of one patented claim, and is held by the applicant under a lease and option to purchase agreement with the owner.

   A duplicate original copy of the agreement is furnished with the application.

   The historic data so far as available is covered in the application and the applicant presents a letter which he obtained from Mr. Forbes which describes in a general way the operations at the property since 1899. Mr. Forbes is an elderly man who formerly held public office in the county. His character is esteemed highly in the community.

   Summarizing briefly: Work at the mine was begun in 1879 and some high grade ore extracted and treated in a smelter which was built upon the property. Some time in the early nineties the property changed hands and was operated intermittently during periods of high copper prices until 1916 when an individual leased it and made a substantial production during the several war years following that date. Since the termination of the war the mine has been worked on a small scale at intermittent intervals. In March of the present year and just prior to acquisition of the property by the applicant an individual shipped a carload of ore which assayed 7.61% Cu. The applicant has recently shipped 7 cars of dump material. Except for these recent shipments there are no records available as to tonnage or grade of ore produced. Judging by the size of the mine openings, the grade of present ore exposures, the size of the present smelter slag dump (much of this has been shipped away) and the amount and grade of discarded copper bearing material on the dumps the past production must have been substantial. The bulk of this production was made when transportation and marketing conditions were less favorable than at the present time and it seems probable that the ore smelted at the property or shipped out was at least moderately high grade (5% Cu or more)

   The ore producing formations of the district are carboniferous and older limestones bordering a granite mountain mass containing porphyritic intrusions. The copper mineralization on the subject property occurs in a gray limestone underlain at shallow depth by granite. In places the limestone is fractured and crushed and is greatly altered

by silification with, on the surface, considerable garnetization. Copper mineralization occurs as replacement in varying degrees in numerous areas of fracturing and alteration on the property. The major development of the property has been performed in two such areas known as the "bulldozer hill deposit," and the "west deposit" on a flat near the base of the hill. The bulk of the production has been made from these two deposits principally from the bulldozer hill deposit. The deposits are described specifically as follows:

The Bulldozer Hill deposit occurs on a low moderately steep circular hill or dome several hundred feet in diameter. The formation is limestone which is much fractured with irregular copper mineralization throughout most of the limestone. A concentration of mineralization, or shoot of ore, occurs in a low dipping bed on the NW side of the hill. The ore shoot passes thru the hill near its crest and has been mined by open cuts at both ends and by a tunnel and some stoping in its lower central portion. The bed is capped by barren or nearly barren material varying in thickness from 5 ft. in the east end to 30 feet in the center. An island or horse of waste was left in the center of the east cut and two dumps here contain a considerable amount of low grade copper ore. The most southerly of the dumps is coarse and contains many large fragments of good ore. The dump contains approximately 800 tons and it is estimated that between 200 and 300 tons of 3% copper ore can be recovered here. The material was too coarse and mixed to be practicably sampled but the above estimate appears reasonable. The main part of the northerly dump is made up principally of low grade or waste material derived from stripping. However, a considerable amount of second class ore and sortings lies on top of the dump and a shovel sample here representing an estimated 150 tons assayed (sample No. 15) 2.9 Oz. Ag., and 3.20% Cu. It seems possible that a considerable amount of the main dump amounting to 1000 tons or more will be shippable on a special premium price.

Samples Nos. 7 and 8 were cut across the west exposure of the top of the ore shoot in the east cut. The lower part of the cut face here was filled with debris and therefore could not be sampled. The samples were cut across widths of 20 feet and 23½ feet and assayed respectively:

1.7 oz. Ag.	2.32% Cu.
3.1 oz. Ag.	3.33% Cu.

Sample No. 7 was cut diagonally across the ore body and represents a formation width of approximately 10 feet. The weighted average across ~~335~~ 43.5' is

2.68 oz. Ag.	3.02% Cu.

A considerable amount of ore has been mined from a cut in the hillside on the west or lower end of the ore shoot. The cut is completely filled with debris and no ore exposures were visible. An opening under the barren capping (some 15 feet thick here) connects with a stope from the tunnel workings. The debris in the cut contains some copper but is quite low grade. A dump from the cut, however, amounting to approximately 500 tons appears to contain about the same grade of copper material as does the tunnel dump, described below.

A tunnel was driven into the east side of the hill and at 60 feet encountered the ore shoot. The shoot was explored by a short extension of the tunnel and a small amount of crosscutting, and some stoping was done above the tunnel. The stoping was extremely irregular and quite evidently aimed at selection of the richer ore only. The silicified limestone of the ore shoot is greatly fractured and in places is intensely brecciated. The ore is blue in color due to the presence of azurite and considerable blue chrysocolla. Some malachite is present and occasional black oxide of copper (melaconite) and, in rare spots, flakes and thin wire native copper.

Sample No. 1 was a grab from muck in a 15' irregular inclined raise on the north edge of the ore shoot. The muck partially filled the raise and the muck sample was deemed more representative than would be the case if cut samples were taken. The material assayed:

.9 oz Ag.	2.05% Cu.

Samples Nos. 2 and No. 3 were cut in crosscuts as shown on the sketch accompanying this report and represent values across the width of the ore shoot at this place. The samples assayed respectively:

.9 oz Ag.	1.611 % Cu.
1.9 oz. Ag	2.11 % Cu.

and the weighted average is

1.55 oz. Ag.	1.94 % Cu

across 39 ft. Sample No. 1 was cut somewhat obliquely across the ore shoot and the actual width of the ore body here is approximately 35 feet.

Sample No. 4 eleven feet in width, was cut across a good showing of ore in a crosscut north from the end of the tunnel and assayed: 4.0 oz. Ag - 4.12% Cu. Good ore continues in the wall beyond the north end of the crosscut.

South from sample No. 4 a barren width of 8 feet in the east wall of the crosscut was not sampled. The material was blocky massive silicified limestone and could easily be discarded during mining operations. The back and the south wall of the crosscut contained low grade material. Sample No. 5 was cut across the balance of the crosscut and drift south from here. It assayed

.6 oz Ag.	1.40% Cu

across 7.8 feet. The ore shoot here has a width in excess of 26 feet and the weighted average (excluding 8 ft. of barren material) is

2.60 oz Ag	2.98% Cu

across 18.7 ft. of ore.

The weighted average of the two sets of samples across the ore body is 1.92 oz. Ag - 2.30 % Cu. In considering this average assay for the ore exposure on the tunnel level attention is called to the fact that good ore continues in the wall beyond the best sample (No. 4). As stated above this barren material could easily be excluded from shipments, and also, here and there in the other samples blocky patches of waste or very low grade material could be excluded. I believe that in mining this material the grade therefore can be held well over the grade shown above.

Several irregular stopes (an estimated 2000 tons in total was stoped) were opened on better portions of the ore body. One of these stopes has caved out 6 or 8 feet into the capping above the ore body but does not open to the surface. The ore body at this place measures 30 feet in thickness above the tunnel floor, and the ore below here and in the balance of the tunnel workings extends into the floor of the tunnel level. A 40 feet winze, now filled and exact location not known, is said to have been all in one. The stopes were either drawn empty or so badly caved that systematic sampling was not possible. The material in the walls and back of the stopes could be seen to be higher grade than on the level with the exception of the material of sample No. 4. (The degree of blue coloration of the material affords a practical measure for rough comparative estimates). Sample No. 6 was cut across 20 feet in the west end of a 20' x 20' stope which connects with the west open cut by an opening in the capping on top of the ore. The ore is not opened to full width laterally and ore similar to that sampled continues into each wall of the stope. The s ample was 20 ft. wide and assayed:

4.1 oz Ag. 4.83% Cu.

Considerable ore of about this grade appears to remain available in the stope.

The dump at the portal of the tunnel is estimated to contain approximately 1000 tons of medium to fine material and contains appreciable copper throughout. The applicant has shipped six carloads from this dump without sorting. Settlement sheets show that the shipments contained 317 tons assaying

1.04 oz. Ag 1.77 % Cu

The <u>West Deposit</u> is located in a flat area some 500 feet northwesterly from the bulldozer hill deposit. Copper mineralization and some production has been made from a vertical shaft said to be 60 feet deep and a small surface cut 60 feet northwest from it.

This deposit is quite different than the bulldozer hill deposit. The copper occurs in the form of malacite, azurite, and chrysocolla and melaconite in a very highly altered silicified limestone. The material is crumbly and flaky and by reason of its porous nature it is very light in weight. The ore is light blue-green stained throughout and contains generally a network of seams and veinlets of black oxide of copper with occasional small masses of the black oxide. The black oxide accounts for the major part of the copper value. Silver content is quite low.

The shaft is caved and filled to within 30 feet of the surface. The hole is 18 feet long and about 12 feet wide.

Sample No. 12 was cut across the southeast wall of the shaft near the top of the fill and 16 feet below the surface. Sample No. 14 was cut 5 feet below the surface in the same wall of the shaft. Sample No. 13 was cut across the northwest wall of the shaft 5 feet above the fill and 25 feet from the surface. The samples assayed as follows:

Sample No.	Width	Oz. Ag.	% Cu.
12	11.7	0.5	6.80
13	9.0	0.5	7.88
14	9.0	0.5	3.63

The southwest wall of the shaft was firm rock. The northeast wall was soft flaky altered material containing some copper mineralization. At sample No. 13 the ore limit was not reached in the northeast wall. Above here the northeast wall was soft flaky altered material containing some copper mineralization and the limit of the ore in this direction was not certainly indicated in either of the two samples (Nos. 12 and 14) on the southwest wall of the shaft.

At a distance of 60 feet north-westerly from the shaft an open cut was made upon what apparently is the trend of the shaft ore. A carload was shipped from here just prior to the acquisition of the property by the applicant. A settlement sheet shows that the shipment contained 33 tons assaying 0.21 oz. Ag and 7.7 % Cu. A sample (No. 9) across the face of the cut assayed 0.2 oz. Ag - 9.50% Cu. The sample was 19.5 feet in width cut obliquely across the ore trend. The corrected true width of the ore is approximately 14 feet. The face here was uniformly green colored by malachite and contained much black oxide of copper.

A weighted average of samples Nos. 9 12 & 14 combined, and 13 is as follows:

Width	Oz. Ag	% Cu
11.1	0.4	7.80

The applicant shipped one car from the shaft dump. The settlement shows that the shipment contained 49 tons assaying no silver and 3.58 % Cu. The dump was shovelled without sorting and it is estimated that about 100 tons more of this same material is available in the dump. A shovelled sample (No. 11) assayed: 0.6 Oz. Ag. - 4.29% Cu.

Sample No. 10 was shovelled from a waste portion of the dump which showed some copper. It assayed .50% Cu.

The flat surface in this area is covered by several feet of dirt and it would be necessary to strip and trench the area to determine the extent of the deposit. The 60 foot shaft is reported to have been in good ore all the way to bottom and a crosscut 30 feet easterly from the bottom is said to have been all in ore assaying 5% Cu.

A vertical shaft said to be 115 feet deep was sunk some 250 feet southeasterly from the above described shaft and it is said that sulphide ore was developed in a crosscut from the bottom. The shaft is partially filled and inaccessible. The dump, however, shows no evidence that any important body of ore was encountered in the shaft workings. The shaft is partially filled and is inaccessible.

There were no other ore showings of interest on the property.

The slag dump at the old smelter site contains approximately 1200 tons. A considerable amount of this slag was hauled out in bulk to another smelter many years ago, and portions of the dump have been screened and picked and it is said that shipments assaying up to 15% Cu. were made. It is estimated that the dump will average 2% or more Cu. The dump was not sampled but the estimate seems reasonable in view of the extremely poor character of the fusion and the fact that the ore treated was probably comparatively high grade. If the project were granted a special premium for copper it is probable that at least a portion of the dump would pay to ship provided, of course, the material would be acceptable at local custom smelting plants.

C. Proposed Development

1. The applicant proposes to mine the two deposits by open cut method using a gas engine driven shovel. No mine development is proposed and no preparation for mining the ore bodies will be required beyond a small amount of shallow initial stripping. Further stripping will be carried on simultaneously with ore extraction.

2. Mining by power shovel is the most feasible manner to work the deposits in their presently indicated limits and the applicant, by reason of his long experience in handling earth-moving equipment and operations is well fitted to conduct this type of operations.

3. It is expected that shipments will begin at a rate of 1200 tons per month and eventually reach a rate of upwards of 3000 tons per month.

D. Equipment

1. There is no equipment upon the property.

2. Not applicable.

3. Not applicable.

4. The applicant proposes to purchase a Model 400 P & H 5/8 yard shovel, a compressor and drilling equipment.

5. No mill installation.

6. There are no housing facilities on the property.

7. No camp or other construction is contemplated beyond a shop and tool shed, and wooden platforms for several tents.

8. A small amount of road construction and rehabilitation on the property is proposed.

E. Cost Estimates

1. Mining will be open cut methods.

a. Mining cost on an anticipated initial shipment rate of 1200 tons per month is estimated at $1.50 per ton for the Bulldozer Hill deposit and $1.00 per ton for the West deposit. These estimates include stripping and sorting expense, and amortiz ation of equipment. Eventual production rate will probably be substantially higher and ought to result in a considerable reduction in the mining cost.

b - g. Not applicable.

h. Trucking ore to Sahuarita is estimated by the applicant at $1.50 per ton. The haul is fifteen miles over good road with few and moderate grades. With sustained volume production the trucking charge would be lower possibly $1.00 per ton. A figure of $1.25 would appear to be a reasonable estimate.

i. Railroad freight charge to the Hayden plant of the A. S. & R. Co. is $1.40 per ton, and to the El Paso plant of this company $2.70 per ton. In the event that the A. S. & R. Co would not accept the full tonnage output of the mine at the Hayden plant it is probable that some of the ore would be diverted to their El Paso smelter and that the company would absorb a large part, and perhaps all, of the freight differential.

A possible outlet for the ore would be the Douglas smelter of the Phelps Dodge plant but shipments to this plant would be on a contract basis which would be entered into by that company only after the shipper had demonstrated his ability to furnish a substantial rate of output (2500 tons monthly minimum). The freight rate to Douglas is $1.00 per ton from Vail, Arizona, which is about the same distance as Sahuarita by road from the mine.

Still another outlet for the ore would be available at the International Smelter at Miami. The freight rate in this case would be $2.20 per ton.

j. Smelter treatment charge at the Hayden or El Paso plant (probable) of the A.S & R Co. would be $2.50 per ton. Treatment charge at the Douglas smelter and at the International Smelter would be $3.50 per ton.

k. Royalty is 10% of smelter net and would probably apply on the 5¢ copper premium.

l. No timber would be required.

m. Total cost per ton shipped to Hayden would be about as follows:

Bulldozer Hill Deposit

Mining	$1.50	
Trucking	1.25	
Freight	1.40	
Treatment	2.50	
Royalty	.50	(10% of estimated smelter net, see below)
Total	$7.15	

West Deposit

Mining	$1.00	
Trucking	1.25	
Freight	1.40	
Treatment	2.50	
Royalty	.62	(10% of estimated smelter net, see below)
Total	$6.77	

In the event shipments were made to Douglas or to Miami, the above estimated costs would differ by the amount of difference in freight rates and royalty charges, and would be about as follows:

	Total Cost	
	Shipped to Douglas	Shipped to Miami
Bulldozer Hill Deposit	$7.72	$8.81
West Deposit	7.34	8.42

2. Inapplicable.

3. Approximate premium for industrial insurance is estimated at $75 per month.

F. Ore Reserves

1. Tonnage - Bulldozer Hill Deposit

Approximately 10,000 tons appear to be reasonably assured in the Bulldozer Hill deposit. Values in the cuts at both ends of the deposit and in the tunnel workings suggest the strong probability that ore values will persist in the block between the tunnel workings and the upper or east cut. The above tonnage estimate is based upon an ore block 35 feet wide, 30 feet thick and 200 feet long on the dip, or

$$\frac{200 \times 35 \times 30}{12.5} = 16,800 \text{ tons}$$

Approximately 2000 tons in the above block has been stoped out in the tunnel workings and of the remainder it is estimated that about 30% will be discarded as barren or submarginal material. Tonnage of shipping ore available therefore would be: (16800- 2000) x 70% or 10,360 tons. This tonnage estimate does not take account of the fact that the floor of tunnel level

within the lateral limits of the ore shoot is still in ore and that a 40 foot winze is reported to have been in ore.

West Deposit. Approximately 2500 tons appear to be reasonably assured in the West deposit. This estimate is based upon the ore exposures in the shaft and cut at this place and assumes an extension of ore 10 feet beyond the end exposures and 10 feet below the shaft fill. The tonnage in the block is calculated as follows:

$$\frac{80 \times 12 \times 40}{14} = 2560$$

This tonnage estimate does not consider the fact that the ore is probably wider than shown by the sampling, nor the reports regarding ore in the deeper part of the shaft. These reports appear to be authentic and are supported in part at least by the amount and grade of the material on the dump (see applicant's carload shipment (3.58% Cu) and dump sample No. 11). As explained earlier in this report it is impossible to estimate the extent of the deposit in its present state of development. It seems probable however that the amount of ore available here will prove to be considerably larger than the 2500 tons estimated above. The method of mining proposed by the applicant would be feasible only for a shallow depth and if the deposit proved to extend to any considerable depth an underground method of mining will be required, with of course a substantial increase in the mining cost.

Dump Ore: The returns from the applicant's shipments of unsorted dump material from the tunnel workings and the West deposit, together with the appearance of the upper dumps, and the grade of dump samples, Nos. 11 and 15, suggest that with a special premium price for copper a substantial amount of copper is recoverable in the dumps. The dump tonnage available is estimated at 2000 tons which will assay approximately 1.10 oz Ag. and 2.0 % Cu. Probably several hundred tons of dump material could be shipped at 3% Cu.

Smelter Slag: Tonnage and probable value of smelter slag were discussed earlier in this report. Under favorable price and marketing conditions it seems likely that this material could be profitably handled.

2 & 3. Values and Indicated Profit

Bulldozer Hill Deposit A weighted average of the samples across the ore body in the tunnel workings and at the upper cut is as follows:

Oz. Ag.	% Cu
2.56	3.0

It will be noted that my sampling checks reasonably well with those shown on the applicant's map. Actually his copper is somewhat higher and his silver lower. Some dilution would be inevitable principally from the cap rock but the amount of dilution would not be large and would be probably more than offset by selection and sorting of the ore mined.

The indicated profit on ore of this grade if shipped to Hayden would work out about as follows:

Silver: (2.56-15) x $.69125=		$ 1.42
Copper: (60 lbs - 8 lbs) x 95 x $.0905 =		4.47
"A" premium copper 60 x 97 x 5 =		2.97
		8.86
Less: Freight	$1.40	
Treatment	2.50	3.90
Net smelter value		$ 4.96
Less: 10% royalty		.50
		$ 4.46
Less: Trucking	$1.25	
Mining	1.50	
		2.75
Indicated Profit		$ 1.71

If shipped to Douglas the profit would work out about as follows:

Silver 2.56 x .90 x .70625 =		1.63
Copper (60 -10) x .9275 =		4.64
"A" premium 60 x 97 x 5 =		2.97
		$ 9.24
Less: Freight	$ 1.00	
Treatment	3.50	4.50
		$ 4.74
Less 10% Royalty		47
		$ 4.27
Less Trucking	1.25	
Mining	1.50	2.75
Indicated Profit		1.52

If shipped to Miami the profit would work out about as follows:

Silver 2.56 x 95 x .70625 =		$ 1.72
Copper (60 - 10) x .0975 =		4.64
"A" premium copper 60 x 97 x 5 =		2.97
		$ 9.33
Less: Freight	$ 2.20	
Treatment	3.50	5.70
		3.63
Less 10% Royalty		.36
		3.27
Less Trucking	$ 1.25	
Mining	1.50	2.75
Indicated Profit		$ .52

West Deposit - The average of my sampling in the West deposit shows 0.4 Oz. Ag. and 7.80% Copper. It will be noted that the copper in my assay is higher than those shown on the applicant's map--particularly my sample No. 9, and the silver is lower. The black oxide mineralization in this deposit is quite erratic and bunchy and the averaging therefore of a large number of samples would give a more reliable figure as to the grade of ore exposed. For this reason the applicant's assays are included in the following calculation which is:

Oz. Ag.	% Cu
.86	5.73

Because of the soft crumbly nature of the ground dilution would be a serious factor particularly with the proposed method of mining the deposit. If a dilution factor of 30% were applied to the above the grade of ore produced would be .60 Oz. Ag. - and 4.01% Copper.

The indicated profit on this ore if shipped to Hayden would work out about as follows:

Silver: No pay			
Copper (80 - 8) x 95 x .0905 =			$ 6.19
"A" premium 80 x 97 x 5 =			3.88
			$10.07
Less: Freight	$1.40		
Treatment	2.50		
			3.90
		Net smelter value	$ 6.17
Less Royalty 10%			.62
			$ 5.55
Less: Trucking	1.25		
Mining	1.00		
			2.25
		Indicated Profit	$ 3.30

If shipped to Douglas or Miami (see schedule of Bulldozer Hill calculation above) the indicated profit would be $3.03 and $1.95 respectively.

The above calculation of indicated profit for the two deposits is based upon the "A" premium only for copper. A former operator applied for an 8¢ special premium for copper in December 1943, and was refused the premium because of the then existing copper situation. The applicant has requested reconsideration of the application for a special premium and has been advised that the subject is under consideration by the quota committee at the present time. If a special premium in this amount were granted the above indicated profit estimates would be increased by $4.95 per ton for the Bulldozer Hill deposit and $6.60 for the West deposit, and the dump material, both ore and slag, could be shipped.

Actually however, the granting of a special premium would result in the inclusion in shipments of a large volume of presently sub-marginal material in the two deposits and would result in a much larger production of copper.

If the need for copper is indeed urgent it would seem that the property would be clearly eligible for a special copper premium.

8. OBJECTIONS TO PROJECT

A. There are no local or regional objections to the project.

B. The project promises to produce a substantial amount of copper almost immediately and the production would be made at an extremely low relative expenditure of labor and critical materials.

9. TIME SCHEDULE

A. The project should be in full production within 60 days of its inception.

B. The project would operate at all seasons throughout the year.

C. The project ought to be able to repay the loan within 18 months.

10. ESTIMATED COST OF PROJECT

A. No development is contemplated.

B. 1 - Model 400 P & H Shovel with dipper, boom, and drag line bucket - - - - - - - - - - - - - - - - - $ 5500.00

Compressor and drilling Equipment - - - - - - - - - - - - 3000.00
Note: The applicant is experienced in appraising and handling the above equipment. He knows exactly what he wants and has obtained firm bids on these items.

C. Construction of Sheds and tent platforms $100.00

Construction and rehabilitation of roads 450.00 — 550.00

D. General Expense

Working capital for 90 days including supervision 4000.00

Industrial Insurance Deposit 450.00

Interest $15,000 1 year at 4% 600.00

E. Contingencies 900.00

TOTAL $ 15000.00

COMMENTS OF SUPERVISING ENGINEER

Sampling of the property indicates that approximately 12,500 tons of ore which will return a modest profit on the "A" premium for copper is available in two deposits, and there is good reason for believing that a substantially larger tonnage than now proven will ultimately be produced. In the event that a special copper premium is granted to the property a greatly increased tonnage of dump material and presently sub-marginal ore would become available.

The proposed project would begin producing a substantial amount of copper within a short time, and the expenditure of labor and critical materials in its operation would be relatively small.

The project would be in capable hands.

I recommend that the requested loan be granted.

T. P. LANE
Supervising Engineer

TPL:ep

removed for each ton of ore recovered. The ratios of waste to ore in the sections at the upper and lower end of the ore would be .34 and 1.14: 1 respectively. By averaging all the sections it will be seen that the ratio of stripped material to material in the ore block would be 1.31:1 or 25,660 tons. However since a portion of the material in the ore block would not be recovered as ore the ratio of stripping to ore produced would be approximately $\frac{25,660}{12,418}$ or 2.11. Therefore to produce an average of 50 tons of ore per day it would be necessary to handle an average of approximately 150 tons of material per day.

Cost for breaking would be about the same for waste and ore and since the breaking would be a bench operation with a bench face of good height the duty per machine shift would be high. Some of the waste material in the shallow portion of the overburden could be stacked on the surface outside the cut and would be handled at somewhat less cost than the ore. Most of overburden however would have to be transported a short distance out of the cut and the cost for handling this material would exceed the cost for handling ore by the amount of the transportation cost. (Ore haulage cost is estimated separately from mining cost.)

It is estimated that one machine, and occasionally two machines, in the cut will supply the broken material to the shovel and that, including the shovel operator, a crew of 3 men will be able to strip the necessary waste and produce an average of 50 tons of ore per day. This is not a high duty for this type of operation and nature of ground. I estimated in my report a mining cost of $1.50 per ton of ore shipped based upon a production rate of 50 tons of ore per day. The daily cost then would be $75.00 classified as follows:

1 Shovel operator	$12.00	
2 Miners @ $7.50	15.00	
	27.00	
Ins. at 10%	2.70	
Total labor		$29.70
Supplies and maintenance		30.00
Supervision and general		15.00
		$74.70

Admittedly, based upon only the A premium for copper, the operation would be highly marginal. I have assumed that dilution would not be great and would be offset by selection, and some sorting (with the shovel). I have assumed also that the ore would be found to be continuous between the end of the stoped area and the upper or east cut and that the grade of ore in this portion of the ore body would be about the same as in the balance of the workings in which sampling was possible.

Obviously if either of these assumptions proved to be incorrect in only small degree on the unfavorable side, or if the rather closely figured cost estimates proved too low, the narrow indicated margin of profit would be wiped out.

Upon reviewing the subject it seems to me that a decision to grant a loan would depend upon whether the urgency of need for copper is sufficiently great to justify the risk of possible subsidization of the project in the amount of the loan, or a portion of it. In this connection I would call attention to the fact that over half of the amount of the loan would be expended for used machinery of a type which commands a high salvage value. The possible loss or amount of subsidization would therefore, except in the event that the assumptions and estimates are very much out of line, be small relative to the amount of metal produced.

It is unfortunate that the Quota Committee has refused to grant a special copper premium price to this project and I presume that the reason is to be found in a recent lessening of need for copper. When considered in the relation between output and the expenditure of labor and critical materials the project would seem to be far more eligible to receive a special premium than many less marginal producers who currently receive maximum premiums. With a special premium I am sure that this would be a successful enterprise and would produce a large amount of copper. At a 10¢ special premium the dump ore could be profitably shipped and the break-even point on the Bulldozer Hill ore would be well under 2% copper.

T. P. Lane
Supervising Engineer

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325 Heard Bldg
Phoenix, Arizona
June 27, 1944

GOHRING - Supervising Engineer - Mining Section RFC - 325 Heard Bldg.

Re: Sherwood B. Owens, (Bulldozer Mine)
Docket No. ND-5995

Pursuant to your request I am commenting as follows upon the questions contained in Mr. Rait's letter, dated June 21, regarding the proposed stripping and mining operations at the Bulldozer Hill deposit:

The ground is not hard and is much fractured and will therefore break out easily. At the same time it is sufficiently firm to permit, with safety, carrying a vertical cut wall up to a height of 35 ft. which is the apparent maximum thickness of the overburden and somewhat less than the indicated thickness of the ore body. The proposed procedure is to carry a cut to the depth of the overburden with vertical or nearly vertical walls, and with a width exceeding the width of the ore body by an amount which will provide a shelf or bench on each side of the cut at the top of the ore body. When the overburden is removed the ore would be broken by benching onto the floor of a cut in the ore, the face of the ore cut being advanced down the gentle slope of the ore body. It would probably be advisable to alternately strip waste and mine ore, maintaining the stripping job well ahead of the ore mining operation. I have illustrated the proposed method by the attached sketch showing sections at each end of the ore body and at the point of heaviest overburden. This latter point occurs near the crown of the hill with the thickness of the overburden decreasing toward each end of the ore body and laterally down the hill on one side. I note that I projected my section A - A, incorrectly from the plan on my original map and call attention to the fact that this is corrected on the attached sketch. The length of the ore block is 235 feet instead of 200, and using this corrected length and making the same allowances previously made for ore already extracted (2000 tons) and for material to be discarded (30%) the new estimate of ore available in the block is 12,418 tons.

It is not possible to calculate exactly the amount of stripping which would be required because of the fact that the presently visible boundaries of the ore shoot while fairly definite are not sharp, and in a large part of the deposit the boundaries are necessarily approximate projections. The sketches show that in the sections of greatest thickness of overburden approximately two tons of waste will have to be

325 Heard Building
Phoenix, Arizona
May 30, 1944

TULLY Ass't Chief - Mining Division- Washington

Re: Sherwood B. Owens - Docket No. ND-5995

I am enclosing herewith two copies of my supervising engineer's report on the captioned docket together with a copy of the application.

I would suggest that the Premium Quota Committee be contacted to learn the premium status with regard to this property. I have pointed out in my report that the Quota Committee has under consideration the applicant's request for a special copper premium. The indicated margin of profit on the 5¢ premium alone is rather narrow and the granting of a special premium would provide more surety for a successful operation and, more importantly, would result in a very much greater ultimate production of copper from the property. In the event that the Washington office of R. F. C. concurs in my opinions and recommendations a statement to this effect to the Quota Committee might assist that committee in reaching a decision regarding a special premium.

TRAVIS P. LANE
Supervising Engineer

3 copies

TPL:ep
Encs.

COPY

325 Heard Building
Phoenix, Arizona
September 25, 1944

Mr. Sherwood B. Owens
P. O. Box 769
Tucson, Arizona

Re: Sherwood B. Owens
(Bulldozer Mine)
Docket No. ND-5995

Dear Mr. Owens:

This will acknowledge receipt of your letter dated September 23rd. I am glad to learn that development of your west deposit looks favorable to you, and to note that your recent car shipment from there ran 5.29% copper.

I have referred your request for reconsideration of your loan application to our Washington office. I feel rather certain, however, that Washington would make no decision further than that already expressed unless you actually obtained the special premium on copper which you expect. And of course, as I told you the other day, I am not able to predict whether even with an additional price for your copper Washington would consider the copper situation sufficiently critical at the present time to justify granting a loan.

Regards.

T. P. Lane, Supervising
Engineer

TPL-bkb

bcc - D. M. Rait

RECONSTRUCTION FINANCE CORPORATION
MINING DIVISION
REPORT OF SUPERVISING ENGINEER

Docket No. ND-5995
Date Authorized for Exam Rec'd
May 6, 1944
Date of Examination - May 9, 1944
Date of Report - May 30, 1944

1. NAME AND ADDRESS OF APPLICANT

Sherwood B. Owens
Box 769, Tucson, Arizona Correspondent: Same

2. CHARACTER OF PROJECT

The purpose of the loan is to provide funds for equipment and initial working capital for mining a copper deposit.

3. LOCATION OF MINE

The property is located in T 18 South, R. 15 East in the Helvetia Mining district, Pima County, Arizona. The mine is 33 miles by road southerly from Tucson. The nearest rail point is Sahuarita , 18 miles south by paved highway from Tucson and 15 miles from the mine by good dirt road with a few moderate grades.

4. APPLICANT

The applicant is a comparatively young man. He conducts a profitable trucking business in Tucson and previous to coming to Tucson two years ago he was engaged in oil field trucking and oil production for many years in Texas. He had no mining experience previous to his coming to Tucson. He is now operating the Papago Chief Mine, southwest of Tucson, under RFC loan (Owens & Freeland - Docket No. ND 8449). The project has been conducted in an efficient manner but has been unprofitable because of the disappointingly low values in the dump material shipped. He and his partner applied for an additional loan with which to develop the mine and a report with respect to the application was forwarded to RFC Washington on May 13, 1944.

Mr. Owens is an aggressive and thoroughly competent business man and the proposed development would undoubtedly be conducted in an efficient manner under his direction.

5. LOAN REQUESTED

$15,000

6. DESCRIPTION OF PROJECT

A. General Features

1. There is no mill on the property nor mine appurtenances, and there are no mine workings which are not confined within applicant's ownership.

2. The proposed project would comply with State compensation and safety-first statutes.

3. There are no apparent legal discrepancies in the project.

4. There are no impeded right-of-way facilities.

5. There is no liklihood of surface or sub-surface trespass during the project.

B. Existing Development

1. The mine is opened by cuts, a tunnel, and several comparatively shallow shafts.

   a. The applicant furnishes a rough claim map and a sketch of the workings. The sketch which accompanies this report was made from a compass and tape survey of the workings.
   b. Formation samples were cut with pick and moil and gathered on canvas. Dump and muck were taken by shovel.
   c. The principal workings were mostly accessible and in good condition.
   d. General Features of Deposit, etc.
   The property consists of one patented claim, and is held by the applicant under a lease and option to purchase agreement with the owner.

   A duplicate original copy of the agreement is furnished with the application.

   The historic data so far as available is covered in the application and the applicant presents a letter which he obtained from Mr. Forbes which describes in a general way the operations at the property since 1899. Mr. Forbes is an elderly man who formerly held public office in the county. His character is esteemed highly in the community.

   Summarizing briefly: Work at the mine was begun in 1879 and some high grade ore extracted and treated in a smelter which was built upon the property. Some time in the early nineties the property changed hands and was operated intermittently during periods of high copper prices until 1916 when an individual leased it and made a substantial production during the several war years following that date. Since the termination of the war the mine has been worked on a small scale at intermittent intervals. In March of the present year and just prior to acquisition of the property by the applicant an individual shipped a carload of ore which assayed 7.61% Cu. The applicant has recently shipped 7 cars of dump material. Except for these recent shipments there are no records available as to tonnage or grade of ore produced. Judging by the size of the mine openings, the grade of present ore exposures, the size of the present smelter slag dump (much of this has been shipped away) and the amount and grade of discarded copper bearing material on the dumps the past production must have been substantial. The bulk of this production was made when transportation and marketing conditions were less favorable than at the present time and it seems probable that the ore smelted at the property or shipped out was at least moderately high grade (5% Cu or more)

   The ore producing formations of the district are carboniferous and older limestones bordering a granite mountain mass containing porphyritic intrusions. The copper mineralization on the subject property occurs in a gray limestone underlain at shallow depth by granite. In places the limestone is fractured and crushed and is greatly altered

by silification with, on the surface, considerable garnetization. Copper mineralization occurs as replacement in varying degrees in numerous areas of fracturing and alteration on the property. The major development of the property has been performed in two such areas known as the "bulldozer hill deposit," and the "west deposit" on a flat near the base of the hill. The bulk of the production has been made from these two deposits principally from the bulldozer hill deposit. The deposits are described specifically as follows:

The Bulldozer Hill deposit occurs on a low moderately steep circular hill or dome several hundred feet in diameter. The formation is limestone which is much fractured with irregular copper mineralization throughout most of the limestone. A concentration of mineralization, or shoot of ore, occurs in a low dipping bed on the NW side of the hill. The ore shoot passes thru the hill near its crest and has been mined by open cuts at both ends and by a tunnel and some stoping in its lower central portion. The bed is capped by barren or nearly barren material varying in thickness from 5 ft. in the east end to 30 feet in the center. An island or horse of waste was left in the center of the east cut and two dumps here contain a considerable amount of low grade copper ore. The most southerly of the dumps is coarse and contains many large fragments of good ore. The dump contains approximately 800 tons and it is estimated that between 200 and 300 tons of 3% copper ore can be recovered here. The material was too coarse and mixed to be practicably sampled but the above estimate appears reasonable. The main part of the northerly dump is made up principally of low grade or waste material derived from stripping. However, a considerable amount of second class ore and sortings lies on top of the dump and a shovel sample here representing an estimated 150 tons assayed (sample No. 15) 2.9 Oz. Ag., and 3.20% Cu. It seems possible that a considerable amount of the main dump amounting to 1000 tons or more will be shippable on a special premium price.

Samples Nos. 7 and 8 were cut across the west exposure of the top of the ore shoot in the east cut. The lower part of the cut face here was filled with debris and therefore could not be sampled. The samples were cut across widths of 20 feet and 23½ feet and assayed respectively:

1.7 oz. Ag.	2.32% Cu.
3.1 oz. Ag.	3.33% Cu.

Sample No. 7 was cut diagonally across the ore body and represents a formation width of approximately 10 feet. The weighted average across ~~335~~ 43.5' is

2.68 oz. Ag.	3.02% Cu.

A considerable amount of ore has been mined from a cut in the hillside on the west or lower end of the ore shoot. The cut is completely filled with debris and no ore exposures were visible. An opening under the barren capping (some 15 feet thick here) connects with a stope from the tunnel workings. The debris in the cut contains some copper but is quite low grade. A dump from the cut, however, amounting to approximately 500 tons appears to contain about the same grade of copper material as does the tunnel dump, described below.

A tunnel was driven into the east side of the hill and at 60 feet encountered the ore shoot. The shoot was explored by a short extension of the tunnel and a small amount of crosscutting, and some stoping was done above the tunnel. The stoping was extremely irregular and quite evidently aimed at selection of the richer ore only. The silicified limestone of the ore shoot is greatly fractured and in places is intensely brecciated. The ore is blue in color due to the presence of azurite and considerable blue chrysocolla. Some malachite is present and occasional black oxide of copper (melaconite) and, in rare spots, flakes and thin wire native copper.

Sample No. 1 was a grab from muck in a 15' irregular inclined raise on the north edge of the ore shoot. The muck partially filled the raise and the muck sample was deemed more representative than would be the case if cut samples were taken. The material assayed:

.9 oz Ag. 2.05% Cu.

Samples Nos. 2 and No. 3 were cut in crosscuts as shown on the sketch accompanying this report and represent values across the width of the ore shoot at this place. The samples assayed respectively:

.9 oz Ag. 1.611 % Cu.
1.9 oz. Ag 2.11 % Cu.

and the weighted average is

1.55 oz. Ag. 1.94 % Cu

across 39 ft. Sample No. 1 was cut somewhat obliquely across the ore shoot and the actual width of the ore body here is approximately 35 feet.

Sample No. 4 eleven feet in width, was cut across a good showing of ore in a crosscut north from the end of the tunnel and assayed: 4.0 oz. Ag - 4.12% Cu. Good ore continues in the wall beyond the north end of the crosscut.

South from sample No. 4 a barren width of 8 feet in the east wall of the crosscut was not sampled. The material was blocky massive silicified limestone and could easily be discarded during mining operations. The back and the south wall of the crosscut contained low grade material. Sample No. 5 was cut across the balance of the crosscut and drift south from here. It assayed

.6 oz Ag. 1.40% Cu

across 7.8 feet. The ore shoot here has a width in excess of 26 feet and the weighted average (excluding 8 ft. of barren material) is

2.60 oz Ag 2.98% Cu

across 18.7 ft. of ore.

The weighted average of the two sets of samples across the ore body is 1.92 oz. Ag - 2.30 % Cu. In considering this average assay for the ore exposure on the tunnel level attention is called to the fact that good ore continues in the wall beyond the best sample (No. 4). As stated above this barren material could easily be excluded from shipments, and also, here and there in the other samples blocky patches of waste or very low grade material could be excluded. I believe that in mining this material the grade therefore can be held well over the grade shown above.

Several irregular stopes (an estimated 2000 tons in total was stoped) were opened on better portions of the ore body. One of these stopes has caved out 6 or 8 feet into the capping above the ore body but does not open to the surface. The ore body at this place measures 30 feet in thickness above the tunnel floor, and the ore below here and in the balance of the tunnel workings extends into the floor of the tunnel level. A 40 feet winze, now filled and exact location not known, is said to have been all in one. The stopes were either drawn empty or so badly caved that systematic sampling was not possible. The material in the walls and back of the stopes could be seen to be higher grade than on the level with the exception of the material of sample No. 4. (The degree of blue coloration of the material affords a practical measure for rough comparative estimates). Sample No. 6 was cut across 20 feet in the west end of a 20' x 20' stope which connects with the west open cut by an opening in the capping on top of the ore. The ore is not opened to full width laterally and ore similar to that sampled continues into each wall of the stope. The s ample was 20 ft. wide and assayed:

4.1 oz Ag. 4.83% Cu.

Considerable ore of about this grade appears to remain available in the stope.

The dump at the portal of the tunnel is estimated to contain approximately 1000 tons of medium to fine material and contains appreciable copper throughout. The applicant has shipped six carloads from this dump without sorting. Settlement sheets show that the shipments contained 317 tons assaying

1.04 oz. Ag 1.77 % Cu

The <u>West Deposit</u> is located in a flat area some 500 feet northwesterly from the bulldozer hill deposit. Copper mineralization and some production has been made from a vertical shaft said to be 60 feet deep and a small surface cut 60 feet northwest from it.

This deposit is quite different than the bulldozer hill deposit. The copper occurs in the form of malacite, azurite, ~~and~~ chrysocolla and melaconite in a very highly altered silicified limestone. The material is crumbly and flaky and by reason of its porous nature it is very light in weight. The ore is light blue-green stained throughout and contains generally a network of seams and veinlets of black oxide of copper with occasional small masses of the black oxide. The black oxide accounts for the major part of the copper value. Silver content is quite low.

The shaft is caved and filled to within 30 feet of the surface. The hole is 18 feet long and about 12 feet wide.

Sample No. 12 was cut across the southeast wall of the shaft near the top of the fill and 16 feet below the surface. Sample No. 14 was cut 5 feet below the surface in the same wall of the shaft. Sample No. 13 was cut across the northwest wall of the shaft 5 feet above the fill and 25 feet from the surface. The samples assayed as follows:

Sample No.	Width	Oz. Ag.	% Cu.
12	11.7	0.5	6.80
13	9.0	0.5	7.88
14	9.0	0.5	3.63

The southwest wall of the shaft was firm rock. The northeast wall was soft flaky altered material containing some copper mineralization. At sample No. 13 the ore limit was not reached in the northeast wall. Above here the northeast wall was soft flaky altered material containing some copper mineralization and the limit of the ore in this direction was not certainly indicated in either of the two samples (Nos. 12 and 14) on the southwest wall of the shaft.

At a distance of 60 feet north-westerly from the shaft an open cut was made upon what apparently is the trend of the shaft ore. A carload was shipped from here just prior to the acquisition of the property by the applicant. A settlement sheet shows that the shipment contained 33 tons assaying 0.21 oz. Ag and 7.7 % Cu. A sample (No. 9) across the face of the cut assayed 0.2 oz. Ag - 9.50% Cu. The sample was 19.5 feet in width cut obliquely across the ore trend. The corrected true width of the ore is approximately 14 feet. The face here was uniformly green colored by malachite and contained much black oxide of copper.

A weighted average of samples Nos. 9 12 & 14 combined, and 13 is as follows:

Width	Oz. Ag	% Cu
11.1	0.4	7.80

The applicant shipped one car from the shaft dump. The settlement shows that the shipment contained 49 tons assaying no silver and 3.58 % Cu. The dump was shovelled without sorting and it is estimated that about 100 tons more of this same material is available in the dump. A shovelled sample (No. 11) assayed: 0.6 Oz. Ag. - 4.29% Cu.

Sample No. 10 was shovelled from a waste portion of the dump which showed some copper. It assayed .50% Cu.

The flat surface in this area is covered by several feet of dirt and it would be necessary to strip and trench the area to determine the extent of the deposit. The 60 foot shaft is reported to have been in good ore all the way to bottom and a crosscut 30 feet easterly from the bottom is said to have been all in ore assaying 5% Cu.

A vertical shaft said to be 115 feet deep was sunk some 250 feet southeasterly from the above described shaft and it is said that sulphide ore was developed in a crosscut from the bottom. The shaft is partially filled and inaccessible. The dump, however, shows no evidence that any important body of ore was encountered in the shaft workings. The shaft is partially filled and is inaccessible.

There were no other ore showings of interest on the property.

The slag dump at the old smelter site contains approximately 1200 tons. A considerable amount of this slag was hauled out in bulk to another smelter many years ago, and portions of the dump have been screened and picked and it is said that shipments assaying up to 15% Cu. were made. It is estimated that the dump will average 2% or more Cu. The dump was not sampled but the estimate seems reasonable in view of the extremely poor character of the fusion and the fact that the ore treated was probably comparatively high grade. If the project were granted a special premium for copper it is probable that at least a portion of the dump would pay to ship provided, of course, the material would be acceptable at local custom smelting plants.

C. Proposed Development

1. The applicant proposes to mine the two deposits by open cut method using a gas engine driven shovel. No mine development is proposed and no preparation for mining the ore bodies will be required beyond a small amount of shallow initial stripping. Further stripping will be carried on simultaneously with ore extraction.

2. Mining by power shovel is the most feasible manner to work the deposits in their presently indicated limits and the applicant, by reason of his long experience in handling earth-moving equipment and operations is well fitted to conduct this type of operations.

3. It is expected that shipments will begin at a rate of 1200 tons per month and eventually reach a rate of upwards of 3000 tons per month.

D. Equipment

1. There is no equipment upon the property.

2. Not applicable.

3. Not applicable.

4. The applicant proposes to purchase a Model 400 P & H 5/8 yard shovel, a compressor and drilling equipment.

5. No mill installation.

6. There are no housing facilities on the property.

7. No camp or other construction is contemplated beyond a shop and tool shed, and wooden platforms for several tents.

8. A small amount of road construction and rehabilitation on the property is proposed.

E. Cost Estimates

1. Mining will be open cut methods.

a. Mining cost on an anticipated initial shipment rate of 1200 tons per month is estimated at $1.50 per ton for the Bulldozer Hill deposit and $1.00 per ton for the West deposit. These estimates include stripping and sorting expense, and amortiz ation of equipment. Eventual production rate will probably be substantially higher and ought to result in a considerable reduction in the mining cost.

b - g. Not applicable.

h. Trucking ore to Sahuarita is estimated by the applicant at $1.50 per ton. The haul is fifteen miles over good road with few and moderate grades. With sustained volume production the trucking charge would be lower possibly $1.00 per ton. A figure of $1.25 would appear to be a reasonable estimate.

i. Railroad freight charge to the Hayden plant of the A. S. & R. Co. is $1.40 per ton, and to the El Paso plant of this company $2.70 per ton. In the event that the A. S. & R. Co would not accept the full tonnage output of the mine at the Hayden plant it is probable that some of the ore would be diverted to their El Paso smelter and that the company would absorb a large part, and perhaps all, of the freight differential.

A possible outlet for the ore would be the Douglas smelter of the Phelps Dodge plant but shipments to this plant would be on a contract basis which would be entered into by that company only after the shipper had demonstrated his ability to furnish a substantial rate of output (2500 tons monthly minimum). The freight rate to Douglas is $1.00 per ton from Vail, Arizona, which is about the same distance as Sahuarita by road from the mine.

Still another outlet for the ore would be available at the International Smelter at Miami. The freight rate in this case would be $2.20 per ton.

j. Smelter treatment charge at the Hayden or El Paso plant (probable) of the A.S & R Co. would be $2.50 per ton. Treatment charge at the Douglas smelter and at the International Smelter would be $3.50 per ton.

k. Royalty is 10% of smelter net and would probably apply on the 5¢ copper premium.

l. No timber would be required.

m. Total cost per ton shipped to Hayden would be about as follows:

Bulldozer Hill Deposit

Mining	$1.50	
Trucking	1.25	
Freight	1.40	
Treatment	2.50	
Royalty	.50	(10% of estimated smelter net, see below)
Total	$7.15	

West Deposit

Mining	$1.00	
Trucking	1.25	
Freight	1.40	
Treatment	2.50	
Royalty	.62	(10% of estimated smelter net, see below)
Total	$6.77	

In the event shipments were made to Douglas or to Miami, the above estimated costs would differ by the amount of difference in freight rates and royalty charges, and would be about as follows:

	Total Cost	
	Shipped to Douglas	Shipped to Miami
Bulldozer Hill Deposit	$7.72	$8.81
West Deposit	7.34	8.42

2. Inapplicable.

3. Approximate premium for industrial insurance is estimated at $75 per month.

F. Ore Reserves

1. Tonnage - Bulldozer Hill Deposit

Approximately 10,000 tons appear to be reasonably assured in the Bulldozer Hill deposit. Values in the cuts at both ends of the deposit and in the tunnel workings suggest the strong probability that ore values will persist in the block between the tunnel workings and the upper or east cut. The above tonnage estimate is based upon an ore block 35 feet wide, 30 feet thick and 200 feet long on the dip, or

$$\frac{200 \times 35 \times 30}{12.5} = 16,800 \text{ tons}$$

Approximately 2000 tons in the above block has been stoped out in the tunnel workings and of the remainder it is estimated that about 30% will be discarded as barren or submarginal material. Tonnage of shipping ore available therefore would be: (16800- 2000) x 70% or 10,360 tons. This tonnage estimate does not take account of the fact that the floor of tunnel level

within the lateral limits of the ore shoot is still in ore and that a 40 foot winze is reported to have been in ore.

West Deposit. Approximately 2500 tons appear to be reasonably assured in the West deposit. This estimate is based upon the ore exposures in the shaft and cut at this place and assumes an extension of ore 10 feet beyond the end exposures and 10 feet below the shaft fill. The tonnage in the block is calculated as follows:

$$\frac{80 \times 12 \times 40}{14} = 2560$$

This tonnage estimate does not consider the fact that the ore is probably wider than shown by the sampling, nor the reports regarding ore in the deeper part of the shaft. These reports appear to be authentic and are supported in part at least by the amount and grade of the material on the dump (see applicant's carload shipment (3.58% Cu) and dump sample No. 11). As explained earlier in this report it is impossible to estimate the extent of the deposit in its present state of development. It seems probable however that the amount of ore available here will prove to be considerably larger than the 2500 tons estimated above. The method of mining proposed by the applicant would be feasible only for a shallow depth and if the deposit proved to extend to any considerable depth an underground method of mining will be required, with of course a substantial increase in the mining cost.

Dump Ore: The returns from the applicant's shipments of unsorted dump material from the tunnel workings and the West deposit, together with the appearance of the upper dumps, and the grade of dump samples, Nos. 11 and 15, suggest that with a special premium price for copper a substantial amount of copper is recoverable in the dumps. The dump tonnage available is estimated at 2000 tons which will assay approximately 1.10 oz Ag. and 2.0 % Cu. Probably several hundred tons of dump material could be shipped at 3% Cu.

Smelter Slag: Tonnage and probable value of smelter slag were discussed earlier in this report. Under favorable price and marketing conditions it seems likely that this material could be profitably handled.

2 & 3. Values and Indicated Profit

Bulldozer Hill Deposit A weighted average of the samples across the ore body in the tunnel workings and at the upper cut is as follows:

Oz. Ag.	% Cu
2.56	3.0

It will be noted that my sampling checks reasonably well with those shown on the applicant's map. Actually his copper is somewhat higher and his silver lower. Some dilution would be inevitable principally from the cap rock but the amount of dilution would not be large and would be probably more than offset by selection and sorting of the ore mined.

The indicated profit on ore of this grade if shipped to Hayden would work out about as follows:

Silver: (2.56-15) x $.69125=		$ 1.42
Copper: (60 lbs - 8 lbs) x 95 x $.0905 =		4.47
"A" premium copper 60 x 97 x 5 =		2.97
		8.86
Less: Freight	$1.40	
Treatment	2.50	3.90
Net smelter value		$ 4.96
Less: 10% royalty		.50
		$ 4.46
Less: Trucking	$1.25	
Mining	1.50	2.75
Indicated Profit		$ 1.71

If shipped to Douglas the profit would work out about as follows:

Silver 2.56 x .90 x .70625 =		1.63
Copper (60 -10) x .9275 =		4.64
"A" premium 60 x 97 x 5 =		2.97
		$ 9.24
Less: Freight	$ 1.00	
Treatment	3.50	4.50
		$ 4.74
Less 10% Royalty		47
		$ 4.27
Less Trucking	1.25	
Mining	1.50	2.75
Indicated Profit		1.52

If shipped to Miami the profit would work out about as follows:

Silver 2.56 x 95 x .70625 =		$ 1.72
Copper (60 - 10) x .0975 =		4.64
"A" premium copper 60 x 97 x 5 =		2.97
		$ 9.33
Less: Freight	$ 2.20	
Treatment	3.50	5.70
		3.63
Less 10% Royalty		.36
		3.27
Less Trucking	$ 1.25	
Mining	1.50	2.75
Indicated Profit		$ .52

West Deposit - The average of my sampling in the West deposit shows 0.4 Oz. Ag. and 7.80% Copper. It will be noted that the copper in my assay is higher than those shown on the applicant's map--particularly my sample No. 9, and the silver is lower. The black oxide mineralization in this deposit is quite erratic and bunchy and the averaging therefore of a large number of samples would give a more reliable figure as to the grade of ore exposed. For this reason the applicant's assays are included in the following calculation which is:

Oz. Ag.	% Cu
.86	5.73

Because of the soft crumbly nature of the ground dilution would be a serious factor particularly with the proposed method of mining the deposit. If a dilution factor of 30% were applied to the above the grade of ore produced would be .60 Oz. Ag. - and 4.01% Copper.

The indicated profit on this ore if shipped to Hayden would work out about as follows:

Silver: No pay			
Copper (80 - 8) x 95 x .0905 =			$ 6.19
"A" premium 80 x 97 x 5 =			3.88
			$10.07
Less: Freight	$1.40		
Treatment	2.50		
			3.90
		Net smelter value	$ 6.17
Less Royalty 10%			.62
		Indicated profit	$ 5.55
Less: Trucking	1.25		
Mining	1.00		
			2.25
		Indicated Profit	$ 3.30

If shipped to Douglas or Miami (see schedule of Bulldozer Hill calculation above) the indicated profit would be $3.03 and $1.95 respectively.

The above calculatioh of indicated profit for the two deposits is based upon the "A" premium only for copper. A former operator applied for an 8¾¢ special premium for copper in December 1943, and was refused the premium because of the then existing copper situation. The applicant has requested reconsideration of the application for a special premium and has been advised that the subject is under consideration by the quota committee at the present time. If a special premium in this amount were granted the above indicated profit estimates would be increased by $4.95 per ton for the Bulldozer Hill deposit and $6.60 for the West deposit, and the dump material, both ore and slag, could be shipped.

Actually however, the granting of a special premium would result in the inclusion in shipments of a large volume of presently sub-marginal material in the two deposits and would result in a much larger production of copper.

If the need for copper is indeed urgent it would seem that the property would be clearly eligible for a special copper premium.

8. OBJECTIONS TO PROJECT

A. There are no local or regional objections to the project.

B. The project promises to produce a substantial amount of copper almost immediately and the production would be made at an extremely low relative expenditure of labor and critical materials.

9. TIME SCHEDULE

A. The project should be in full production within 60 days of its inception.

B. The project would operate at all seasons throughout the year.

C. The project ought to be able to repay the loan within 18 months.

10. ESTIMATED COST OF PROJECT

A. No development is contemplated.

B. 1 - Model 400 P & H Shovel with dipper, boom, and drag line bucket - - - - - - - - - - - - - - - - - $ 5500.00

Compressor and drilling Equipment - - - - - - - - - - - - 3000.00

Note: The applicant is experienced in appraising and handling the above equipment. He knows exactly what he wants and has obtained firm bids on these items.

C. Construction of Sheds and tent platforms	$100.00	100.00
Construction and rehabilitation of roads	450.00	450.00
		550.00

D. General Expense

Working capital for 90 days including supervision	4000.00
Industrial Insurance Deposit	450.00
Interest $15,000 1 year at 4%	600.00
E. Contingencies	900.00
TOTAL	$ 15000.00

COMMENTS OF SUPERVISING ENGINEER

Sampling of the property indicates that approximately 12,500 tons of ore which will return a modest profit on the "A" premium for copper is available in two deposits, and there is good reason for believing that a substantially larger tonnage than now proven will ultimately be produced. In the event that a special copper premium is granted to the property a greatly increased tonnage of dump material and presently sub-marginal ore would become available.

The proposed project would begin producing a substantial amount of copper within a short time, and the expenditure of labor and critical materials in its operation would be relatively small.

The project would be in capable hands.

I recommend that the requested loan be granted.

T. P. LANE
Supervising Engineer

TPL:ep

Docket No B-506
Date Auth for Exam Rec'd. May 6
Date of Examination May 9
Date of Report MAY 19, 1943

1. Name and Address of Applicant

Name Sherman B. Owens

Address Box 769
Tucson, Arizona

Correspondent Same

2. Character of Project

The purpose of the ~~loan~~ is to provide funds for equipment and initial working capital for mining ~~a copper deposit~~.

3. Location of Mine

The property is located in (T14S, R15E in) the Helvetia Mining district, Pima Co., Arizona. The mine is 33 miles by road southeast from Tucson. The nearest rail point is Sahuarita 18 miles south by paved highway, from Tucson and 15 miles from the mine by good dirt road with a moderate grade.

4. Applicant

The applicant is a comparatively young man. He conducts a profitable trucking business in Tucson and previous to coming to Tucson 2 years ago he was engaged in the trucking and oil production for many years in Texas. He had no mining experience prior to this coming to Tucson. He is now operating the Papago Chief mine under R.F.C. loan (Owens & Freeland - Docket No ND 8449). The project has been conducted in an efficient manner but has been unprofitable

because of the disappointingly low values in the dump material shipped. He and his partner ~~have~~ applied for an additional loan with which to develop the mine and a report with respect to the operation ~~upon the property~~, was forwarded to RFC Washington on May 13, 1944. ~~Mr. Owens is a gentleman~~

Mr. Owens is an aggressive and thoroughly competent business man and ~~Mr. Owens is a gentleman~~ the proposed development ~~under~~ would undoubtedly be conducted in an efficient manner under his direction.

5 Loan Requested
$15,000.

6 Description of Project
A. General Features
1. There is no mill on the property nor mine appurtenances, ~~etc~~ and there are no mine workings which are not confined within applicant's ownership.
2. The proposed project would comply with state compensation and safety-first ~~statutes~~.
3. There are no apparent legal discrepancies in the project.
4. There are no impeded right-of-way facilities.
5. There is no likelihood of surface or sub-surface trespass during the project.

D Existing Development

1. The mine is opened by cuts, adits, and several comparatively shallow shafts.

a. The applicant furnishes a rough claim map and a sketch of the workings. The sketch which accompanies this report was made from a compass and tape survey of the workings.

b. Formation samples were cut with pick and mail and gathered on canvas. Dump is much more taken ~~this should be~~ by shovel.

c. The primary workings were ~~is~~ mostly accessible and in good condition.

d. General Features of Deposit etc.

The property consists of one patented claim, and is held by the applicant under a lease and option to purchase ~~from the~~ agreement with the owner. ~~Copy of the agreement~~

A duplicate original copy of the agreement is furnished with the application.

~~The predominant rocks in the region are [illegible] the mineralogy [illegible] of quartz [illegible] and crystals [illegible] Mineralogy of the mineralization is intermixed [illegible] and in places [illegible] it contains considerable garnet. The~~

¶ The historical data so far as available is covered in the application and the applicant ~~[illegible]~~ ~~historical data available regarding the property~~ ~~and [illegible] in this his application also~~ ~~[illegible]~~ the permit a letter which he obtained from Mr. Forbes, which describes operations at the property since 1899. Mr. Forbes is an elderly man who formerly held public office in the county. His character ~~[illegible]~~ is ~~[illegible]~~ esteemed and held high respect in the community. ~~Mr. Forbes is an elderly man who held public office in the county [illegible] and~~

¶ Summarizing briefly: ~~[illegible]~~ Work at the mine was ~~[illegible]~~ begun in 1899 and ~~a smelter~~ some high grade ore extracted and treated in a smelter which was built upon the property. Sometime in the early 'nineties the property changed hands and ~~[illegible]~~ was operated intermittently ~~[illegible]~~ during periods of high copper prices until 1916 when an under seal lessee took it and made a substantial production during the small war years following that date. Since the termination of the war the mine has been worked on a small scale at intermittent intervals. In March of the present year and just prior to acquisition of the property by the applicant an individual shipped a carload of ore which assayed 7.61% Cu. The applicant has recently shipped 7 cars of dump material. ~~There are no records~~ ~~except~~ for these ~~[illegible]~~ recent shipments there are no records available as to tonnage or grade of ore produced. ~~[illegible]~~ by the ~~[illegible]~~

~~The [illegible] of the [illegible] ~~ ~~the~~ copper [illegible]

MFR Judging by the size of the [illegible] dump (much of this has been shipped away) and the amount of copper bearing material discarded on the dump as the result of past prospecting, much has been shipped. The bulk of this production was made when transportation and marketing conditions were less favorable than at the present time and it seems probable that the ore ~~[illegible]~~ shipped or milled at the ~~[illegible]~~ property or shipped out was at least moderately high grade (5% Cu or more).

~~The predominant rocks in the region are quartzite and monzonite and in certain localities of [illegible] are such localities in the [illegible] The subject property lies in one of these shallow thicknesses of limestone.~~

PR The ore producing formations of the district are conformable and often limestone bordering a granite monzonite mass containing porphyritic intrusions. The copper mineralization on the subject property occurs in a gray limestone underlain at shallow depth by granite. ~~The limestone is in places [illegible] and, on the surface, much altered by [illegible]~~

See summary

~~and granite~~
~~and intermixed~~

MoP ~~Fan~~ plane. The limestone is ~~much altered~~ fractured and crushed and is greatly altered by silicification with, on the surface, considerable gummitization. ~~The areas of greatest alteration~~ Copper mineralization ~~or replacement~~ occurs or replacement in varying degrees in the numerous areas of ~~such~~ fracturing and alteration on the property.

~~The areas on the claims of the principal development production of the property has been performed on two such areas and the bulk of the production has been made from the two deposits. The deposits are described as follows:~~

~~Bulldozer Hill deposit: Bulldozer Hill is a low hill~~

MoP The major development of the property has been performed on two such areas, namely the "bulldozer hill deposit", and the "nest deposit" on a flat near the base of the hill. The bulk of the production has been made from the two deposits, principally from the bulldozer hill deposit. The deposits are described as follows:

The Bulldozer Hill deposit occurs on a low, ~~irregular~~ mid-sized, steep hill or dome several hundred feet in diameter. The formation is limestone which is much fractured ~~and altered~~ with

irregular copper mineralization throughout most of the limestone, ~~and~~ @ concentration of mineralization or shoot of ore occurs low dipping bed ~~in~~ with the NW side of the hill. The ore shoot ~~has been mined by open cuts on each~~ passes thru the hill near its crest and has been mined by open cuts at both ends and by a tunnel and some stoping in its lower central portion. The bed is capped by ~~the lower~~ limestone ~~which forms a natural roof in the drift from the portal~~ (see sketch). An island or horse of waste was left in the center of the ~~shoot~~ mest cut and the two dumps ~~dump~~ here contain a considerable amount of low grade copper ore. The most southerly of the dumps is coarse and contains many large fragments of good ore. ~~It is estimated that the~~ The ~~that also~~ dump contains approximately 800 tons and it is estimated that between 200 and 300 tons of 3% copper ore can be recovered here. The material was too coarse and varied and to be practically sampled but the above estimate appears reasonable. The main part of the ~~northerly~~ dump ~~appears~~ is made up principally of low grade or waste material dumped from stoping. ~~also the top of the two contain pits~~

Hmm, @ Considerable amount of 2d class ore and sorting lies on top of the dump and a shovel sample here representing an estimate of 150 tons assayed (sample No. 15) 2.9 Oz Ag - 3.20 % Cu. It seems possible that a considerable amount of the main dump, amounting to 1000 tons more, will be shippable in a ~~high~~ premium price.

[redacted] Samples Nos. 7 and 8 were cut across the west exposure of the top of the ore shoot in the ~~est~~ mest cut. The lower part of the cut face here was filled with

2.6 oz Ag 2.02% Cu

2.65 oz Ag 2.0% Cu

debris and therefore could not be sampled. The sample was cut across widths of 20 feet and 23" feet and assayed respectively 1.7 oz Ag - 2.32% Cu, and 3.1 oz Ag - 3.33% Cu. Sample No. 7 was cut diagonally across the ore body and represents a formation width of approximately 10 feet. The ore is

A considerable amount of ore has been mined from a cut in the hillside on the east or lower end of the ore shoot. The cut is completely filled with debris and no ore exposures were visible. An opening under the barren capping (some 15 feet thick here) connects with a stope from the tunnel workings. The ~~[illegible]~~ debris in the cut contains some copper but is ~~[illegible]~~ quite low grade. A dump from the cut, however, ~~[illegible]~~ amounting to approximately 500 tons appears to contain about the same grade of copper material as does the tunnel dump, described below.

A tunnel was driven into the east side of the hill and at 60 feet encountered the ore shoot. The shoot was explored by a short extension of the tunnel and a small amount of cross-cutting, and some stoping was done above the tunnel. The stoping was extremely irregular and quite evidently aimed at selection of the richer ore only. The principal limestone of the ore shoot is ~~extremely~~ greatly fractured and in places is intensely brecciated. The ore is blue in color due to the presence of azurite and considerable blue chrysocolla. Some malachite is present and occasional black oxide of copper (melaconite) and, in rare spots, flakes and thin veins of native copper.

97
6
582
4
2910
4656
49470

330
90
240

1007
677
323

7
602

7
101

8.5

777

67 | 1280
1062
218

1007
767
240

1007
677
330

517
52

67

777

97
480
6 7236
4
3880
6208
65960

677

777

7

15' vein was included in muck in ~~an~~

Sample No. 1 was a grab from ~~a~~ raise on the north edge of the ore shoot. The ~~sample~~ ~~was reported~~ partially filled the raise and ~~it added to the muck~~ the muck sample was deemed more representative than would be the case if ~~the original~~ cut samples were taken. The material assayed: .9 oz Ag - 2.05% Cu.

Samples Nos. 2 and No 3 were cut in crosscuts as shown on the sketch accompanying this report and represent ~~[illegible] samples~~ values across the width of the ore shoot at this place. ~~[illegible]~~ ~~35 feet~~ The samples assayed respectively: .9 oz Ag - 1.611% Cu and 1.9 oz Ag - 2.11% Cu.

Sample No. 4, located in north, was cut across a ~~[illegible]~~ showing of ore in a crosscut north from the end of the tunnel and assayed: 4.0 oz Ag - 4.12% Cu. Good ore continues in the tunnel beyond the north end of the crosscut. South from sample No. 4 a barren width ~~with~~ of 8 feet in the ~~south~~ east wall of the cross cut was not sampled. The material was blocky massive siliceous limestone and could easily be discarded ~~[illegible]~~ during mining operations. The ~~[illegible]~~ ~~area [illegible] crosscut~~ and the south wall of the crosscut ~~[illegible]~~ contained low grade material.

NEW Samples No. 5 was cut across the balance of the crosscut and drift south from ~~the~~ here. It averaged .60 oz Ag - 1.40% Cu across 7.8 feet. The ore shoot here has a width ~~[illegible]~~ in excess of 26 feet and the weighted average (excluding ~~[illegible]~~ 8 ft of barren ~~[illegible]~~ material) is ~~[illegible]~~ 2.60 oz Ag - 2.98% Cu. covering 18.7 ft of ore.

The weighted ~~average~~ of the two sets of samples ~~of the tunnel level~~

7.8
8
11
26 8

and the weighted average is 1.45 oz Ag - 1.94% Cu across 39 ft. Sample No 1 was cut approximately [illegible] above the tunnel level and the other samples were taken below the tunnel level.

across the ore body is ~~1.66~~ 1.92 oz Ag - ~~1.94~~ 2.30% Cu
In considering this average for the ore exposure on the level attention is called to the fact that ~~the~~ good ore continues in the wall beyond the bad sample (No. 4), ~~and that the barren material width of material between ore & barren and 5 is included in the weighted area.~~
As stated above this barren material could easily be excluded from shipment, and here and there in the other samples blocky patches of waste or very low grade material could be excluded.
Several irregular stopes (one estimated 2000 tons in total was stoped) were opened on both positions of the ore body. One of these stopes has caved out to the surface above the ore body, but does not open to the surface. The ore body at this place measures 25 feet in thickness above the tunnel floor, and the ore below here and in the balance of the tunnel working extends into the floor of the tunnel level. The stopes were either drawn empty or so badly caved that systematic sampling was not possible. The material in the walls and back of the stopes could be seen to be higher grade than on the level with the exception of the material of sample No. 4. (The degree of blue coloration of this material offers a practical measure for rough composite estimates). Sample No. 6 was cut across 20 feet in the west end of the stope ~~20'x20'~~

Quinn, said bottom not known, said to have been all in ore

Inclined that in mining this material the candidate felt that the surface ~~the~~ ~~and the discontinuity~~ ~~the~~ ~~material~~ ~~the~~ ~~sample~~ ~~the~~ ~~sample~~ ~~the~~ ~~sample

which connects with the west open cut by an opening ~~on top of the ore~~ in the capping on top of the ore. The ore ~~[illegible]~~ is not opened to full width laterally ~~limits of the [illegible]~~ and ore similar to that sampled continues into each wall of the stope. ~~[illegible]~~ The sample was 20 feet wide and assayed: 4.1 oz Ag - 4.83% Cu. Considerable ore of about this grade appears to remain available in the stope.

The dump at the portal of the tunnel is estimated to contain approximately 1000 tons ~~[illegible]~~ of medium to fine material ~~which contains~~ and contains appreciable copper throughout. ~~The applicant has shipped 6 carloads~~ from the dump without sorting. ~~The settlement shipments averaged~~ Settlement sheets show that ~~the shipped ore~~

MoP The applicant has shipped six carloads from this dump without sorting. Settlement sheets show that the shipments contained 317 tons assaying 1.04 oz Ag - 1.77% Cu.

The West Deposit is located in a flat area some 500 feet Northwesterly from the bulldozer hill deposit. Copper mineralization and some production has been made from a vertical shaft said to be 60 feet deep and a small surface cut

60 feet northwest from it.

This deposit is quite different than the bulldozer hill deposit. The copper occurs in the form of malachite, azurite and chrysocolla in a very highly altered silicified limestone. The material is crumbly and flaky and porous and by reason of its porous nature it is very light in weight. The ore is blue-green stained throughout and contains a network of seams and veinlets of black oxide of copper with occasional small masses of the black oxide. The black oxide accounts for the major part of the copper value. Silica content is quite low.

The shaft is cored and filled to within 30 feet of the surface. The hole is 18 feet long and about 12 feet wide by 12 feet in depth. Sample No. 12 was cut across the southeast wall of the shaft near the top of the fill and 16 feet below the surface. Sample No. 14 was cut 5 feet below the surface in the same wall of the shaft. Sample No. 13 was cut across the northwest wall of the shaft about 5 feet above the fill and 25 feet from the surface. The samples assayed as follows:

Sample No.	Width	oz Ag	% Cu.
12	11.7'	0.5	6.80
13	9.0'	0.5	7.84
14	9.0'	0.5	3.63

The southwest wall of the shaft was firm rock. The northeast wall was soft flaky altered material ~~with some~~ containing some copper mineralization. At sample No. 13 the ore limit was not reached in the northeast wall. Above here the northeast wall was soft flaky altered material ~~with~~ containing some copper mineralization and the limit of the ore in this direction was not certainly indicated in either of the two samples (Nos 12 & 14) on the southwest wall ~~(Nos 12)~~ of the shaft.

At a distance of 60 feet northwesterly from the shaft an open cut ~~between~~ was made upon what apparently is ~~appears to be~~ the trend of the shaft ore. A carload was shipped from here just prior to the acquisition of the property by the applicant. ~~The~~ settlement ~~for the shipments~~ sheet shows that the settlement contained 33 tons assaying 0.21 oz Ag - 7.7% Cu.

NOTE: A sample ~~[illegible]~~ (No 9) across the face of the cut assayed 0.2 oz Ag - 9.50% Cu. The sample was ~~[illegible]~~

19.5 feet in width ~~but it was cut~~ obliquely across the ore trend. The ~~ore~~ stringer width ~~of the ore width~~ is approximately 14 feet. ~~The sample assayed 0.2 oz Ag 9.5% Cu~~

A weighted average of samples Nos 9, 12 & 14 combined, and 13 is as follows:

Width	oz Ag	% Cu
11.1	0.4	7.82

The applicant shipped one car from the shaft dump. The settlement shows that the shipment contained 49 tons ~~assay~~ ~~Ans~~ silver and 3.46 % Cu. The dump ~~when~~ was shovelled ~~up~~ without sorting and ~~that appears~~ it is estimated that about 100 tons of this same material ~~remain on the~~ is available in the dump. A shovelled sample (No 11) assayed: 0.6 oz Ag - 4.29 % Cu.

Sample No 10 was shovelled from a waste portion of the dump which showed some copper. It assayed .50 % Cu.

The flat surface in this area ~~is flat and~~ is covered by several feet of dirt and it would be necessary to strip and trench the area to determine the extent of the deposit. The 60 foot shaft is reported to have been in good ore all the way to bottom and a ~~30 foot~~ crosscut 30 feet ~~at~~ northerly from the bottom is said to have been

The term lens implies ~~[illegible]~~ ~~[illegible]~~ ~~[illegible]~~

all in one assaying 5% Cu.

A vertical shaft said to be 115 feet deep was sunk some 250 feet southeastly from the above described shaft and it is said that sulphide ore was developed in a crosscut from the bottom. The shaft is partially filled and inaccessible. The dump shows no evidence that any important body of ore was encountered in the shaft workings. The shaft is partially filled and is inaccessible.

There was no other ore showings of interest on the property.

The slag dump at the old smelter site contains approximately 1200 tons. A considerable amount of the slag was handed out in bulk to anyone, many years ago, and portions of the dump have been screened and picked. It is said that shipments assaying up to 15% Cu were made, and it is estimated that the dump will average 2% or more Cu. The dump was not sampled but the estimate seems reasonable in view of the extremely poor character of the fusion and the fact that the ore

treated was probably comparatively high grade. If the project were granted a ~~high~~ special premium for copper it is probable that at least a portion of the dump would pay to ship provided, of course, the material would be acceptable ~~at~~ to local custom smelting plants.

C Proposed Development

1. ~~The property can be placed on production without further development or preparation beyond shallow stripping of overburden.~~

The applicant proposes to mine the two deposits by open cut method using a gas shovel. No mine development is ~~contemplated~~ proposed and no preparation for mining of the ore bodies will be required beyond a small amount of shallow initial stripping. Further stripping will be carried on simultaneously with ~~mining~~ ore extraction.

~~The applicant proposes to mine the ore bodies by gas shovel operations. This undoubtedly is the most feasable method~~

2. Mining by ~~shovel~~ power shovel is the most feasable manner to work the deposit ~~property~~. ~~If or when the ore bodies are proven to be deeper than~~ extend to a great depth than now indicated ~~other mining methods will be a change in the mining~~ in their proximity indicated limits. and the applicant by reason of his long experience in ~~ore~~ handling earth moving equipment and operations is well fitted to ~~handle~~ conduct ~~the~~ this type of operations. ~~The mining~~

3. It is expected that shipments will begin at a rate of 1200 tons per month and eventually reach a rate of upwards of 3000 tons per month.

D. Equipment

1. There is no equipment upon the property
2. Not applicable
3. Not applicable
4. The applicant proposes to purchase a Model 450 P&H 5/8 yard shovel, a compressor and drilling equipment.

Page 8.

5. No mill installation
6. There are no housing facilities on the property
7. No camp or other construction is contemplated beyond a ~~[illegible]~~ shop and tool shed, and wooden platforms for semi-tents.
8. A small amount of road construction and rehabilitation on the property is proposed.

E. Cost Estimates

1. Mining will be open cut methods
   a. Mining cost on an anticipated initial shipment rate of 1200 tons per month is estimated at $1.50 per ton for the Bulldozer hill deposit and $1.00 per ton for the West deposit. These estimates include trucking and storage of material, mining and concentration of material, maintenance, and general administrative costs.
   b. Not applicable
   c. Trucking ore to Salmonita is estimated at $1.50 per ton by the applicant. The haul is 15 miles over good road with few and moderate grades. With sustained volume production the trucking charge would be lower possibly $1.00 per ton. A figure of $1.25 would

appear ~~seem~~ to be a reasonable estimate.

1.40
2.70

i. Railroad freight charge to the Hayden plant of the A.S. & R. Co. is $1.40 per ton, and to the El Paso plant of this company $2.70 per ton. In the event that the A.S. & R. Co. ~~Hayden plant~~ ~~mill~~ would not accept the full tonnage output of the mine at the Hayden plant it is probable that some of ~~the~~ the ~~ore~~ would be diverted to their El Paso ~~plant of~~ smelter and that the company would absorb ~~would absorb all or~~ (and perhaps all) a large part of the freight differential.

A possible outlet for the ore would be ~~the~~ the Douglas smelter of the Phelps Dodge plant but ~~the~~ shipments to this plant would be on a contract basis which would be entered into by that company only after the shipper had demonstrated his ability to furnish a substantial rate of output (250 tons monthly minimum). The freight rate to Douglas is $1.00 per ton from. ~~Vail area which is about the same distance as Salmon~~

Mining cost

j. ~~Smelter treatment charge at the~~ Hayden or El Paso plant (probably) of the A.S. & R. Co. would be $2.50 per ton. Treatment charge at the Douglas ~~smelter~~ (and at the International) would be $3.50 per ton.

~~k.~~ Still another outlet for the ore would be available at the International smelter at Miami. The freight rate in this case would be $2.50 per ton ~~and the treatment charge~~ $3.50 per ton.

~~k.~~ Royalty is 10% of smelter net and would probably apply on the 5 of copper

$$\frac{25 \times 35 \times 2}{12}$$

2100

2

19000

25

35

7

1750

1550

2

3

12

1550

310

1250

210

pl. ~~mine~~ trucks would be required in (1) Total cost after shipment to Hayden would be about as follows:

1. Bullard's Hill Deposit

~~Mining~~	1.50
Trucking	1.25
Freight	1.40
Treatment	2.50
Royalty	.54 (10% of estimated smelter net, see below)
Total	$ 7.19

West Deposit

Mining	1.00
Trucking	1.25
Freight	1.40
Treatment	2.50
Royalty	.64 (10% of estimated smelter net, see below)
Total	6.79

Total Cost Shipment to Douglas

Bullard's Hill Deposit 7.72

West Deposit 7.34

In the event shipments were made to Douglas ~~Bisbee~~ the ~~to treatment~~ the above estimated ~~costs~~ would differ by ~~the~~ amount of difference in freight rates and royalty charges and would be about as follows: (roughly)

2. Inapplicable

3. Approximate premium for industrial insurance is estimated at $75 per month

By Reser
T. Tomsage
Approved [illegible]

F Ore Reserves

1. Tonnage

Bulldozer Hill Deposit

Approximately 12,500 tons appears to be reasonably assumed in the Bulldozer Hill deposit. Values in the cuts at both ends of the deposit and in the tunnel workings suggests the strong probability that ore values will persist in the block between the tunnel workings and the ~~east~~ upper or east cut. The above tonnage estimate is ~~estimated~~ based upon an ore block 35 feet wide, 30 feet thick and 200 feet long on the dip or

$$\frac{200 \times 35 \times 30}{1.25} = 16,800 \text{ tons}$$

MoR Approximately 2000 tons in the above block has been stoped out in the tunnel workings and of the ~~balance~~ remainder it is estimated that about 30% will be discarded as ~~barren or~~ ~~barren~~ submarginal ~~material~~ Tonnage ~~barren material~~

~~(1680 - 2000) x 70% = 10,360 tons~~

~~The above estimate~~

of shipping ore available therefore would be: (16800-2000) x 70% or 10,360 tons. This tonnage estimate does not take account ~~of the fact~~ ~~that~~ the flow of tunnel level within the lateral limits of the ore shoot is still in ore and that ~~the~~ 40 foot winze is reported to have been in ore.

West Deposit

Approximately 12,800 tons appear to be reasonably assured in the West deposit. This estimate is based upon the ore exposures in the ~~est~~ shaft and cut at this place and assumes an extension of ~~ore~~ 10 feet beyond the end exposures and ~~an extension of~~ 10 feet ~~above~~ below the shaft fill. The tonnage in the block is calculated as follows:

$$\frac{80 \times 12 \times 40}{14} = 2760$$

MoPP This tonnage estimate does not consider the fact that the ore is probably ~~wider~~ thicker than shown by the samples, ~~nor that~~ the reports regarding ore in the deeper portion of the shaft. These reports appear to be authentic and are supported in part at least by the amount and grade of the material on the dump (see applicant's carload shipment (3.58% Cu) and dump sample No 11). As ~~also~~ explained earlier in this report it is ~~difficult~~ impossible to ~~approx~~ estimate the extent of the deposit in its present state of development. It seems probable however that the amount of ore available here will prove to be considerably larger than the 2500 tons estimated above. ~~In the event that it extends to a substantial~~ the method of mining proposed by the applicant would be feasible only for ~~the~~ a shallow depth

M.P. ~~This tonnage estimate does not consider the fact that the ore is further under than shown by the sampling, nor that the reports (apparently authentic) and supported in part at least by the amount and grade of material on the dump, sample Nos. 11)~~

~~the deposit by sampling, some the report regarding the fact of the continuation of ore to the bottom of the shaft and in the cross cut appears authentic, and~~ as reported apparently authentically, and supported in part at least by the amount of ore presently on the dump. ~~It seems probable therefore that the amount~~ as shown ~~stated~~ earlier in this report it is difficult to appraise the extent of the deposit in its present state of development. ~~It seems probable that the amount of ore available here will~~ and if the deposit proves to extend to any considerable depth an underground method of mining will be required, with of course a substantial increase in the mining cost.

Dump Ore:

The ~~results~~ returns from the ~~the~~ applicants' shipments of unsorted dump material from the tunnel workings and the West deposit, ~~indicate~~ together with the appearance of the upper dumps, and the grade of dump samples Nos 11 and 15, suggests that with a special premium price for copper a substantial amount of copper is recoverable ~~from~~ in the dumps. The dump tonnage available ~~in the dumps~~ is estimated at ~~upwards of about~~ 3000 tons which will assay approximately 1.10 oz/ton 2.0% Cu. Probably several hundred tons of dump material could be shipped at 3% Cu.

300
150
100
800
500
50

Smelter Slag

Tonnage and probable value of smelter slag were discussed earlier in this report. Under favorable price and marketing conditions it seems likely that this material could be profitably handled.

2&3 Values and Indicated Profit

~~Pulled down with the rest~~

~~A weighted average of the samples across the ore body on the tunnel level, in the stope and at the upper open cut is as follows:~~

Oz Ag	% Cu
2.19	2.90

~~Some dilution of ore grade would be inevitable, principally from the caprock, but the amount of dilution would be small and would probably be more than offset by the amount of selection and sorting of ore which is possible. It will be noted that the above grade of ore is not a great deal higher than the dump material. I believe that the grade of ore shipped could be held to the above grade or above calculated grade and possibly somewhat higher.~~

~~The indicated profit on this ore would work out about as follows:~~

~~Silver (2.19 - .5) x .69 x .97 =~~

~~Copper (58 lbs - 8 lbs) x .97 x .1905 =~~

~~"A" premium copper .57 x 97 x .5 =~~

~~Total Payment per unit~~

223. Values and Indicated Profit

Bulldozer Hill Deposit

A weighted average of the samples across the ore body in the tunnel workings and at the upper cut was as follows:

Oz Ag	% Cu
2.56	3.0

It will be noted that the sampling checks reasonably well with those shown on the applicant's map. Actually this copper is somewhat higher and the silver lower.

MTP Some dilution would be inevitable principally from the cap rock but the amount of dilution would not be large and would probably be more than offset by selection and sorting of the ore mined.

The indicated profit on one of this grade if shipped to Hayden would work out about as follows:

Silver: (2.56 - .5) × $.69125		1.42
Copper: (60 lbs - 8 lbs) × 95 × $.0905		4.47
"A" premium copper 60 × 97 × 5		2.97
		8.86
less: Freight	1.40	
Treatment	2.50	3.90
Net smelter value		4.96
less: 10% royalty		.50
		4.46
less: Trucking	1.25	
Mining	1.50	2.75
Indicated Profit		1.71

If shipped to Douglas the profit would work out about as follows:

Silver 2.56 × .90 × .70625		1.63
Copper (60 - 10) × .9275		4.64
"A" premium 60 × 97 × 5		2.97
		9.24
less Freight	1.00	
Treatment	3.50	4.50
		4.74
less 10% Royalty		.47
		4.27
less Trucking	1.25	
Mining	1.50	2.75
Indicated Profit		1.52

If shipped to Douglas the profit would work out about as follows:

Silver 2.56 × .90 × .70625		1.62
Copper (60 - 10) × .9275		4.64
"A" premium 60 × 97 × 5		2.97
		9.23
less Freight	1.00	
Treatment	3.50	4.50
		4.73
less 10% Royalty		.47
		4.26
less Trucking	1.25	
Mining	1.50	2.75
Indicated Profit		1.51

West Deposit

The assays of my sampling in the West deposit show 0.4 oz Ag and 7.80% Copper. It will be noted that the copper in my assays is ~~my samples average~~ higher than those shown on the applicant's map on the claim is known, particularly my sample No. 9. The black oxide mineralization in this

deposit is quite erratic and hardly ~~and it seems likely that samples taken~~ ~~and for this reason a number of samples~~ ~~figures which would be if it is believed~~ ~~that a more reliable average~~ and the average thickness of a a large number of samples would give a more reliable figure as to the grade of ore exposed. For this reason ~~these results~~ the applicant's assays are included in the following calculation which is:

Oz Ag	% Cu
1.86	5.73

Because of the soft nature of the ground dilution would be a serious factor particularly with the proposed method of mining the deposit. If a dilution factor of 30% were applied to the above the grade of ore produced would be .60 Oz Ag – 4.01% Cu

The indicated profit on this ore ~~would~~ if shipped to Hayden would work out about as follows:

Value per ton

Copper	(80 – 8) × 95 × .0905) =	6.19
"A" premium	80 × 97 × 5 =	3.88
		10.07
less freight	1.40	
Treatment	2.50	
		3.90
Net Smelter Value		6.17
Less 10% Royalty		.62
		5.55

Less trucking 1.25
Mining 1.00
2.25

Indicated Profit $3.30
(see schedule of Bulldog Hill deposit above)

If shipped to Douglas or Miami the indicated profit would be $3.03 and $1.95 respectively

The above calculation of indicated profit for the two deposits is based upon the "A" premium only for copper. A former operator applied for an 8½¢ special premium for copper in December 1943 and was refused the premium because of the then existing copper situation. The ~~present~~ applicant has requested reconsideration of the application for ~~per~~ special premium and has been advised that the subject is under consideration by the quota committee at the present time. If a special premium in this amount was granted the above indicated profit estimates would be increased ~~by~~ by $4.95 per ton for the Bull dog Hill deposit and $6.60 for the West deposit, and the dump material, both ore and slag, could be shipped. Actually, however, the granting of a special premium would ~~[illegible]~~ result in the inclusion in shipments of a large volume

of presently sub-marginal material in the tin-deposits and would result in a ~~very substantial~~ much larger production of copper.

If the need for copper is indeed urgent it would seem that the profit would be clearly adequate for a special copper premium.

8 Objections to Project

A. There are no local or regional objections to the project

B. The project promises to ~~[illegible]~~ produce a substantial ~~[illegible]~~ amount of copper almost immediately, and the production would be made at extremely low relative expenditure of labor and critical materials.

9 Time Schedule

A. The project should be in full production within 60 days of its inception.

B. The project would operate at all seasons throughout the year.

C. The project ought to be able to repay the loan within 18 months

10 Estimated Cost of Project

A. No development is contemplated

B. 1 - Model 400 P&H Shovel with dipper, boom, and dragline bucket. The applicant ~~operator~~ is experienced in operating and handling these ~~[illegible]~~ equipment. He knows exactly what he wants and has obtained firm bids on these ~~[illegible]~~ items. $5500.00

Compressor and drilling Equipment 3000.00

Note:

C. Construction of sheds and tent platform.. ~~is estimated~~ 100.00

Construction and rehabilitation of roads 450.00

550.00

~~D & E General Expense and Contingency Supervision, Insurance compensation, & interest etc.~~

~~15,000~~

D. General Expense

Working capital for 90 days 4000

~~Industrial & Insurance~~ including employees Deposit 450

~~& interest~~ 15,000 loan at 4% 600

E. Contingencies 900

Total $ 15,900

Comments of Supervising Engineer

Sampling of the ~~project~~ property indicates that ~~as~~ approximately 12,500 tons of ore ~~ore is reasonably well available in the two deposits. A market~~ of a grade which will return a modest profit on the "A" premium for copper ~~and a~~ is available ~~available~~ in two ~~a~~ deposits, and ~~the prospect the alt that~~ the ~~tonnage~~ is good reason for believing that a substantially larger tonnage than ~~will~~ now proven will ultimately be produced. In the event that ~~a~~ special copper premium is granted to the property ~~the profit margin~~ a greatly increased tonnage of dump material and presently sub-marginal ore would become available.

~~The proposed project would begin a substantial amount of copper within a short~~

~~begin producing a substantial amount of copper within a short time, and the production not to make and the expenditure of labor and critical material would be unusually small~~

The proposed project would begin producing a substantial amount of copper in the a short time, and the expenditure of labor and critical material in its operation would be relatively small.