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REPORT ON ORO GRANDE PROPERTY
BY
S. F. PARRISH, E.M.

Frank A. Keith, Esq.,
General Manager The Tonopah Mining Co., of Nevada,
Tonopah, Nevada.

1907
Tonopah, Nev. June 10, 1900

Dear Sir:

I beg to submit the following report as the result of my trip to the property of the Oro Grande Mines Company in the Black Rock Mining District, Yavapai County, Arizona, near the town of Wickenburg.

After talking the matter over with you and receiving your memorandum of the information you desired re the above property I left Tonopah the morning of May 29th., inst., and arrived at the mine June 1st., twenty four hours late on account of delays caused by two freight wrecks.

Wickenburg is a station on the Santa Fe, Prescott and Phoenix Railway, (Now Santa Fe) a part of the Santa Fe system branching from the main line at Ash Fork and running South. (Now a junction point of the Phoenix, Parker Los Angeles route of the Santa Fe.) It is 140 miles south of the main line and 54 miles north of Phoenix and is a town of a few hundred inhabitants where all ordinary mine supplies can be had at reasonable prices.

The property of this Company is located $4\frac{1}{2}$ miles north of Wickenburg and is easily accessible by a good wagon road with good grades, it fords the Hassayampa River, but this, excepting at very high water, which is rare and for a few days at a time only, is not an inconvenience.

This property consists of nine mineral claims (see Exhibits A, part of this report) all of which are covered by United States Patent; they are named as follows: the Copper Head, May, Dutchman, Frenchman, Nigger Ben, Colossal, Alma, Montana and Oro Grande. In addition to these there are three mill sites belonging to the Company; these are located on the Hassayampa River about a mile and a half northwest of the above group of mineral claims and from the pumping plant located on them, an ample supply of water for the mine and mill is conveyed thru a four inch pipe line.

All of the underground development upon the property is on the Copper Head Claim and has been done through and from the main Copper Head shaft.

The elevation of the collar of this shaft is 2500 feet above sea level and its depth is 300 feet. Water stands in the shaft now to a depth of about 70 feet. The flow of water in sinking was inconsiderable and I do not think serious trouble from this cause need be anticipated for at least several hundred feet deeper, and may not be then, the ground is open and does not appear to be wet.

There are three levels turned from the shaft at 100, 200 and 300 feet respectively. The shaft was sunk in an ore body nearly to the bottom and the levels and the crosscuts from them have almost entirely been driven in the same ore body as shown on the plan of the mine and the longitudinal and cross sections herewith; (see Exhibits B, C and D.) The location of this shaft is an excellent one for the purpose of prospecting the ore body but to extract the ore it will be found advantageous, I believe, to sink a new shaft in the country rock near the ore body.

The work done has disclosed a mass of low grade gold ore with a varying width and a depth limited by what appears to me to be an intruded sheet of diorite, the thickness of which has not been satisfactorily determined. I have classed this as an intrusion because of its regularity and the constancy of its dip, at the same time I have found no evidence of it in the country rock on either side of the ore body on the surface; there is considerable wash here however, and it may be covered up. By referring to the longitudinal section herewith, (Exhibit D.) I can more easily make myself understood.

The intruded sheet rises from a depth of about 416 feet from the surface under the most southerly limit to which the ore body has been explored, this is the second level about 260 feet south of the shaft, at an angle of 38 deg. from the horizontal, this varies but slightly, at times it is 35 deg. and near the surface it is 40 deg. This for present purposes I shall assume as the floor of the ore body, although there is strong evidence from croppings still further to the north that the ore exists under this intrusion. The horizontal measurement of the ore body I shall take as extending from its vertical measurement to the south of the shaft described above as the southernmost limit to which the ore has been followed, north to the outcrop of the intrusion described above, drawn from the collar of the shaft. This gives a right triangle having an area of 119,808 square feet. This is not entirely accurate as it will be seen on the longitudinal section that on the first level the ore does not extend quite as far south as it does on the second level, but as it does extend considerable farther south on the third level, in all probability, and is there much wider, I am safe in making the estimate I have.

The width of the ore body is much more difficult to determine with accuracy, indeed with the present development it can only be approximated. On the west is a well defined and quite regular wall of quartz diorite as will be seen by the cross sections, (Exhibit D) against this lies the ore body. Both the wall rock and the ore are somewhat altered near the line of contact but not materially so. On the east the country rock is schist, and bands of coarsely crystallized quartz and feldspar, and fine silvery shales. Between these lies the ore mass. As stated above the west line is well defined while the east is indeterminate, for extending far beyond the limits I have in a more or less arbitrary manner determined upon adopting as the east wall, bunches of rich gold ore have been extracted. In this connection it might be well to state here that the owners have been obliged, in order to obtain funds to work with, to gouge out pockets of rich ore found in various places, mostly on and above the first level, and near to and north of the shaft, and north of the shaft on the second level. What has been done in this way however has not materially reduced the value of the whole ore body, as in all only 8861 tons of ore have been mined, 2,000 tons of which was material that had been sorted from the

Parrish report - 3.

run of the mine ore and put on the dump as waste.

With a width of 100 feet of ore, and the area of this triangle as above described there is in the mine now a mass of ore containing 11,980,800 cubic feet or 998,400 tons estimating twelve cubic feet to the ton. I figure on 35% of this being waste, leaving 648,900 tons net.

The ore body is a brecciated and conglomerated mass held together with quartz and clay and calcite. The boulders are mostly of diorite and quartzite and the broken and angular pieces of schist and quartz more or less decomposed and of all sizes mostly small.

The cementing material carries the gold values. There is a very little silver associated with the gold. In places apparently without relation to the gold ore, high grade copper ore, mostly oxidized is found, carrying scarcely any gold, but some silver, in one instance as high as 31 oz. per ton.

Following are a few mine assays I found recorded in the mine office, made in January and March 1901.

Gold Ozs.	Silver Ozs.	Copper %	Gold Ozs.	Silver	Copper %
1972.20	329.4	---	1.44	None	---
163.55	5.7	---	1.16	"	---
---	---	20.	0.60	"	---
---	---	4.	7.88	"	---
---	---	22.	6.25	"	---
None	1.0	2.	.50	"	---
"	31.	24.	8.92	"	---
"	3.0	15.	.32	"	---

Owing to the physical character of the ore mass and also to the coarseness of the gold in many instances, it is impossible to hand sample the mine and obtain results which can in any way be relied upon; they are either entirely too high to base any calculations upon or so low that a margin of profit in mining and milling the ore would appear to be out of the question. When it is considered that the rocks of which the boulders in the ore body are made and the pieces of schist and quartz composing the breccia, are barren, this can be appreciated. The only method of determining the value of the ore body is by carefully weighing the ore as it is delivered to the mill and as carefully valuing the gold recovered from the plates and assaying the tailings.

So far the ore run through the mill has shown a greater value than the cost of mining, hoisting, delivering it to the mill and milling it. From information I obtained at the time I should judge the value to be in the neighborhood of \$5.00 per ton.

The following figures were obtained: -

Mining and delivering ore to mill, cost per ton,	\$ 0.917
Milling,	Do. 1.116
Blacksmithing,	Do. 0.029
Water, including camp supply,	Do. 0.295
Stable, one half,	Do. 0.074
General, legal, office expense,	
Salaries, assay, taxes, ins., trav. one-half,	0.360
TOTAL	\$2.791

I examined and copied bullion receipts for bullion sold from October 19th, 1903, to April 14th, 1905, amounting to \$40,888.74.

Tons of ore milled,	8861
Received per ton	\$4.61

Of this 8861 tons milled, 2,000 tons came from the dump material that had been previously sorted from the ore and which I was told yielded but \$1.44 per ton; deducting this amount would leave 6861 tons milled for which was received \$38,008.74 or \$5.53 per ton.

As will be noted I have not included on the statement of mining and milling the ore, any charge for exploration work. As the mill has in the main been used to sample the ore and its capacity in no way equals an ordinary output for the mine, such a charge seemed unwarranted.

The tailings assays show a good saving by straight amalgamation. Any other or any additional method of milling will not be necessary so long as the ore retains its present character. Of 128 tailings assays I examined, 84 showed a trace only of gold, and the rest with 13 exceptions, taken when the screens had burst or very bad milling had been done, showed a loss of 20¢ per ton. 113 tailings samples showed a saving with the ore valued at \$5.00 per ton, of 96% of the gold.

The fuel used is gasoline which, if extensive operations were carried on could be replaced by electricity if desirable.

The water supply is ample at all times of the year for present purposes, and could be largely increased by impounding dams if it ever became necessary, both at the source of supply, The Hassayampa River, and below the mill. At low water there is a flow of 400 inches in the Hassayampa River and at higher stages of the water an almost unlimited supply. After being used for power and milling purposes this water is again returned to the river it came from with but a few miles intervening between the points of out-take and delivery. A four inch wrought iron pipe line one and one-half miles long now conveys the water to the mine from the river; after pumping from the river to the necessary elevation it is delivered by gravity. The cost of the water plant and line was as follows:

Pumping plant and house ready to start,	\$4,144.12
Pipe line,	5,550.51
Storage tank at mine, 35,00 gals.	262.68
Water line, telephone,	199.44
	<u>\$ 10,176.75</u>

A ten stamp mill, 1,000 lb. stamps, with a capacity of 45 to 50 tons of mine ore in 24 hours is in order and ready to start up. It is run by a 40 H.P. Gasoline engine.

Cost of mill bldg.,	\$5,069.30
Machinery & Tools	10,060.96

\$ 15,130.26

A four drill Sullivan Air Compressor is connected to the mill engine and furnishes compressed air for diamond drilling and machine drilling and other purposes. This, with two 2 1/4 in. Sullivan drills

cost, put in place ready to run, \$3,104.08. There is a practically new Sullivan "Champion" Diamond Drill; the diamond drilling cost \$2.45 per foot. The above drilling has materially aided in determining the extent of the ore body and the drill will doubtless be used in the future as a valuable aid in prospecting and development work.

At the Copper Head shaft is a gasoline hoisting engine powerful enough for the present. The mine buildings, including the residence and office and mine bunk house and boarding house and storage cellar and club house and good stable and corral, are all in excellent order, although the heat is great, with care and the use of some ice, there is not much loss in boarding house supplies.

Finally in regard to the mine equipment and buildings; everything is of the best quality and in first class condition.

On the Frenchman claim about 900 feet north of the Copper Head Shaft there is a good shaft sunk in the country rock east of the croppings of apparently the same ore body as I have above described; it was intended to use this as the main working shaft of the mine. It is down 100 feet but has not been connected with the vein.

There are a number of gold bearing quartz ledges on the property none of which however have been worked further than to obtain government title. That some of these may prove of value is quite possible.

This property lies at the southern extremity of the Bradshaw Mountains, in the foothills of the range, and is on the southerly slope of a divide, the summit of which is on the Frenchman claim at an elevation of 2,825 feet above sea level.

In the foregoing I have endeavored to convey to you the conditions existing at the Oro Grande property and trust you will have been enabled to grasp the situation existing there. The company is capitalized for \$3,000,000.00 having 300,000 shares of a par value of \$10.00 The present Company, The Oro Grande Consolidated Mines Co., an Arizona Corporation, hold entire title to the property and is capitalized at \$3,000,000.00 with 3,000,000 shares of \$1.00 par value E.S.U.)

The proposition as given me by Mr. George B. Upton, one-third owner, (now holding all except a few thousand shares of the present corporation) is as follows:

The Lamb Estate has invested in the property \$275,000 and owns 200,000 shares of the stock upon which Mr. Upton has an option. Etc., (I have elided the portion of Mr. Parrish's report relative to this matter, as Mr. Upton is now the entire owner of the property through arrangements made with previous partners, and the matter has no bearing upon the essence of the report. E.S.U.)

After a careful investigation of the mine, I feel entirely justified in recommending it to your favorable consideration. There is a very large tonnage of ore exposed now, which, judging by what has been done, can be mined and milled at a substantial profit. How much per ton I do not feel that I have a right to estimate until the value of the mine run of the ore is more definitely known.

Nearly nine thousand tons of ore have been mined and milled, showing a profit of \$1.82 per ton, but I do not feel satisfied that this ore represents in value the ore left in the mine. It may be more or less, but 2,000 tons of it represented material thrown away as waste, and a considerable portion of it was ore known to be rich or at any rate richer than the general ore body. The remainder came from running drifts and cross cuts in the mass of ore; and this is what would have to be depended upon for profit until further ore bodies are developed. The limits of the present ore body have not been found and that a very large amount will be disclosed by further development, is a reasonable deduction. In the prosecution of this work a more definite knowledge of the origin of the existing body will be obtained and intelligent prospecting for further bodies will be made more possible.

If you decide to go to work here, and as I said I feel entirely justified in recommending your doing so, I should advise a careful sampling of the exposed ore body by mill runs made on ore taken from different parts of the mine, and the opening up of the ground in such favorable places as are indicated on the surface; and of carefully exploring by diamond drill at first so far as possible the country underlying the present floor of the ore.

Thanking you for this expression of your confidence in my judgement, believe me,

Yours sincerely,

(Signed)

S. F. Parrish,

ORE GRANDE MINE

by G. M. Colvocoresses

Visited Second time 1/21/32 with E. S. Upton.

Last mill run, 80 tons @ \$4.20 per ton recovered and 243 tons @ \$3.00 per ton recovered.

This makes it appear doubtful if average grade of ore body will equal \$3.00 since Upton was trying to take out a high ^{of} grade/ore (if he could find it,) but he thinks that he got an average grade.

One Frenchman claims there is outcrop of ore on top of hill and some 200' above shaft and 1500' to the south of it. At this point there is an adit run in 30' to the S. and a winze from it 30 feet deep. Looks like a fair grade of ore in the breccia, but no samples seem to have been taken. About 500' north of this adit, i.e. 1000' south of the shaft there is a shaft 100' deep sunk in the hanging wall which is said to have bottomed in ore but no reliable information available.

On 100' level there is a long drift to the south and a cross cut has been started to the east and is now in 30', all this work is in the hanging wall and Upton thinks that they should catch the ore in another 10-15' of advance, judging by the location of the outcrop in the gulch above.

Present equipment is small gas hoist which should be O. K. to raise 50 ton from 300' level and take care of necessary development.

Portable compressor (borrowed or rented) up 160 cu. ft. which could be operated if power were available. The old type oil engine in the mill has only sufficient power to run the mill and is very wasteful of fuel. A new engine preferably a Diesel of 125 H.P. or more should be installed to run both mill and compressor.

Mill crusher is O. K, but it would be advantageous to follow this with a small gyratory or Simonds disc to send finer ore to the stamps and permit proper installation for samples which would obviate necessary of frequent clean-ups in the mill.

In the mine the percentage of waste to ore is said to

2- Oro Grande

decrease in 200' level and to be practically nil in 300'.

Am told that Place, engineer for Morton of Los Angeles, had the 300' level unwatered and sampled this in 1929 and Hussen says that his samples ran over \$3 but it is presumed that he found sulphides at this depth and very low values--no deal resulted.

Konselman has visited mine and thinks that grade of ore is very low and says that this opinion was reached by an engineer of the United Eastern Co. who turned it down.

Kruttschmidt of A. S. & R. Co., visited the mine briefly and thought the tonnage small and some think that the good ore is merely confined to a series of small pockets and balance of breccia is waste; I think this could only be proven by systematic sampling.

To operate mine and mill @ 50 ton per day would require about 20 men and cost say \$150 per day, which would be covered if \$3.00 per ton was recovered.

Capital investment required for thorough test.

1 Engine	\$7000
1 small crusher & sampler.	1000
Table & change in mill.	1000
Incidentals	1000
	<hr/>
	\$10,000

Payment to Upton ?

It is said that the liens against the property (now Jan.32) amount to about \$5000 which would probably have to be paid before test could start.

Capital expenditure as above	\$15,000
Preliminary exam. surveying etc.	2,000
Operating loss (maximum \$50 per day, 300 days.)	15,000
Overhead, etc.	3,000
Total risk	<hr/>
	\$ 35,000

February 9, 1932

Mr. George B. Upton,
Oro Grande Mine,
Wickenburg, Arizona.

Dear Mr. Upton,

I have your letter of February 7th and I have been giving considerable thought to the Oro Grande property and have communicated in a general way with other parties who might be interested, - not only the concern which I mentioned to your son and which, by the way, is not a New York company, but also with some of my friends in California who are anxious to expand their present mining operations.

Your property interests me very much and I believe that it would prove interesting to the parties with whom I have discussed it, but none of us would be prepared to continue negotiations on the basis of the terms which you originally outlined nor as modified in your letter of February 7th, and I think it is only fair to state the case frankly so that you will understand my position and in order that neither of us will continue to work at cross purposes.

I have obtained considerable outside information concerning the examination of the Oro Grande made by various Engineers and this is not at all favorable. Apparently these men all considered that your ore body was either too low grade or too small to justify any interest on the part of their principals and this is proved by the fact that you have had it hold it so long. I was particularly disturbed by a statement that the Engineer who examined your 300 ft. level in 1929 found the ore body very small and very low grade and that

Mr. Geo. B. Upton, -2.

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none of his samples showed pay ore. Perhaps this is untrue, but in any case, I think that you should, if possible, obtain a copy of that man's report and submit it along with the other data.

My own impression concerning your mine is that you have a very large body of mineralized ground, but that neither you nor anyone else has any reliable data as to its average value. Parrish quite ~~probably~~ ^{possibly} was unwilling to estimate the grade and I see no justification for the estimate of Bray nor Defty, and in my opinion there will be no means of determining whether your ore contains \$3.00 or more per ton, in which case it will be very valuable, or whether it contains on the average less than \$1.00 per ton, in which case it may have no value whatever.

Under these circumstances I am compelled to consider your Mine as a promising prospect and it is a pretty well established principle in mining deals that no Company is going to pay for the privilege of spending their money to determine the value of another man's mine, even tho they may be willing to risk money in actually determining the true conditions.

We are all agreed that your property cannot be sampled by hand, at least in any reliable or satisfactory manner, and I should advocate the operation of your present Mill for a period of one year on sample lots taken from a number of different places in order to establish a true basis for estimating the value of the ore. This work, I think, would cost over and above the returns from bullion some \$15,000 to \$25,000 and in order to operate efficiently, new equipment should be installed, costing about \$10,000. I do not think that it would be advisable to deepen your present shaft nor to open up the 400 ft. level until the grade of the ore on the 300 ft. and above had been pretty definitely established, but the

other development which you mentioned is quite in order and would probably cost an additional \$5,000 so that prospective purchasers taking over the development of your Mine would face an expenditure of \$30,000 to \$40,000 aside from any cash payment which they might make to you or the Company.

I realize that the corporate debts of the Company, which I understand are about \$6,000, would have to be paid and also that you would expect some cash payment for the option, altho I think that this should take the form of a sale of some of your stock as otherwise it does not seem to me to be justified.

Now, I am going to suggest a basis on which I believe that my friends would be willing to go somewhat further. I hardly expect that this will interest you at all at present, but perhaps you will think it over and feel differently at a later date and in any event, please do not feel offended at my suggestions which merely represent an opinion with which, of course, you are entirely at liberty to disagree.

As I understand the financial position of your Company, the authorized capital is 3,000,000 shares of \$1.00 par value. Of this stock about 40,000 shares is held by other parties and 2,960,000 shares is either in the Treasury or in your possession. I would suggest that 2,250,000 shares should be placed in the Treasury and valued for purposes of this deal at 10¢ a share. Its present value is nothing at all and its speculative value is certainly not more than 10¢ considering the amount of money which must be spent to determine whether or not it will have any real value.

The purchasers, after preliminary examination of your property to buy from the Treasury 60,000 shares for \$6,000, thus paying off the debts of the Company and at the same time to purchase from you 50,000 shares for \$5,000 which would leave you with approximately 660,000 shares.

Mr. Geo. B. Upton,

-4.

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The purchasers to acquire an additional 100,000 shares of Treasury stock thru providing the necessary equipment including a new Diesel Engine, which would be necessary to operate the Mine and mill in an economical manner.

The purchasers to agree to expend during the life of the option a minimum of ⁵⁰⁰⁰ \$10,000 per month for development and mining operations, the operations to take the form of the sampling by mill runs as previously mentioned and their net expenditure (over and above returns from bullion) to entitle them to receive additional Treasury stock on the basis of one share for every 10¢ expended. At the end of the year the property would be fully sampled and the value pretty well known and the purchasers would have acquired approximately 400,000 to ⁵⁰⁰ 450,000 shares of stock including the 50,000 which they would have purchased from you. There would remain in the Treasury some 1,800,000 to 1,900,000 shares of stock on all of which they should have an option on the same terms and thru the purchase of this they would be able to properly continue the development and equip the Mine with machinery and a large mill sufficient for operations on a commercial scale.

If it were determined that the mine required a larger Plant than this money would provide, the capital could of course be increased, but that situation could be taken care of when it arose.

Terms and conditions of this nature have, to my knowledge, been agreed upon by a number of large mining companies during the past few years. They are similar to those on which the Calumet and Arizona took over the controlling interest in the Verde Central and I believe they are somewhat similar to the terms made by the U.V.X. in dealing with the Vulture Company.

I have no doubt that you can work up a much better deal with pro-

Mr. Geo. B. Upton,

-5.

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motors or small concerns who would depend upon the sale of stock to finance their operations, but from my standpoint I think that such an arrangement as I have suggested would be fair and reasonable to both parties and I hope that these may appeal to you a little later, even if they do not seem favorable at present.

With personal regards,

Sincerely,

S. M. C.

GMC:HG

GEORGE M. COLVOCÓRESSES
MINING AND METALLURGICAL ENGINEER
1108 LUHRS TOWER
PHOENIX, ARIZONA

PRELIMINARY REPORT ON ORO GRANDE MINE

This property has attracted favorable attention for many years as offering the possibility of developing into a large low-grade gold mine. Actual development has been delayed because of uncertainty concerning the value of the great mass of the ore body and by the unreasonable terms which were asked by the owner. The recent advance in the price of gold has nearly doubled whatever value could previously be assigned to the ore, and the owner is now disposed to consider a modification of the terms to a basis that will be fair and satisfactory.

LOCATION, ETC.

The Oro Grande property consists of nine patented and five unpatented lode claims and three millsites on the Hassayampa River, all being in the Black Rock Mining District, Yavapai County, Arizona. The mine is located four and one-half ($4\frac{1}{2}$) miles north of the town of Wickenburg with which it is connected by a fair road, although at times the crossing of the Hassayampa River is difficult. The mine is one and one-half ($1\frac{1}{2}$) miles southeast of the Hassayampa River at the point where the millsites are located. The patented claims are named as follows:

Copper Head
May
Dutchman
Frenchman
Colossal
Nigger Ben
Alma
Montana
Oro Grande

The elevation at the Mine is 2500' above sea level and the country is rough with low ridges and hills separated by shallow canyons and washes sloping down toward the river. Aside from desert shrubs there is very little vegetation and no timber of any value. The climate is hot and dry but well suited to mining and milling. The average rainfall is about eight inches per annum. Ample water rights are held on the Hassayampa River and the present small pumping plant is connected to the mine by a pipe line.

At the millsites it should be possible to develop sufficient water, say 150,000 gallons per day, for the treatment of 500 tons of ore in a mill, but the present well would have to be enlarged and timbered and a new pumping plant and pipe line installed.

GEOLOGY

The country rock is Yavapai schist and locally this has been intruded by dykes of diorite and pegmatite probably all pre-Cambrian and recently by a volcanic breccia probably of Tertiary age. The breccia has been impregnated with mineralized solutions from which quartz and gold were deposited in the cementing material also a little copper and lead in places. The gold is all free and generally very fine and the metals were probably derived from heated solutions rising from a molten magma of which the breccia formed a part. The ore body or more properly the ore-bearing zone, seems to consist of the entire mass of breccia which I consider to be an intrusion forced up through a fissure in the older rocks and probably extending

downward to a great depth. In such a formation it is probable that the commercial ore is limited to a certain horizon where secondary enrichment has been responsible for a concentration of gold and other metals. The extent of this zone has not yet been explored below a depth of 280' from the surface, except by one diamond drill hole the record of which is not in my possession but which is said to have reached the foot-wall of the ore body at a depth of 370'. The length of developed ore may be taken as about 350' and on the first and second levels the average width is 100' but it is said to be nearly 300' on the third level suggesting that the present workings are located near the apex of the shoot and that the area of the ore body may increase as further depth is gained.

While the extent of the ore above the 300' level is thus partly determined the quality is still unknown and it is most essential to determine its average grade before any definite estimate as to the value of the mine can be made.

Because the ore bearing zone is practically a conglomerate with barren pebbles and gold bearing cementing material it is impossible to obtain any reliable estimate of average grade even by careful and systematic hand sampling and such samples cut in various parts of the mine have varied from a trace to \$100.00 per ton without permitting any reliable conclusion as to the average value of the ore. This has been variously estimated at from \$3.00 to over \$10.00 per ton based on the present price of gold.

More reliable information has been obtained from mill runs and it is recorded that in 1903, 8,861 tons of ore were milled

with an average yield equivalent to \$8.05 per ton and again in 1931 some 300 tons of ore were milled with a value of nearly \$4.00 per ton. In each case the recovery of gold in the batteries and on the plates exceeded 95% of the total value, and it is obvious that practically all of the gold is free milling and can be recovered by an inexpensive and efficient amalgamating process.

The Oro Grande Mine has been examined and reported on by a number of engineers but most of their reports are not now available. I have a copy of the report made to the Tonapah Mining Company in June 1907 by S. F. Parrish who highly recommended the property for further development and estimated a probable tonnage of 658,900 above the 300' level; but he does not attempt to give any average value to this ore. Parrish quotes the working costs of the experimental run at \$2.791 per ton on the basis of treating about 30 tons of ore per day.

In 1931 Mr. J. Carlton Bray of the International Engineering Company made an examination and estimated that the ore body above the 300' level contained 635,000 tons of proven ore to which he assigned (on the basis of the 1903 mill run) an average value of around \$9.00 per ton. Bray estimated that the cost of mining and treating the Oro Grande ore would be \$1.75 per ton when treating 1000 tons per day. The owner of the property, Mr. Upton, believes that the average value of the ore will be around \$8.00 per ton, and I have had a number of other opinions ranging from \$3.00 to \$7.00 per ton, including a letter from Mr. Rose, of the Mexican Goldfields Company, who says that the results of his investigation--which was not very thorough--lead him to conclude that the average value would be around \$5.50.

The various examinations which I have personally made of this mine and which have been made by engineers in my employ tend to confirm the estimates of tonnage given above, and I feel confident that there are at least 600,000 tons of ore or mineralized ground above the 300' level and also excellent chances that this figure will be increased to a total of 1,000,000 tons or more by further development in other portions of the mining claims and by continuing the development from the present underground workings below the 300' level. I cannot accept Bray's estimate of value nor that of the owner, but must agree with Parrish in believing that the records and available data furnish no adequate basis for any estimate of the average grade of the developed ore which for all we now know may be as low as \$2.00 per ton; in which case it is not commercial, but much more likely will have a considerably higher value.

My investigation of the workings indicates that the mining done in 1903 was naturally located in the sections of the mine which seemed to be the best mineralized and the mill run then obtained was by no means representative of the average grade of the ore body nor do the results of any hand sampling give any reliable data on which to form an opinion. It is my impression that the ore body will break down with an average grade of around \$5.00 per ton, but this can only be confirmed or refuted by further testing as suggested below.

As to working costs it is clear that a cheap method of mining can be effectively practiced and that the crushing and milling will be inexpensive so that I conservatively estimate a total cost of \$2.50 per ton on the basis of treating 300 tons per day or \$2.00 per ton on the basis of 500 tons per day. These estimates may well be improved in practice.

In view of the present situation of this property it is first essential to determine the average value of the ore and in my opinion this can only be done by carefully surveying the underground workings and dividing the developed ore into a number of representative sections, say twenty altogether. From each of these sections there should be mined a large sample of approximately 500 tons which should represent as nearly as possible the average material contained in this particular block of ground and each of these sample lots should be sent to the present stamp mill and treated separately with careful record of the values and recoveries. I believe that the present plant will be capable of treating approximately 1000 tons or two ^{such} ~~or~~ samples per month and allowing ample time for preparing the mine and mill for this work I believe that ^a total of 10,000 tons or twenty samples can be run during a twelve months period. The cost of such mining and milling will obviously be much higher than if one were operating for commercial profit, and I estimate the total expense, including supervision and engineering, at \$5.00 per ton or say \$50,000 for the years operation. The additional equipment required including a new engine and some drills etc., and the payment which would probably have to be made to the owners for the privilege of operating as above might add to the investment about \$10,000 making the total outlay \$60,000 against which there would of course be credited the value of the gold produced less a royalty and any other payments subsequently made to the owners. If the recovered value over and above the royalty was only \$2.00 per ton the net outlay would be \$44,000 whereas if the value as above should be \$5.00 per ton the net outlay would be reduced to

only \$10,000 and with higher values the test run might break even.

If this testing of the mine should prove, as I believe it will, that the average value is in the order of \$5.00 per ton the property will then justify the installation of a 300 ton per day mining and milling plant, which would call for an additional expenditure of probably \$150,000 and to this would be added the cost of additional development work and some payment to the owners, bringing the total capital investment, including the preliminary expenses, to approximately \$250,000 including^a working capital of \$50,000. If the further development, particularly below the 300' level should justify a 300 ton plant then the total investment would be around \$400,000. In the first instance the profit on 600,000 tons of \$5.00 ore with operating cost of \$2.50 per ton would be \$1,500,000 and in the second instance the operating profit on 1,000,000 tons of similar ore with working cost of \$2.00 per ton would be \$3,000,000. Assuming that the purchaser of the property can secure a 75% interest for the cost of the development and improvements plus a cash payment of not over \$50,000 to the present owners the investment gives promise of yielding a very satisfactory profit.

In view of the geological conditions and indications that the developed ore is of pay value and also that substantial additions to the ore body will later be found I highly recommend this property as the basis for a speculative mining venture which will at worst involve a possible loss of \$40,000 but which seems likely to result in a profit of several hundred per cent on the investment.

L. H. Colverson

NOTES RE ORO GRANDE MINE by S. H. C.

visited 2nd time 1/21/32 with E. S. Upton

Last Mill run 80 tons @ 4.20 per ton recovered and

243 tons @ 3.00 per ton recovered.

this makes it appear doubtful if average grade of ore body will equal 3.00 since Upton was trying to take out a high grade of ore, (if he could find it) but he thinks that he got an average grade.

Car Frenchman A Frenchman claims there is outcrop of ore on top of hill and some 200' above shaft and 1500' to the south of it. At this point there is an adit run in 30' to the S. and a winze from it 30+ feet deep. Looks like a fair grade of ore in the brecchia but no samples seem to have been taken. About 500' north of this adit i.e. 1000' south of the shaft there is a shaft 100' deep sunk in the hanging wall which is said to have bottomed in ore but no reliable information available.

on 100' level there is a long drift to the south and a cross cut has been started to the east and is now in 30', all this work is in the hanging wall and Upton thinks that they should catch the ore in another 10-15' of advance, judging by the location of the outcrop in the gulch above.

Present equipment is small gas hoist which should be O.K. to raise 50 ton from 300' level and take care of necessary development.

Portable compressor (borrowed or rented) up 160 cu. ft. which could be operated if power were available. The old type oil engine in the mill has only sufficient power to run the mill and is very wasteful of fuel. A new engine preferably a Deisel of 125 H. P. or more should be installed to run both mill and compressor.

Mill crusher is O.K. but it would be advantageous to follow this with a small gyratory or Simonds disc to send finer ore to the

stamps and permit proper installation for samples which would obviate necessity of frequent clean-ups in the mill.

In ^{the} mine ^{the} percentage of waste to ore is said to decrease in 200' level and to be practically nil in 300'.

Am told that Place, engineer for Morton of L. A. had the 300' level unwatered and sampled this in 1929 and Hussen says that his samples ran over \$3.00 but it is presumed that he found sulphides at this depth and very low values -- no deal resulted.

Konselman has visited mine and thinks that grade of ore is very low and says that this opinion was reached by ^{an} engineer of the United Eastern ^{Co} who turned it down, -- ~~might write to them.~~

Krutt ^{of A.S. & R. Co} visited the mine briefly and thought the tonnage small and some think that the good ore is merely confined to a series of small pockets and balance of breccia is waste, I think this could only be proved by systematic sampling.

To operate mine and mill @ 50 ton per day would require about 20 men and cost say \$150 per day which would be covered if \$3.00 per ton was recovered.

Capital investment required for thorough test:

1 Engine	\$7000
1 small crusher & sampler	1000
Table and change in mill	1000
Incidentals	1000

\$10000

Payment to Upton

?

It is said that the liens against the property now (Jan. '32) amount to about \$5000 which would probably have to be paid before test could start.

Cap. expenditure as above	\$15,000
Preliminary exam., surveying etc.	2,000
Operating loss (max \$50 per d, 300 d.)	15,000
Overhead, etc.	3,000

total risk

\$ 35,000

REPORT ON ORO GRANDE PROPERTY
BY
S. F. PARRISH, E.M.

Frank A. Keith, Esq.,
General Manager The Tonopah Mining Co., of Nevada,
Tonopah, Nevada.

Tonopah, Nev. June 10, 1900²⁷

Dear Sir:

I beg to submit the following report as the result of my trip to the property of the Oro Grande Mines Company in the Black Rock Mining District, Yavapai County, Arizona, near the town of Wickenburg.

After talking the matter over with you and receiving your memorandum of the information you desired re the above property I left Tonopah the morning of May 29th., inst., and arrived at the mine June 1st., twenty four hours late on account of delays caused by two freight wrecks.

Wickenburg is a station on the Santa Fe, Prescott and Phoenix Railway, (Now Santa Fe) a part of the Santa Fe system branching from the main line at Ash Fork and running South. (Now a junction point of the Phoenix, Parker Los Angeles route of the Santa Fe.) It is 140 miles south of the main line and 54 miles north of Phoenix and is a town of a few hundred inhabitants where all ordinary mine supplies can be had at reasonable prices.

The property of this Company is located $4\frac{1}{2}$ miles north of Wickenburg and is easily accessible by a good wagon road with good grades, it fords the Hassayampa River, but this, excepting at very high water, which is rare and for a few days at a time only, is not an inconvenience.

This property consists of nine mineral claims (see Exhibits A, part of this report) all of which are covered by United States Patent; they are named as follows; the Copper Head, May, Dutchman, Frenchman, Nigger Ben, Colossal, Alma, Montana and Oro Grande. In addition to these there are three mill sites belonging to the Company; these are located on the Hassayampa River about a mile and a half northwest of the above group of mineral claims and from the pumping plant located on them, an ample supply of water for the mine and mill is conveyed thru a four inch pipe line.

All of the underground development upon the property is on the Copper Head Claim and has been done through and from the main Copper Head shaft.

The elevation of the collar of this shaft is 2500 feet above sea level and its depth is 300 feet. Water stands in the shaft now to a depth of about 70 feet. The flow of water in sinking was inconsiderable and I do not think serious trouble from this cause need be anticipated for at least several hundred feet deeper, and may not be then, the ground is open and does not appear to be wet.

There are three levels turned from the shaft at 100, 200 and 300 feet respectively. The shaft was sunk in an ore body nearly to the bottom and the levels and the crosscuts from them have almost entirely been driven in the same ore body as shown on the plan of the mine and the longitudinal and cross sections herewith; (see Exhibits B, C and D.) The location of this shaft is an excellent one for the purpose of prospecting the ore body but to extract the ore it will be found advantageous, I believe, to sink a new shaft in the country rock near the ore body.

The work done has disclosed a mass of low grade gold ore with a varying width and a depth limited by what appears to me to be an intruded sheet of diorite, the thickness of which has not been satisfactorily determined. I have classed this as an intrusion because of its regularity and the constancy of its dip, at the same time I have found no evidence of it in the country rock on either side of the ore body on the surface; there is considerable wash here however, and it may be covered up. By referring to the longitudinal section herewith, (Exhibit D.) I can more easily make myself understood.

The intruded sheet rises from a depth of about 416 feet from the surface under the most southerly limit to which the ore body has been explored, this is the second level about 260 feet south of the shaft, at an angle of 38 deg. from the horizontal, this varies but slightly, at times it is 35 deg. and near the surface it is 40 deg. This for present purposes I shall assume as the floor of the ore body, although there is strong evidence from croppings still further to the north that the ore exists under this intrusion. The horizontal measurement of the ore body I shall take as extending from its vertical measurement to the south of the shaft described above as the southernmost limit to which the ore has been followed, north to the outcrop of the intrusion described above, drawn from the collar of the shaft. This gives a right triangle having an area of 119,808 square feet. This is not entirely accurate as it will be seen on the longitudinal section that on the first level the ore does not extend quite as far south as it does on the second level, but as it does extend considerable farther south on the third level, in all probability, and is there much wider, I am safe in making the estimate I have.

The width of the ore body is much more difficult to determine with accuracy, indeed with the present development it can only be approximated. On the west is a well defined and quite regular wall of quartz diorite as will be seen by the cross sections, (Exhibit D) against this lies the ore body. Both the wall rock and the ore are somewhat altered near the line of contact but not materially so. On the east the country rock is schist, and bands of coarsely crystallized quartz and feldspar, and fine silvery shales. Between these lies the ore mass. As stated above the west line is well defined while the east is indeterminate, for extending far beyond the limits I have in a more or less arbitrary manner determined upon adopting as the east wall, bunches of rich gold ore have been extracted. In this connection it might be well to state here that the owners have been obliged, in order to obtain funds to work with, to gouge out pockets of rich ore found in various places, mostly on and above the first level, and near to and north of the shaft, and north of the shaft on the second level. What has been done in this way however has not materially reduced the value of the whole ore body, as in all only 8861 tons of ore have been mined, 2,000 tons of which was material that had been sorted from the

run of the mine ore and put on the dump as waste.

With a width of 100 feet of ore, and the area of this triangle as above described there is in the mine now a mass of ore containing 11,980,800 cubic feet or 998,400 tons estimating twelve cubic feet to the ton. I figure on 35% of this being waste, leaving 648,900 tons net.

The ore body is a brecciated and conglomerated mass held together with quartz and clay and calcite. The boulders are mostly of diorite and quartzite and the broken and angular pieces of schist and quartz more or less decomposed and of all sizes mostly small.

The cementing material carries the gold values. There is a very little silver associated with the gold. In places apparently without relation to the gold ore, high grade copper ore, mostly oxidized is found, carrying scarcely any gold, but some silver, in one instance as high as 31 oz. per ton.

Following are a few mine assays I found recorded in the mine office, made in January and March 1901.

Gold Ozs.	Silver Ozs.	Copper %	Gold Ozs.	Silver	Copper %
1972.20	329.4	---	1.44	None	---
163.55	5.7	---	1.16	"	---
---	---	20.	0.60	"	---
---	---	4.	7.88	"	---
---	---	22.	6.25	"	---
None	1.0	2.	.50	"	---
"	31.	24.	8.92	"	---
"	3.0	15.	.32	"	---

Owing to the physical character of the ore mass and also to the coarseness of the gold in many instances, it is impossible to hand sample the mine and obtain results which can in any way be relied upon; they are either entirely too high to base any calculations upon or so low that a margin of profit in mining and milling the ore would appear to be out of the question. When it is considered that the rocks of which the boulders in the ore body are made and the pieces of schist and quartz composing the breccia, are barren, this can be appreciated. The only method of determining the value of the ore body is by carefully weighing the ore as it is delivered to the mill and as carefully valuing the gold recovered from the plates and assaying the tailings.

So far the ore run through the mill has shown a greater value than the cost of mining, hoisting, delivering it to the mill and milling it. From information I obtained at the time I should judge the value to be in the neighborhood of \$5.00 per ton.

The following figures were obtained: -

Mining and delivering ore to mill, cost per ton,	\$ 0.917
Milling,	Do. 1.116
Blacksmithing,	Do. 0.029
Water, including camp supply,	Do. 0.295
Stable, one half,	Do. 0.074
General, legal, office expense,	
Salaries, assay, taxes, ins., trav. one-half,	0.360
TOTAL	\$2.791

I examined and copied bullion receipts for bullion sold from October 19th, 1903, to April 14th, 1905, amounting to \$40,888.74.

Tons of ore milled,	8861
received per ton	\$4.61

Of this 8861 tons milled, 2,000 tons came from the dump material that had been previously sorted from the ore and which I was told yielded but \$1.44 per ton; deducting this amount would leave 6861 tons milled for which was received \$38,008.74 or \$5.53 per ton.

As will be noted I have not included on the statement of mining and milling the ore, any charge for exploration work. As the mill has in the main been used to sample the ore and its capacity in no way equals an ordinary output for the mine, such a charge seemed unwarranted.

The tailings assays show a good saving by straight amalgamation. Any other or any additional method of milling will not be necessary so long as the ore retains its present character. Of 128 tailings assays I examined, 84 showed a trace only of gold, and the rest with 13 exceptions, taken when the screens had burst or very bad milling had been done, showed a loss of 20¢ per ton. 113 tailings samples showed a saving with the ore valued at \$5.00 per ton, of 96% of the gold.

The fuel used is gasoline which, if extensive operations were carried on could be replaced by electricity if desirable.

The water supply is ample at all times of the year for present purposes, and could be largely increased by impounding dams if it ever became necessary, both at the source of supply, The Hassayampa River, and below the mill. At low water there is a flow of 400 inches in the Hassayampa River and at higher stages of the water an almost unlimited supply. After being used for power and milling purposes this water is again returned to the river it came from with but a few miles intervening between the points of out-take and delivery. A four inch wrought iron pipe line one and one-half miles long now conveys the water to the mine from the river; after pumping from the river to the necessary elevation it is delivered by gravity. The cost of the water plant and line was as follows:

Pumping plant and house ready to start,	\$4,144.12
Pipe line,	5,550.51
Storage tank at mine, 35,00 gals.	262.68
Water line, telephone,	199.44
	<u>\$ 10,176.75</u>

A ten stamp mill, 1,000 lb. stamps, with a capacity of 45 to 50 tons of mine ore in 24 hours is in order and ready to start up. It is run by a 40 H.P. Gasoline engine.

Cost of mill bldg.,	\$5,069.30
Machinery & Tools	10,060.96

\$ 15,130.26

A four drill Sullivan Air Compressor is connected to the mill engine and furnishes compressed air for diamond drilling and machine drilling and other purposes. This, with two 2 1/4 in. Sullivan drills

cost, put in place ready to run, \$3,104.08. There is a practically new Sullivan "Champion" Diamond Drill; the diamond drilling cost \$2.45 per foot. The above drilling has materially aided in determining the extent of the ore body and the drill will doubtless be used in the future as a valuable aid in prospecting and development work.

At the Copper Head shaft is a gasoline hoisting engine powerful enough for the present. The mine buildings, including the residence and office and mine bunk house and boarding house and storage cellar and club house and good stable and corral, are all in excellent order, although the heat is great, with care and the use of some ice, there is not much loss in boarding house supplies.

Finally in regard to the mine equipment and buildings; everything is of the best quality and in first class condition.

On the Frenchman claim about 900 feet north of the Copper Head Shaft there is a good shaft sunk in the country rock east of the croppings of apparently the same ore body as I have above described; it was intended to use this as the main working shaft of the mine. It is down 100 feet but has not been connected with the vein.

There are a number of gold bearing quartz ledges on the property none of which however have been worked further than to obtain government title. That some of these may prove of value is quite possible.

This property lies at the southern extremity of the Bradshaw Mountains, in the foothills of the range, and is on the southerly slope of a divide, the summit of which is on the Frenchman claim at an elevation of 2,825 feet above sea level.

In the foregoing I have endeavored to convey to you the conditions existing at the Oro Grande property and trust you will have been enabled to grasp the situation existing there. The company is capitalized for \$3,000,000.00 having 300,000 shares of a par value of \$10.00 (The present Company, The Oro Grande Consolidated Mines Co., an Arizona Corporation, hold entire title to the property and is capitalized at \$3,000,000.00 with 3,000,000 shares of \$1.00 per value E.S.U.)

The proposition as given me by Mr. George B. Upton, one-third owner, (now holding all except a few thousand shares of the present corporation) is as follows:

The Lamb Estate has invested in the property \$275,000 and owns 200,000 shares of the stock upon which Mr. Upton has an option. Etc., (I have elided the portion of Mr. Parrish's report relative to this matter, as Mr. Upton is now the entire owner of the property through arrangements made with previous partners, and the matter has no bearing upon the essence of the report. E.S.U.)

After a careful investigation of the mine, I feel entirely justified in recommending it to your favorable consideration. There is a very large tonnage of ore exposed now, which, judging by what has been done, can be mined and milled at a substantial profit. How much per ton I do not feel that I have a right to estimate until the value of the mine run of the ore is more definitely known.

Nearly nine thousand tons of ore have been mined and milled, showing a profit of \$1.82 per ton, but I do not feel satisfied that this ore represents in value the ore left in the mine. It may be more or less, but 2,000 tons of it represented material thrown away as waste, and a considerable portion of it was ore known to be rich or at any rate richer than the general ore body. The remainder came from running drifts and cross cuts in the mass of ore; and this is what would have to be depended upon for profit until further ore bodies are developed. The limits of the present ore body have not been found and that a very large amount will be disclosed by further development, is a reasonable deduction. In the prosecution of this work a more definite knowledge of the origin of the existing body will be obtained and intelligent prospecting for further bodies will be made more possible.

If you decide to go to work here, and as I said I feel entirely justified in recommending your doing so, I should advise a careful sampling of the exposed ore body by mill runs made on ore taken from different parts of the mine, and the opening up of the ground in such favorable places as are indicated on the surface; and of carefully exploring by diamond drill at first so far as possible the country underlying the present floor of the ore.

Thanking you for this expression of your confidence in my judgement, believe me,

Yours sincerely,

(Signed) S. F. Parrish,

NOTES

On Oro Grande Mine, visited March 21st and 27th, 1917, by L.F.S. Holland, representing Consolidated Arizona Smelting Company.

9 Claims patented.

Prospected originally for copper. Was operated as a gold mine, producing \$44,000.00 in free gold from 8861 tons milled. Possibilities of copper in commercial quantities with greater depth, and perhaps existing large reserves of profitable gold ore. Latter can only be verified by mill runs. Country rock coarse diorite and hornblende schist, trend of schist N. 37 E. cut by pegmatite dykes running at right angles to the schist. Ore body large mass of breccia and conglomerate limited by quartz diorite, which is probably an intrusive sheet, the thickness of which has not been determined. Specimens of rich gold ore consist of crystalline quartz aggregates, often black with manganese, with gold in shots and flakes; specks of gold in iron jasperoid; free gold in the cementing material of breccia, the fragments of which consist of hornblende schist and quartzite; and soft leached porphyry. The richest gold was found associated with boulders and hornblende schist. Some skeleton silica suggests leaching by sulphuric acid. At the mouth of the main shaft chrysocolla appears in calc-spar and iron, and there are showings of copper silicate and carbonates twenty feet down the shaft. The relation of this copper ore with the main ore body has not been determined. According to Mr. Upton, stringers and bunches of high grade copper ore were found in the breccia; in fractured portions of the intrusive diorite; and in the country rock on the east wall of the ore body, where the formation is shattered. Mr. Upton further states that stringers of bornite were found in the country rock on the 200' and 300' levels, and that a diamond drill hole 700' deep disclosed chalcopyrite sprinkled and in small veinlets in the country rock to the limit of the drill hole. No ore was obtained in the ore body owing to its friability.

My sample of what Mr. Upton thought good looking ore from the stope on the 50' level assayed only .04 oz. gold and .16 oz. silver, but hand sampling of an ore body of this nature is obviously of little value. I also inspected the stopes on the 100' and 200' levels. The 300' level is under water. The backs in all stopes are generally high, with indications of having been "gouged", and will require considerable preparatory work when the mine is reopened. Large horres of country rock were encountered in stoping, perhaps one-third of the ground broken. A sample of the intrusive sheet on the 100' level showing pyrite and marcasite, but no copper, assayed a trace in gold and .16 oz. silver. An estimate of the ore reserves made by S.F. Parrish for the Tonopah Mining Company made in 1907, which I have seen, indicates a triangle having an area of 119,808 square feet and a thickness estimated at 100 feet, or 998,400 tons. Estimating 35% waste, he shows a net tonnage of 648,900. Owing to the careful nature of the ore body and the coarseness of the gold, mill runs would be necessary to determine the value of these reserves. There is a ten stamp mill in fair condition on the property. The 8861 tons milled yielded \$4.61 per ton, but this included 2000 tons from the waste dump, which yielded \$1.11 per ton, so that the 6861 tons of mine ore yielded \$5.65 per ton. The mill recovery appears to have been about 96% of the values in the heads. The

company's books show the total operating cost of mining and milling, without development, to have been about \$2.25 per ton, and as low as \$1.97.

The Company (consisting chiefly of the Lamb Bros. now dead) spent \$240,000.00, less \$44,000.00 mill recovery. The proposal is that a suitable Company develop the property, paying an ultimate price of \$120,000.00 for two-thirds of the stock, making no payments for six months, then \$15,000.00, but no more for two years. These terms are considerably better than those on which the Tonopah Mining Company are said to have made arrangements to take over the property after Parrish reported in 1907, but which they are said to have postponed indefinitely owing to the financial panic in that year. W.E. Defty made the favorable report which caused the Lamb Brothers to finance the Oro Grande Co. I have seen the report but have not ascertained Mr. Defty's present views.

Report on the
ORO GRANDE CONSOLIDATED MINES,
Black Rock Mining District,
Yavapai County, Arizona

Four Miles North of
Wickenburg, Arizona

By

INTERNATIONAL ENGINEERING COMPANY,
El Paso National Bank Bldg., El Paso, Texas
309 Dallas National Bank Bldg., Dallas, Tex.

J. Carlton Gray, Mining Engineer.

El Paso, Texas,
September 15, 1931.

REPORT ON ORO GRANDE CONSOLIDATED MINES.

LOCATION:-

The Oro Grande mine lies $4\frac{1}{2}$ miles due North of the town of Wickenburg, Arizona. It consists of nine patented and five unpatented lode claims, and three mill sites on the Hassayampa River, one and one-half miles Northwest of the mine; All in Black Rock mining District, Yavapai County, Arizona. The mine is reached by a fair road from Wickenburg. No Power line is close to the mine, but a Diesel engine plant can easily be installed at Wickenburg.

DEVELOPMENT:-

The mine consists of a vertical shaft 340 feet deep, an inclined air shaft 100 feet deep and three levels. The 100 foot level connects the two shafts, and consists of 900 feet of drifts and 300 feet of cross-cuts, of which 600 feet are in ore of good grade. 900 300 220 370 900

The 300 foot level consists of 220 feet of drifts and 370 feet of cross-cuts, 400 feet of which are in ore. At the bottom of the shaft, (340 ft.) a drift 85 feet long penetrates a fault and shows the ore body. 370

The 200 foot level consists of 900 feet of drifts and cross-cuts, 700 feet of which are in ore.

Short levels at 20 and 50 feet, raises and stopes comprise at least 500 feet of workings not mapped to date, making a total of over 3600 feet of workings. x

These workings prove the Ore Shoot on the Copperhead Claim to be 435 feet long and from 90 to 190 feet in width to the 300 foot level. The Ore Shoot on the Frenchman Claim is over 300 feet long on surface, but only developed by a short drift and winze.

EQUIPMENT:-

Equipment consists of Pumping Plant, 8,000 feet of 4 inch water line, 100,000 gallons steel water tank, 25 H.P. gasoline engine; 25 HP Hoist, gasoline type, cage and buckets, blacksmith shop and tools, 4 drill Sullivan Air Compressor, 1-Sullivan diamond drill, ore cars, tracks and mining tools, 50 Ton capacity 10 stamp mill, bunkhouses and camp buildings.

GEOLOGY:-

The country rock is diorite on the west wall of the main vein and Hornblende and other Schists and Diorite on the East wall. All these rocks are metamorphosed and are probably pre-Cambrian in age.

The Diorite seems to be intrusive and consists of Hornblend and a soda-line feldspar, probably Labradorite. It varies from as much as 90% hornblende and to as low as 40% hornblende. Accessory original minerals such as Pyroxene are scarce, but secondary minerals, such as Epidote are common, due to the metamorphism. The diorite carries inclusions of schists which may have been sedimentary rocks originally, or may have been developed by shearing and metamorphism of the diorite itself.

DYKES:-

The Diorite is intruded by a series of Aplite and Pegmatitic dykes which have a general East-west strike, and consist of quartz, orthoclase and black tourmaline and are extremely irregular in shape and composition. There are also small intrusions of basic pegmatite, consisting of plagioclase feldspars, pyroxene and hornblende.

A series of small, nearly vertical dikes of hard, finegrained, dark rock, locally called "Syenite" has an East-west trend, dipping north. These rocks may be Andesite, Trachyte or Diabase, but require a microscope for determination. They are evidently associated with the ore deposition, and are much younger than the diorites.

METAMORPHISM:-

The diorite was metamorphosed at the time of the Aplite intrusion, forming Epidote, Chlorite and other minerals along the joint planes; but the most important result was the changing of the diorite to Schists along shearing planes having a Northeast-Southwest trend.

VEINS:-

The veins are zones of shearing in the schist and diorite. The Oro Grande vein is from 100 to 200 feet wide and traceable on surface for more than 3,000 feet, being terminated on the South by a fault and covered on the North by Tertiary Andesite flows. The strike is N. 30 degrees E. and dips approximately vertically or nearly parallel to the schistosity. Two other similar veins outcrop on the property.

Ascending solutions in these shear zones decomposed the broken schists and diorite, forming Sericite and Kaolin and depositing Quartz, Calcite, Pyrite, Chalcopryite and Gold; thus forming the ore bodies. These ore bodies are elliptical in shape on any level and rake to the South at about 40 degrees. There followed a long period of oxidization by surface waters which completely removed the sulphides and copper, leaving oxides of iron and native gold, with a few small bunches of rich oxidized copper ores and small amounts of silver chlorides to indicate what the original sulphide ores were. This oxidization is known to continue to 625 feet vertical depth, or more than 300 feet below the present water level in the Hassayampa River Valley, one mile to the west. After the oxidization, the veins were broken and displaced by Post-Miocene faults which trend N. 40 degrees W. and dip both South and North.

ORE BODIES:-

Two such ore bodies are known, one on the Copperhead Claim and one on the Frenchman Claim. The Copperhead Shaft is developed to a depth of 340 feet by the Oro Grande Shaft and its three levels. It is from 90 feet wide, on the 200 foot level to 150 feet wide on the 300 foot level. Its greatest proven length is 435 feet on the 100 foot level, where it is terminated on both ends by faults, but there is every reason to believe that it does continue both North and South. The 300 foot level has not been driven far enough to the South to determine the length of the ore at this depth. The ore body contains "Horses" and small bunches of wall rock, forming as much as one-third of the mass above the 200 foot level, but less in proportion as depth is attained, being less than 20% on the 300 foot level.

This shoot contains at least 635000 tons of proven ore above the 300 foot level, of an average value of \$5.27 per ton in gold. This value was determined by milling 8,861 tons of ore which yielded \$45,709.81 in bullion, the tailings contained only 20% per ton.

The West wall is solid diorite, but the East wall contains stringers, bunches and fair sized bodies of rich ore for at least 300 feet beyond the wall of the ore shoot proper. It is probable that part of this great mass can be profitably mined. It contains more than 2,000,000 tons and may average from \$1.50 to \$2.00 per

ton. It can be caved and the waste removed at a small cost per ton.

The Copperhead Ore Shoot is known to continue below the 300 foot level. It is shown in a drift at 340 feet depth, the drill core to a depth of 325 feet below the 300 foot level, where it is still oxidized and the gold in a free state. It contains at least 900,000 of Probable Ore to this depth. The values are as yet unknown, but there is no reason to believe they will decrease to any great extent.

OTHER ORE RESOURCES:-

Pay ore is now exposed North of the fault, on the 200 foot level, and on the surface. It is probable that nearly as much ore lies to the North of this fault. It can easily be picked up by cross-cutting on the 100 foot level.

The same condition exists at the South end of the Copperhead shoot on all levels.

The Ore shoot on the Frenchman Claim lies 1,000 feet North of the Copperhead shoot. It outcrops for more than 300 feet on the surface. A short tunnel and shallow winze shows 6 feet of excellent ore. This shoot may be equally as important as the Copperhead shoot when developed.

These shoots are known to extend to great depth and hold their values. The Congress Mine, 14 miles Northwest, was mined to 4,200 feet depth.

CONCLUSION:-

The Oro Grande Consolidated Mine is probably the most valuable semi-developed, free milling gold mine in the western United States. It has proved ore reserves of 635,000 tons, of a gross value of \$3,175,000.00 above the 300 foot level. By sinking the Oro Grande shaft 100 feet and extending the 400 foot level, more than 340,000 tons of the same ore will be added to this figure, or a gross value of \$1,700,000.00, for each 100 feet of this ore shoot alone. By continuous development, ore reserves can easily be kept ahead of a 1,000 ton mill on the Copperhead shoot alone. The certainty of developing ore beyond the North and South faults and in the Frenchman Claim, makes this mine as valuable as was the Vulture mine to the south and the Congress Mine to the Northwest, when they were in a similar stage of development. The Vulture produced \$16,000,000.00 and the Congress \$14,000,000.00.

COSTS:-

Careful records of the cost of mining and milling of 5,645 tons of ore were kept by the former owner, Mr. George B. Upton. These records show an average cost of \$1.04 for mining and \$1.16 for milling, with an extraction of 98%. One test run of 660 tons shows a cost of \$0.85 for mining and \$0.83 for milling, a total of \$1.68 per ton. These results were obtained without the use of air drills. The old fashioned stamp mill treated 50 tons per day. Gasoline was used for power. It is reasonably certain that these costs can be greatly reduced with cheap power and a modern mill of large capacity, together with a caving system of mining the ore. The writer predicts a total cost of not to exceed \$1.75 per ton can be obtained on a 1,000 ton per day basis.

RECOMMENDATIONS:-

The writer recommends the purchase of control of this mine and the expenditure of at least \$400,000.00 for a new Power Plant, new working shaft and new equipment of the mine together with a

new mill of at least 500 tons capacity, initial, to be increased to 1,000 tons at a later date. Detailed recommendations will follow as work now being done is completed.

INTERNATIONAL ENGINEERING COMPANY

By: (J. Carlton Bray)
(Mining Engineer)

(Signed)

El Paso, Texas,
September 15, 1931.

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

Jan. 1st. 1931.

W/4 32

Mr. G. M. Colvocoresses,
1108 Luhrs Tower,
Phoenix, Arizona.

Dear Mr. Colvocoresses:-

I am in receipt of your favor of the 28th.,
with the Bray report enclosed.

We would like to have you visit the mine and make a thorough study of the geology and ore occurrence of the mine and surface, but would rather you wait until we have completed our repair work; We have not been able to run the mill a full shift without shutting down for repairs; The portable compressor was broken and we had to wait for a block to come from New York.

We are badly handicapped for power and are not able to dewater the mine without shutting down all other work and this would not be advisable as we can open up a large ore body to the North, above water level.

The property has been submitted to several parties on the following terms; Consideration for 75% of the stock, \$650,000; Of this amount I turn \$400,000 into the treasury for development and equipment; The remaining \$250,000 I retain and is to be paid on the following terms; \$25,000 cash when contract is signed; The balance in three annual payments of \$75,000 each. These parties are negotiating for terms that will not be granted, but before submitting to others it will be necessary for me to call the deal off with those to whom it has been put up to.

Before again submitting the control of the company, I would like to do the following work; Put on a Diesel engine and generator; An air compressor; Electric hoist on new three compartment shaft; The mill enlarged to 20 or 30 stamps, motor driven; Sink the present shaft 60 feet deeper, making it 500 ft. This work in the old shaft with a drift and cross cut on the 400 and 500 levels will block out an additional 1,000,000 tons of ore. The new shaft 1,000 ft. North of the old shaft to be sunk 300 ft. This would be the 200 level from the old shaft; this would enable us to block out over 5,000,000 tons to the North of our present developed ore body; With the present prices for equipment it would not take a large sum to carry out this program and we would have the bullion that would cover a very large part of the operating expense; On a deal of this kind I would require a cash payment of \$10,000 as I have obligations to meet; The total amount of indebtedness of the company does not exceed \$6,000 and this would have to be paid.

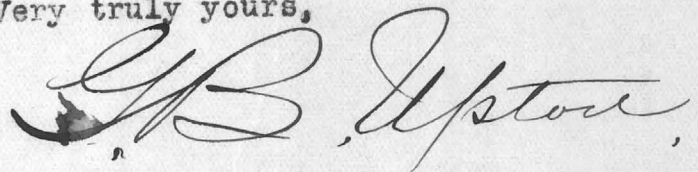
G. M. C. #2.

If you would be interested in a deal of this kind I would make you a better business proposition than you have ever had on a mining deal. You have the Diesel engine and generator and may have a compressor; we have the 300 ft. Sullivan that can be driven by motor; We would need a pump but not a large one as water in the mine is no problem nor would it be to a depth of 500 ft; An electric hoist large enough to answer our purpose is not expensive.

If you are interested in a proposition of this kind come up and go over the property with me and we will work out the details of a deal; Would like to know at once as I have another party in mind to whom I would submit it in case you are not interested.

With kindest regards I remain,

Very truly yours,

A handwritten signature in cursive script, appearing to read "G. B. Upton". The signature is written in dark ink and is positioned to the right of the typed phrase "Very truly yours,".

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

March 28th. 1932.

A 3/29
132

Mr. G. M. Colvocoresses,
1108 Luhrs Tower,
Phoenix, Arizona.

Dear Mr. Colvocoresses:-

Since talking over the Oro Grande matter with you I have gone over the situation from all angles and have decided to submit a compromise proposition, between the terms submitted in my letter of Feb. 7th., and your own basis of a deal as contained in yours of Feb. 9th. If the terms as contained herein are acceptable and can be closed without loss of time, I submit 2,000,000 shares of stock on the following basis;

2,000,000 shares @ 15¢ per share, \$300,000

\$11,000 cash payment to be paid to me, and the further payments of \$500.00 per month until a total of \$14,000 has been paid in monthly payments, making the total sum payable to me, \$25,000; This sum to be paid from the purchase price of \$300,000, leaving \$275,000 for development and equipment.

Stock to be issued in blocks as money is paid into the treasury.

The present shaft to be sunk to the 400 foot level and the ore body to be opened up on that level; the 300 level to be cleaned up and track laid; when this work is completed the cage could be put on replacing the bucket; this would then enable the use of cars for the milling tests.

If the ore body is not larger on both the 300 and 400 levels, than the width on the upper levels, I agree to turn in enough of my stock at 15¢ per share to cover this work.

I believe it would be a mistake to neglect the sinking of the shaft an additional 60 feet, to the 400 level; it will add over 400,000 tons to the developed ore body and I feel confident that the ore on the 300 is the upper portion of a horizontal zone of secondary enrichment and that the platinum found in a portion of the dump came from the 300 level, although I am not certain on that point.

Would like to hear from you at once on this proposition so that I may know whether or not to hold the property open for you.

Very truly yours,

G. B. Upson

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

June 17th. 1932.

Oro Grande

Mr. G. M. Colvocoresses,
Luhrs Tower,
Phoenix, Arizona.

Dear Mr. Colvocoresses:-

The parties holding option until June 30th., now have the 300 level dewatered; within the next two days an opening through a small cave in the drift will be open; Would like to have you see the level as it proves the statement made by Butler of the State University, to be absolutely false; He has killed several prospective deals on the property; he has never been on the Oro Grande but he informed Lindsley Morton that the ore body pinched out on the 300 level; The same information has been given to others and through some of them I believe you got the same information.

Would also be able to show you the only place in the Oro Grande ore body that Place, the engineer had any assays from; the first part of the drift and the short crosscut; I know that the reports you heard of his sampling and the statement that the ore body had pinched out or was small on the 300, made an unsatisfactory impression upon you. Here are the facts regarding Mr. Place and his sampling; Morton and his three engineers all agreed that the only practical method of sampling was by milling at least 15,000 tons; this they agreed to do; They confined their work to dewatering the shaft; we encountered a bad cave in the drift, on the contact of intrusive mass and ore; it took several weeks to get through it; Not until then did I learn that Butler had informed Morton that the ore pinched out on the 300; At that time Morton, who was a Birmingham banker, went to New York and was loaning money on call loans at a high rate of interest and stopped work on several properties that he had under option; Place took a few samples but only had the first few samples assayed; following are the facts.

Mr. Place was not in the old stopes on the 50 or 100; He saw no samples panned; He never saw the south drift on the 100; He took no samples from the 50 level, 100 level or the 200 level; He had no assays except from a portion of the drift on the 300 from the shaft to the cave in the drift that we will open within the next few days; Had no assays at all from the rest of the drift nor the long crosscut; In the face of these facts I hear that Place sampled the Oro Grande mine and this is the reason that I will not be the victim of a second confidence game and permit hit and miss hand sampling.

G. M. C. #2.

Hope that you can spare the time to come up and see a very large ore body "that does not exist". I would like to hear the opinion of Mr. Butler on an eruptive ore body, showing great stress along the walls, with a vertical wall on one side and a fractured wall on the other side that shows great pressure from below; an ore body occupying a transverse fault with a vertical wall that can be followed for 3,000 feet on the surface and showing a cropping 250 feet in width and then have Mr. Butler explain how such an ore body could possibly pinch out at 300 feet, when it contains an intrusive mass that has moved upward with the ore body and diamond drill hole proves to be above an ore body of unknown size.

It is rather tough on mine owners who have been heavy tax payers for 35 years, to be compelled to pay taxes to keep such men in the State University; Either practical men should be employed or the mining department closed.

Kindly advise me if you can spare the time to visit the mine.

With kindest regards, I remain,

Very truly yours,

G. B. Squire

have Mr Butler

*Keep up of 3 points
Can we lead to,*

Q 2 Goodman

Oro Grande - #3

If purchased 75% of stock @	250,000
But in equipment @ 1000 t per day	215,000
Total would be	500,000
Profit on 1,000,000 tons @ 1.00 per t.	1,000,000
Purchasers share of profit	750,000
Net gain in this tonnage	250,000, which is not attractive.

Deal should be revised to provide for acquiring 75% interest on the following terms, - Cap. is 3,000,000 shares @ 1.00 par. share. Options to be given on 2,250,000 shares @ 25¢ = \$562,500.

Suggested Deal for Oro Grande

Capital 3,000,000 shares @ 1.00 per

Issued

To be held in Treasury 2,000,000 shares all of which to be optioned to Purchaser @ 25¢ per share. Upton to also option his personal stock to the extent of 500,000 shares @ 50¢, the option on 100,000 of this to be held for one year and must be taken up if the Co. proceeds to option it on another 200,000 Option and Co. for 2 years and another 200,000 for 3 years Option and Co.

Treasury stock to be paid for @ 20¢

In exchange for option	30,000 shares	\$6,000
Equip. and Operating Deficit	150,000	30,000
New equip., mill etc. up to	1,820,000	364,000

2,000,000	400,000
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Would on 60% interest for 400,000 or could pay Upton 500,000 sh. and get 83% 650,000
@ 250,000

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

Los Angeles, California,
Feb. 7th. 1932.

Mr. G. M. Colvocoresses,
Luhrs Tower,
Phoenix, Arizona.

C 7/9 '32

Dear Mr. Colvocoresses:-

Gene came over here and has told me of the conversation he had with you recently regarding a deal on the Oro Grande; He states that you are interested and that you would like to submit the property to your associates in New York; I would like to have you take the matter up with them, if, in your opinion, we could get prompt action; You know our situation and how anxious we are to get the property properly equipped for further development work which would be necessary before installing a large mill.

Our present situation is as follows; We owe for mining supplies and equipment, approximately \$6,000; All labor has been paid for in stock and comes out of the stock retained by ourselves; In addition to the \$6,000 indebtedness, we have put in \$2400.00 in cash since starting work on the property last August. I also owe \$2700.00 to the Arizona Bank, Phoenix.

In submitting the stock, 75% of the capital stock of the company, amounting to 2,250,000 shares, the consideration would be \$250,000 and the development and equipment of the property; The \$250,000 to be divided into three annual payments.

The consideration for the option contract would be the payment of the \$6,000 indebtedness and a payment to ourselves of \$7500.00;

Would like very much to have purchasers obligate themselves to do the following work; Continue the cross cut we are running on the 100 level, North, to the ore body and drift in the ore; Sink the old shaft an additional 60 feet, to the 400 level, and do 540 feet of work on that level; This latter work will open up over 400,000 tons of ore between the 300 and 400 levels; There is very little waste in the ore on the 300 level and there is no barren ground; the waste rock is confined to the upper levels.

The water should be taken out at once; you would have to dewater the mine to make mill tests anyway and I would like to have you see the 300 level and the man who is sent out from New York should see the conditions on that level; Parrish estimated that of 998,000 tons blocked out, one third was waste; In our mill tests on the ore from upper levels, less than 20% was discarded as waste and much of that ore came from fractured wall rock; On the 300 there is no part of the ore body that would be rejected as waste.

G. M. C. #2.

The cash payment of \$7500.00 to ourselves would be credited on the purchase price in case parties take over the stock.

The \$6,000 would clear the property of all indebtedness and title is perfect; I have an abstract on the property; this was made about four months ago.

There are approximately 40,000 shares of stock outstanding; most of this was paid to the employees who have taken their full wages in stock.

Would like to hear from you soon as we are not in position to continue work much longer unless we can raise some money; Parties that have been trying for months to deal on the property have not been able to meet requirements.

Address us at Wickenburg as we expect to leave here within the next few days.

Very truly yours,

G. B. Upstone.

May 16th, 1935

Mr. Eugene Upton
Wickenburg
Arizona

RE: ORO GRANDE

Dear Upton:

Let me restate the substance of our conversation of May 10th based on my letter to your father dated April 24th and see if we are in agreement in respect to the terms which would be favorably considered by the owners of the Oro Grande Mine before I make any definite effort to take this matter up again with parties whom I represent. I have made some slight changes in the terms which we discussed, but I think you will agree that they are reasonable and should not make the suggested proposition materially less acceptable to the owners.

Before outlining these terms I want you to understand that my own position is purely that of an engineer representing a client and in no sense that of a promoter, in other words, my personal compensation from this transaction would come from the parties on whose behalf I am seeking a lease and option and the owners of the Oro Grande would not be expected to take care of me to any extent whatever so that the payments stipulated would be net to them.

I would like to feel assured that I could obtain a lease and option for one year on all of the Oro Grande property,

2- E. U.

including the mine and the present equipment, water rights, etc. During the period of this lease we would agree to operate as outlined in my letter of April 24th for the purposes of thoroughly sampling the mine by running as much ore as possible through the mill, this ore to be taken from various sections of the mine as we might designate. During the period of the lease we would pay the owners a royalty of 10% on all shipments of bullion, concentrates, etc., and we would guarantee that the minimum royalty or rental should not be less than \$500.00 per month after the end of the first two months covered by the lease.

The lease would contain all the usual provisions protecting the owner but would give us full control of the operations subject to inspection by the owner, and we would probably insist upon having the right to cancel the lease at any time during the option period by giving a thirty day notice of our intention to do so. Needless to say this right would only be exercised in case we should be tremendously disappointed with the results of our sampling.

The option to purchase would run for the period of the lease, i. e. for one year and under this option we should have the right to acquire a 55% interest in the property free of all debts and encumbrances in exchange for our expenditure to be made for the purpose of developing and equipping the mine to operate on the basis of producing a minimum of 200 tons of ore per day or any larger tonnage that we might deem feasible. Needless for me to say our own interest would lead

3- E. U.

us to operate ^{on} as large a scale as the mine would stand because in that way we would make more profit per ton of ore and would get back our investment just so much more quickly. If the mine and water supply will stand a 500 ton operation we would certainly wish to work on that basis.

The option should also include our right to purchase a 30% additional interest in the property (giving us altogether a total of 85%) for a cash consideration to be determined on the basis of the estimated net profits which might be derived from mining and treating the ore. This estimate would be made jointly by an engineer representing the owner and by our engineer and if the two estimates were in reasonable agreement an average between them would be accepted, otherwise the two parties in interest should agree upon a third engineer ~~who~~ would act as an umpire and if his valuation fell between the two original estimates this should be considered as final or otherwise a split would be made between the estimate of the umpire-engineer and of the engineer representing either the owner or lessee whose estimate was closest to that of the umpire. The fees of each of the original engineer would be paid by the parties whom they represented and the fee of the umpire engineer would be paid by the party whose original estimate was furthest from the umpire's estimate.

It would probably be essential to agree in advance that the value of the ore should be based upon the results of the mill runs made during the lease since there would be no other reliable basis for estimating such value, and I should

4 E. U.

propose that in making this estimate the cost of repaying the initial investment including the equipment should be figured at 50¢ per ton of estimated ore and the costs of operating including losses and marketing charges and taxes should be figured at \$2.50 so that the costs would represent a total of \$3.00 per ton and the net value would be the gross value of the ore as determined by assay less \$3.00 per ton as mentioned above. On this assumption there would be no profit in \$3.00 ore and the profit on \$4.00 ore would be \$1.00 and on \$5.00 ore \$2.00 per ton., etc.,

If the total net value of the ore developed in the mine at the termination of the lease should be estimated at \$500,000 or less the purchase price of the 30% of stock optioned for cash should be fixed at \$25,000, i. e. 5% of the total net additional profit. This purchase price would rise pro rata at the rate of \$5,000 for each additional \$100,000 of estimated net profit, so that the purchase price of the stock would be \$50,000 if the total profit were \$1,000,000; \$75,000 if the profit were \$1,500,000; \$100,000 if the profit were estimated at \$2,000,000 and so on up to a maximum of \$250,000 which would be based on an estimated net profit of \$5,000,000 or over.

If the option to purchase this stock is exercised the payment is to be made over a period of two years, 10% of the stock being purchased and paid for upon the exercise of the option, the second 10% one year later and the third 10% two years later.

I trust that this letter will give you something concrete

5- E. U.

to discuss with your father and that you will both feel convinced that the suggestions are fair and reasonable and upon receiving your advice to that effect I will promptly take the matter up with the parties whom I hope to interest in this venture. Of course I shall be very glad in the meantime to discuss details further with you or your father.

I have just learned indirectly that other parties are negotiating for the Oro Grande; if any lease or option should be given to others please advise me promptly so that I can discontinue my efforts on behalf of my clients.

Yours very truly,

S. M. C.

GMC: DF

ORO GRANDE.

Further Notes by G. M. Colvocoresses,

October, 1937.

In 1934 or '35 I tried to do business with Mr. Upton but we could never agree on any terms. It was my idea to operate the mine for a year in order to thoroughly test the value of the ore by mill runs on several representative portions.

During the past three years small operations have been carried on at intervals and Upton has also tried to work the mine himself.

I have been informed that parties who operated in 1936 milled over 1000 tons of what they believed to be the average grade ore (outside of the ^{two} higher grade shoots) and recovered \$2.66 per ton at present prices.

They estimated that the ore in the two pay shoots would be limited to about 10,000 tons that would carry \$6.00 to \$8.00 per ton and that \$2.66 would represent the average value of the balance of the mineralized area.

If this conclusion is correct the mine certainly does not constitute an attractive investment, but I still consider it most interesting from a geological standpoint and would want to confirm these last figures before expressing a personal opinion.

GEORGE M. COLVOCORESSES
MINING AND METALLURGICAL ENGINEER
1108 LUHRS TOWER
PHOENIX, ARIZONA

PRELIMINARY REPORT ON ORO GRANDE MINE

This property has attracted favorable attention for many years as offering the possibility of developing into a large low-grade gold mine. Actual development has been delayed because of uncertainty concerning the value of the great mass of the ore body and by the unreasonable terms which were asked by the owner. The recent advance in the price of gold has nearly doubled whatever value could previously be assigned to the ore, and the owner is now disposed to consider a modification of the terms to a basis that will be fair and satisfactory.

LOCATION, ETC.

The Oro Grande property consists of nine patented and five unpatented lode claims and three millsites on the Hassayampa River, all being in the Black Rock Mining District, Yavapai County, Arizona. The mine is located four and one-half ($4\frac{1}{2}$) miles north of the town of Wickenburg with which it is connected by a fair road, although at times the crossing of the Hassayampa River is difficult. The mine is one and one-half ($1\frac{1}{2}$) miles southeast of the Hassayampa River at the point where the millsites are located. The patented claims are named as follows:

Copper Head
May
Dutchman
Frenchman
Colossal
Nigger Ben
Alma
Montana
Oro Grande

The elevation at the Mine is 2500' above sea level and the country is rough with low ridges and hills separated by shallow canyons and washes sloping down toward the river. Aside from desert shrubs there is very little vegetation and no timber of any value. The climate is hot and dry but well suited to mining and milling. The average rainfall is about eight inches per annum. Ample water rights are held on the Hassayampa River and the present small pumping plant is connected to the mine by a pipe line.

At the mill sites it should be possible to develop sufficient water, say 150,000 gallons per day, for the treatment of 500 tons of ore in a mill, but the present well would have to be enlarged and timbered and a new pumping plant and pipe line installed.

GEOLOGY

The country rock is Yavapai schist and locally this has been intruded by dykes of diorite and pegmatite probably all pre-Cambrian and recently by a volcanic breccia probably of Tertiary age. The breccia has been impregnated with mineralized solutions from which quartz and gold were deposited in the cementing material also a little copper and lead in places. The gold is all free and generally very fine and the metals were probably derived from heated solutions rising from a molten magma of which the breccia formed a part. The ore body or more properly the ore-bearing zone, seems to consist of the entire mass of breccia which I consider to be an intrusion forced up through a fissure in the older rocks and probably extending

downward to a great depth. In such a formation it is probable that the commercial ore is limited to a certain horizon where secondary enrichment has been responsible for a concentration of gold and other metals. The extent of this zone has not yet been explored below a depth of 280' from the surface, except by one diamond drill hole the record of which is not in my possession but which is said to have reached the foot-wall of the ore body at a depth of 370'. The length of developed ore may be taken as about 350' and on the first and second levels the average width is 100' but it is said to be nearly 300' on the third level suggesting that the present workings are located near the apex of the shoot and that the area of the ore body may increase as further depth is gained.

While the extent of the ore above the 300' level is thus partly determined the quality is still unknown and it is most essential to determine its average grade before any definite estimate as to the value of the mine can be made.

Because the ore bearing zone is practically a conglomerate with barren pebbles and gold bearing cementing material it is impossible to obtain any reliable estimate of average grade even by careful and systematic hand sampling and such samples cut in various parts of the mine have varied from a trace to \$100.00 per ton without permitting any reliable conclusion as to the average value of the ore. This has been variously estimated at from \$3.00 to over \$10.00 per ton based on the present price of gold.

More reliable information has been obtained from mill runs and it is recorded that in 1903, 8,861 tons of ore were milled

with an average yield equivalent to \$8.05 per ton and again in 1931 some 300 tons of ore were milled with a value of nearly \$4.00 per ton. In each case the recovery of gold in the batteries and on the plates exceeded 95% of the total value, and it is obvious that practically all of the gold is free milling and can be recovered by an inexpensive and efficient amalgamating process.

The Oro Grande Mine has been examined and reported on by a number of engineers but most of their reports are not now available. I have a copy of the report made to the Tonapah Mining Company in June 1907 by S. F. Parrish who highly recommended the property for further development and estimated a probable tonnage of 658,900 above the 300' level; but he does not attempt to give any average value to this ore. Parrish quotes the working costs of the experimental run at \$2.791 per ton on the basis of treating about 30 tons of ore per day.

In 1931 Mr. J. Carlton Bray of the International Engineering Company made an examination and estimated that the ore body above the 300' level contained 635,000 tons of proven ore to which he assigned (on the basis of the 1903 mill run) an average value of around \$9.00 per ton. Bray estimated that the cost of mining and treating the Oro Grande ore would be \$1.75 per ton when treating 1000 tons per day. The owner of the property, Mr. Upton, believes that the average value of the ore will be around \$8.00 per ton, and I have had a number of other opinions ranging from \$3.00 to \$7.00 per ton, including a letter from Mr. Rose, of the Mexican Goldfields Company, who says that the results of his investigation--which was not a very thorough--lead him to conclude that the average value would be around \$5.50.

The various examinations which I have personally made of this mine and which have been made by engineers in my employ tend to confirm the estimates of tonnage given above, and I feel confident that there are at least 600,000 tons of ore or mineralized ground above the 300' level and also excellent chances that this figure will be increased to a total of 1,000,000 tons or more by further development in other portions of the mining claims and by continuing the development from the present underground workings below the 300' level. I cannot accept Bray's estimate of value nor that of the owner, but must agree with Parrish in believing that the records and available data furnish no adequate basis for any estimate of the average grade of the developed ore which for all we now know may be as low as \$2.00 per ton; in which case it is not commercial, but much more likely will have a considerably higher value.

My investigation of the workings indicates that the mining done in 1903 was naturally located in the sections of the mine which seemed to be the best mineralized and the mill run then obtained was by no means representative of the average grade of the ore body nor do the results of any hand sampling give any reliable data on which to form an opinion. It is my impression that the ore body will break down with an average grade of around \$5.00 per ton, but this can only be confirmed or refuted by further testing as suggested below.

As to working costs it is clear that a cheap method of mining can be effectively practiced and that the crushing and milling will be inexpensive so that I conservatively estimate a total cost of \$2.50 per ton on the basis of treating 300 tons per day or \$2.00 per ton on the basis of 500 tons per day. These estimates may well be improved in practice.

In view of the present situation of this property it is first essential to determine the average value of the ore and in my opinion this can only be done by carefully surveying the underground workings and dividing the developed ore into a number of representative sections, say twenty altogether. From each of these sections there should be mined a large sample of approximately 500 tons which should represent as nearly as possible the average material contained in this particular block of ground and each of these sample lots should be sent to the present stamp mill and treated separately with careful record of the values and recoveries. I believe that the present plant will be capable of treating approximately 1000 such tons or two ~~ex~~/samples per month and allowing ample time for preparing the mine and mill for this work I believe that ^atotal of 10,000 tons or twenty samples can be run during a twelve months period. The cost of such mining and milling will obviously be much higher than if one were operating for commercial profit, and I estimate the total expense, including supervision and engineering, at ₱5.00 per ton or say ₱50,000 for the years operation. The additional equipment required including a new engine and some drills etc., and the payment which would probably have to be made to the owners for the privilege of operating as above might add to the investment about ₱10,000 making the total outlay ₱60,000 against which there would of course be credited the value of the gold produced less a royalty and any other payments subsequently made to the owners. If the recovered value over and above the royalty was only ₱2.00 per ton the net outlay would be ₱40,000 whereas if the value as above should be ₱5.00 per ton the net outlay would be reduced to

only ₱10,000 and with higher values the test run might break even.

If this testing of the mine should prove, as I believe it will, that the average value is in the order of ₱5.00 per ton the property will then justify the installation of a 300 ton per day mining and milling plant, which would call for an additional expenditure of probably ₱150,000 and to this would be added the cost of additional development work and some payment to the owners, bringing the total capital investment, including the preliminary expenses, to approximately ₱250,000 including^a working capital of ₱50,000. If the further development, particularly below the 300' level should justify a 300 ton plant then the total investment would be around ₱400,000. In the first instance the profit on 600,000 tons of ₱5.00 ore with operating cost of ₱2.50 per ton would be ₱1,500,000 and in the second instance the operating profit on 1,000,000 tons of similar ore with working cost of ₱2.00 per ton would be ₱3,000,000. Assuming that the purchaser of the property can secure a 75% interest for the cost of the development and improvements plus a cash payment of not over ₱50,000 to the present owners the investment gives promise of yielding a very satisfactory profit.

In view of the geological conditions and indications that the developed ore is of pay value and also that substantial additions to the ore body will later be found I highly recommend this property as the basis for a speculative mining venture which will at worst involve a possible loss of ₱40,000 but which seems likely to result in a profit of several hundred per cent on the investment.

L. M. Colverson

GENERAL NOTES ON ORO GRANDE.

By G. M. Colvocoresses, 1934.

This property has attracted attention for many years as offering the possibility of developing into a large low-grade gold mine. Actual development has been delayed because of uncertainty concerning the value of the great mass of the ore body and by the unreasonable terms which were asked by the owner.

The advance in the price of gold has nearly doubled whatever value could previously be assigned to the ore as noted in the older reports.

The patented claims are named as follows:

Copper Head
May
Dutchman
Frenchman
Colossal
Nigger Ben
Alma
Montana
Ore Grande.

The elevation at the mine is 2500' above sea level and the country is rough with low ridges and hills separated by shallow canyons and washes sloping down toward the river. Aside from desert shrubs there is very little vegetation and no timber of any value. The climate is hot and dry but well suited to mining and milling. The average rainfall is about 8" per annum. Water rights are held on the Hassayampa River and the present small pumping plant is connected to the mine by a pipe line.

At the millsites it should be possible to develop sufficient water, say 150,000 gals. per day for the treatment of 500 tons of ore in a mill, but the present well would have to be enlarged and timbered and a new pumping plant and pipe line installed.

GEOLOGY: The country rock is Yavapai schist and locally this has been intruded by dykes of diorite and pegmatite probably all Pre-Cambrian and more recently by a volcanic breccia probably of Tertiary age. The breccia has been impregnated with mineralized solutions from which quartz and gold were deposited in the cementing material, also a little copper and lead in places. The boulders and fragments in the breccia are entirely barren. The gold is all

free and generally very fine and the metals were probably derived from heated solutions rising from a molten magma of which the breccia formed a part. The ore body or more properly the ore-bearing zone, seems to consist of the entire mass of breccia, which I believe to have been ^{an} intrusion forced up thru a fissure in the old rocks and probably extending downward to a great depth. In such a formation it is probable that the commercial ore is limited to a certain horizon where secondary enrichment has been responsible for a concentration of gold and other metals. The extent of this zone has not yet been explored below a depth of 230' from the surface, except by one diamond drill hole, the record of which is not in my possession but which is said to have reached the foot wall of the ore body at a depth of 370'. The length of developed ore may be taken as about 350' and on the first and second levels the average width is 100', but it is said to be nearly 300' on the third level suggesting that the present workings are located near the apex of the shoot and that the area of the ore body may increase as further depth is gained.

While the extent of the ore above the 300' level is thus partly determined the quality is still unknown and it is most essential to determine its average grade before any definite estimate as to the value of the mine can be made.

Because the ore bearing zone is practically a conglomerate with barren pebbles and gold bearing cementing material it is impossible to obtain any reliable estimate of average grade even by the most careful and systematic hand sampling and such samples cut in various parts of the mine have varied from a trace to \$100 per ton without permitting any reliable conclusion as to the average value of the ore. This has been variously estimated at from less than \$2 to over \$7.00 per ton based on the present price of gold.

More reliable information has been obtained from mill runs and it is recorded that in 1903, 8,861 tons of ore were milled with an average yield equivalent to \$8.05 per ton and again in 1931 some 300 tons of ore were milled with a value of nearly \$4.00 per ton. In each case the recovery of gold in the batteries and on

the plates exceeded 95% of the total value, and it is obvious that practically all of the gold is free milling and can be recovered by an inexpensive and efficient amalgamating process.

The owner of the property, Mr. Upton, believes that the average value of the ore will be around \$7.00 per ton, and I have had a number of other opinions ranging from \$2.00 to \$7.00 per ton, including a letter from Mr. Rose, of the Mexican Goldfields Co., who says that the results of his investigation---which was not very thorough---lead him to conclude that the average value might be around \$5.00.

The three brief examinations which I have personally made of this mine and which have been made by engineers in my employ tend to confirm the estimates of tonnage given above, and I feel confident that there are at least 600,000 tons of mineralized ground above the 300' level and also excellent chances that this figure will be increased to a total of one million tons or more by further development in other portions of the mining claims and by continuing the development from the present underground workings below the 300' level. I cannot accept Bray's estimate of value nor that of the owner, but must agree with Parrish in believing that the records and available data furnish no adequate basis for any estimate of the average grade of the developed ore which for all we know may be as low as \$1.00 per ton; in which case it is not commercial, but more likely will have a higher value.

My investigation of the workings indicate that the mining gone in 1903 and in 1931 were naturally located in the sections of the mine which seemed to be the best mineralized and the mill runs then obtained were by no means representative of the average grade of the ore body.

As to working costs it is clear that a cheap method of mining can be effectively practiced and that the crushing and milling will be inexpensive so that I estimate a total cost of \$2.50 per ton on the basis of treating 300 tons per day or \$2.00 per ton on the basis of 500 tons per day. These estimates may well be improved in practice.

REPORT ON ORO GRANDE PROPERTY
BY

S. F. PARRISH, E.M.

3 Copies
Frank A. Keith, "sq.,

07
Tonopah, Nev. June 10, 1907

General Manager The Tonopah Mining Co., of Nevada,
Tonopah, Nevada.

Dear Sir:

I beg to submit the following report as the result of my trip to the property of the Oro Grande Mines Company in the Black Rock Mining District, Yavapai County, Arizona, near the town of Wickenburg.

After talking the matter over with you and receiving your memorandum of the information you desired re the above property I left Tonopah the morning of May 29th., inst., and arrived at the mine June 1st., twenty four hours late on account of delays caused by two freight wrecks.

Wickenburg is a station on the Santa Fe, Prescott and Phoenix Railway, (Now Santa Fe) a part of the Santa Fe system branching from the main line at Ash Fork and running South. (Now a junction point of the Phoenix, Parker Los Angeles route of the Santa Fe.) It is 140 miles south of the main line and 54 miles north of Phoenix and is a town of a few hundred inhabitants where all ordinary mine supplies can be had at reasonable prices.

The property of this Company is located 4 1/2 miles north of Wickenburg and is easily accessible by a good wagon road with good grades, it fords the Hassayampa River, but this, excepting at very high water, which is rare and for a few days at a time only, is not an inconvenience.

This property consists of nine mineral claims, (see Exhibits A, part of this report) all of which are covered by United States Patent; they are named as follows; the Copper Head, May, Dutchman, Frenchman, Nigger Ben, Colossal, Alma, Montana and Oro Grande. In addition to these there are three mill sites belonging to the Company; these are located on the Hassayamp River about a mile and a half northwest of the above group of mineral claims and from the pumping plant located on them, an ample supply of water for the mine and mill is conveyed through a six inch pipe line.

All of the underground development upon the property is on the Copper Head claim and has been done through and from the main Copper Head Shaft.

The elevation of the collar of this shaft is 2500 feet above sea level and its depth is 300 feet. Water stands in the shaft now to a depth of about 70 feet. The flow of water in sinking was inconsiderable and I do not think serious trouble from this cause need be anticipated for at least several hundred feet deeper, and may not be then, the ground is open and does not appear to be wet.

There are three levels turned from the shaft at 100, 200 and 300 feet respectively. The shaft was sunk in an ore body nearly to the bottom and the levels and the crosscuts from them have almost entirely been driven in the same ore body as shown on the plan of the mine and the longitudinal and cross sections herewith; (see Exhibits B, C and D.) The location of this shaft is an excellent one for the purpose of prospecting the ore body but to extract the ore it will be found advantageous, I believe, to sink a new shaft in the country rock near the ore body.

The work done has disclosed a mass of low grade gold ore with a varying width and a depth limited by what appears to me to be an intruded sheet of diorite, the thickness of which has not been satisfactorily determined. I have classed this as an intrusion because of its regularity and the constancy of its dip, at the same time I have found no evidence of it in the country rock on either side of the ore body on the surface; there is considerable wash here however, and it may be covered up. By referring to the longitudinal section herewith, (Exhibit D,) I can more easily make myself understood.

The intruded sheet rises from a depth of about 416 feet from the surface under the most southerly limit to which the ore body has been explored, this is on the second level about 260 feet south of the shaft, at an angle of 38 deg. from the horizontal, this varies but slightly, at times it is 35 deg. and near the surface it is 40 deg. This for present purposes I shall assume as the floor of the ore body, although there is strong evidence from croppings still further to the north that the ore exists under this intrusion. The horizontal measurement of the ore body I shall take as extending from its vertical measurement to the south of the shaft described above as the southernmost limit to which the ore has been followed, north to the outcrop of the intrusion described above, drawn from the collar of the shaft. This gives a right triangle having an area of 119,808 square feet. This is not entirely accurate as it will be seen on the longitudinal section that on the first level the ore does not extend quite as far south as it does on the second level, but as it does extend considerably farther south on the third level in all probability, and is there much wider, I am safe in making the estimate I have.

The width of the ore body is much more difficult to determine with accuracy, indeed with the present development it can only be approximated. On the west is a well defined and quite regular wall of quartz diorite as will be seen by the cross sections, (Exhibit D) against this lies the ore body. Both the wall rock and the ore are somewhat altered near the line of contact but not materially so. On the east the country rock is schist, and bands of coarsely crystallized quartz and feldspar, and fine silvery shales. Between these lies the ore mass. As stated above the west line is well defined while the east is indeterminate, for extending far beyond the limits I have in a more or less arbitrary manner determined upon adopting as the east wall, bunches of rich gold ore have been extracted. In this connection it might be well to state here that the owners have been obliged, in order to obtain funds to work with, to gouge out

Parrish report -3.

pockets of rich ore found in various places, mostly on and above the first level, and near to and north of the shaft, and north of the shaft on the second level. What has been done in this way however has not materially reduced the value of the whole ore body, as in all only 8861 tons of ore have been mined, 2,000 tons of which was material that had been sorted from the run of the mine ore and put on the dump as waste.

With a width of 100 feet of ore, and the area of this triangle as above described there is in the mine now a mass of ore containing 11,980,800 cubic feet or 998,400 tons, estimating twelve cubic feet to the ton. I figure on 35% of this being waste, leaving 648,900 tons net.

The ore body is a brecciated and conglomerated mass held together with quartz and clay and calcite. The boulders are mostly of diorite and quartzite and the broken and angular pieces of schist and quartz more or less decomposed and of all sizes mostly small.

The cementing material carries the gold values. There is a very little silver associated with the gold. In places apparently without relation to the gold ore, high grade copper ore, mostly oxidized is found, carrying scarcely any gold, but some silver, in one instance as high as 31 oz. per ton.

Following are a few mine assays I found recorded in the mine office, made in January and March 1901.

Gold Ozs.	Silver Ozs.	Copper %	Gold Ozs.	Silver	Copper %
1972.20	329.4	-----	1.44	None	-----
163.55	5.7	-----	1.16	"	-----
-----	-----	20.	0.60	"	-----
-----	-----	4.	7.88	"	-----
-----	-----	222	6.25	"	-----
None	1.0	2.	.50	"	-----
"	31.	24.	8.92	"	-----
"	3.0	15.	.32	"	-----

Owing to the physical character of the ore mass and also to the coarseness of the gold in many instances, it is impossible to hand sample the mine and obtain results which can in any way be relied upon; they are either entirely too high to base any calculations upon or so low that a margin of profit in mining and milling the ore would appear to be out of the question. When it is considered that the rocks of which the boulders in the ore body are made and the pieces of schist and quartz composing the breccia, are barren, this can be appreciated. The only method of determining the value of the ore body is by carefully weighing the ore as it is delivered to the mill and as carefully valuing the gold recovered from the plates and assaying the tailings.

So far the ore run through the mill has shown a greater value than the cost of mining, hoisting, delivering it to the mill and milling it. From information I obtained at the time I should judge the value to be in the neighborhood of \$5.00 per ton.

The following figures were obtained:-

Mining and delivering ore to mill, cost per ton,	\$	0.917
Milling,	Do.	1.116
Blacksmithing,	Do.	0.029
Water, including camp supply,	Do.	0.295
Stable, one half,	Do.	0.074
General, legal, office expse. Salaries,		
assaying, taxes, ins., trav. one-half,		<u>0.350</u>
Total	Do.	\$2.791

I examined and copied bullion receipts for bullion sold from October 19th, 1903, to April 14th, 1906, amounting to \$40,888.74.

Tons of ore milled, 8861
Received per ton \$4.61

Of this 8861 tons milled, 2,000 tons came from the dump material that had been previously sorted from the ore and which I was told yielded but \$1.44 per ton; deducting this amount would leave 6861 tons milled for which was received \$38,008.74 or \$5.53 per ton.

As will be noted I have not included on the statement of mining and milling the ore, any charge for exploration work. As the mill has in the main been used to sample the ore and its capacity in no way equals an ordinary output for the mine, such a charge seemed unwarranted.

The tailings assays show a good saving by straight amalgamation. Any other or any additional method of milling will not be necessary so long as the ore retains its present character. Of 128 tailing assays I examined, 84 showed a trace only of gold, and the rest with 13 exceptions, taken when the screens had burst or very bad milling had been done, showed a loss of 20% per ton. 113 tailings samples showed a saving with the ore valued at \$5.00 per ton, of 96% of the gold.

The fuel used is gas line which, if extensive operations were carried on could be replaced by electricity if desirable.

The water supply is ample at all times of the year for present purposes, and could be largely increased by impounding dams if it ever became necessary, both at the source of supply, the Hassayampa River, and below the mill. At low water there is a flow of 400 inches in the Hassayampa River and at higher stages of the water an almost unlimited supply. After being used for power and milling purposes this water is again returned to the river it came from with but a few miles intervening between the points of out-take and delivery. A four inch wrought iron pipe line one and one-half miles long now conveys the water to the mine from the river; after pumping from the river to the necessary elevation it is delivered by gravity. The cost of the water plant and line was as follows:

Pumping plant and house ready to start,	\$4,144.12
Pipe line,	5,550.51
Storage tank at mine, 35,000 gals.	262.68
Water line telephone,	<u>199.44</u>
	10,156.75

A ten stamp mill, 1,000 lb. stamps, with a capacity of 45 to 50 tons of mine ore in 24 hours, is in order and ready to start up. It is run by a 40 H.P. Gasoline engine.

Cost of mill bldg.	\$5,069.30
Machinery & Tools,	10,060.96
	<hr/> \$15,130.26

A four drill Sullivan Air Compressor is connected to the mill engine and furnishes compressed air for diamond drilling and machine drilling and other purposes. This, with two 2 1/2 In. Sullivan drills cost, put in place ready to run, \$3,104.08. There is a practically new Sullivan "Champion" Diamond Drill; the diamond drilling cost \$2.45 per foot. The above drilling has materially aided in determining the extent of the ore body and the drill will doubtless be used in the future as a valuable aid in prospecting and development work.

At the Copper Head shaft is a gasoline hoisting engine powerful enough for the present. The mine buildings, including the residence and office and mine bunk house and boarding house and storage cellar and club house and good stable and corral, are all in excellent order. Although the heat is great, with care and the use of some ice, there is not much loss in boarding house supplies.

Finally in regard to the mine equipment and buildings; everything is of the best quality and in first class condition.

On the Frenchman claim about 900 feet north of the Copper Head Shaft there is a good shaft sunk in the country rock east of the croppings of apparently the same ore body as I have above described; it was intended to use this as the main working shaft of the mine. It is down 100 feet but has not been connected with the vein.

There are a number of gold bearing quartz ledges on the property none of which however have been worked further than to obtain government title. That some of these may prove of value is quite possible.

This property lies at the southern extremity of the Bradshaw Mountains, in the foothills of the range, and is on the southerly slope of a divide, the summit of which is on the Frenchman claim at an elevation of 2,825 feet above sea level.

In the forgoing I have endeavored to convey to you the conditions existing at the Oro Grande property and trust you will have been enabled to grasp the situation existing there. The company is capitalized for \$3,000,000.00 having 300,000 shares of a par value of \$10.00. The present Company, The Oro Grande Consolidated Mines Co., an Arizona corporation, hold entire title to the property and is capitalized at \$1,000,000.00 with 3,000,000 Shares of \$1.00 par value (E.S.U.)

The proposition as given me by Mr. George B. Upton, one-third owner, (Now holding all except a few thousand shares of the present corporation) is as follows:

The Lamb State has invested in the property \$275,000, and owns 200,000 shares of the stock upon which Mr. Upton has an option. Etc. (I have elided the portion of Mr. Parrish's report relative to this matter, as Mr. Upton is now the entire owner of the property through arrangements made with previous partners, and the matter has no bearing upon the essence of the report. E.S.U.)

After a careful investigation of the mine I feel entirely justified in recommending it to your favorable consideration. There is a very large tonnage of ore exposed now, which, judging by what has been done, can be mined and milled at a substantial profit. How much per ton I do not feel that I have a right to estimate until the value of the mine run of the ore is more definitely known.

Nearly nine thousand tons of ore have been mined and milled, showing a profit of \$1.82 per ton, but I do not feel satisfied that this ore represents in value the ore left in the mine. It may be more or less, but 2,000 tons of it represented material thrown away as waste, and a considerable portion of it was ore known to be rich or at any rate richer than the general ore body. The remainder came from running drifts and cross cuts in the mass of ore; and this is what would have to be depended upon for profit until further ore bodies are developed. The limits of the present ore body have not been found and that a very large amount will be disclosed by further development, is a reasonable deduction. In the prosecution of this work a more definite knowledge of the origin of the existing body will be obtained and intelligent prospecting for further bodies will be made more possible.

If you decide to go to work here, and as I said I feel entirely justified in recommending your doing so, I should advise a careful sampling of the exposed ore body by mill runs made on ore taken from different parts of the mine, and the opening up of the ground in such favorable places as are indicated on the surface; and of carefully exploring by diamond drill at first so far as possible the country underlying the present floor of the ore.

Thanking you for this expression of your confidence in my judgement, believe me,

Yours sincerely,

S. P. Parrish, E.M.

M

District	Property	Location	Owners & Operators	Date Visited.	Notes.
Wickenburg	Oro Grande	4 mi. N. W'burg across River. Bad crossing in sand in wet seasons for automobiles, but accessible by wagon at all times.	Oro Grande Mines Co. Clinton, Ia. Geo. B. Upton, Wickenburg, Mgr. Shut down since 1906.	March 21 & 27-17.	<p>9 claims patented. Prospected originally for copper. Was operated as a gold mine, producing \$44,000.00 in free gold from 8861 tons milled. Possibilities of copper in commercial quantities with greater depth, and perhaps existing large reserves of profitable gold ore. Latter can only be verified by mill runs. Country rock coarse diorite and hornblende schist, trend of schist N. 37 E. cut by pegmatite dikes running at right angles to the schist. Ore body large mass of breccia and conglomerate limited by quartz diorite, which is probably an intrusive sheet, the thickness of which has not been determined. Specimens of rich gold ore consist of crystalline quartz aggregates, often black with manganese, with gold in shots and flakes; specks of gold in iron jasperoid; free gold in the cementing material of breccia, the fragments of which consist of hornblende schist and quartzite; and soft leached porphyry. The richest gold was found associated with boulders and hornblende schist. Some skeleton silica suggests leaching by sulphuric acid. At the mouth of the main shaft chrysocolla appears in calc-spar and iron, and there are showings of copper silicate and carbonates twenty feet down the shaft. The relation of this copper ore with the main ore body has not been determined. According to Mr. Upton, stringers and bunches of high grade copper ore were found in the breccia; in fractured portions of the intrusive diorite; and in the country rock on the east wall of the</p>

Haystack

ore body, where the formation is shattered. Mr. Upton further states that stringers of bornite were found in the country rock on the 200' and 300' levels, and that a diamond drill hole 700' deep disclosed chalcopryrite sprinkled and in small veinlets in the country rock to the limit of the drill hole. No core was obtained in the ore body owing to its friability.

My sample of what Mr. Upton thought good looking ore from the stope on the 50' level assayed only .04 oz. gold and .16 oz. silver, but hand sampling of an ore body of this nature is obviously of little value. I also inspected the stopes on the 100' and 200' levels. The 300' level is under water. The backs in all stopes are generally high, with indications of having been "gouged", and will require considerable preparatory work when the mine is re-opened. Large horres of country rock were encountered in stoping, perhaps one third of the ground broken. A sample of the intrusive sheet on the 100' level showing pyrite and marcasite, but no copper, assayed a trace in gold and .16 oz. silver. An estimate of the ore reserves made by S. F. Parrish for the Tonopah Mining Company made in 1907, which I have seen, indicates a triangle having an area of 119,808 square feet and a thickness estimated at 100 feet, or 998,400 tons. Estimating 35% waste, he shows a net tonnage of 648,900. Owing to the nature of the ore body and the coarseness of the gold, careful mill runs would be necessary to determine the value of these reserves. There is a ten stamp mill in fair condition on the property. The 8861 tons milled yielded \$4.61 per ton, but this included 2000 tons from the waste dump, which yielded \$1.11 per ton, so that the 6861 tons of mine ore yielded \$5.65 per ton. The mill recovery appears to have been about 96% of the values in the heads. The company's books show the total operating cost of mining and milling, without development, to have been about \$2.25 per ton, and low as \$1.97.

The Company (consisting chiefly of the Lamb Bros. now dead) spent \$240,000.00, less \$44,000.00 mill recovery. The proposal is that a suitable Company devel

op the property, paying an ultimate price of \$120,000.0 for two-thirds of the stock, making no payments for six months, then \$15,000.00, but no more for two years. These terms are considerably better than those on which the Tonopah Mining Company are said to have made arrangements to take over the property after Parrish reported in 1907, but which they are said to have postponed indefinitely owing to the financial panic in that year. W. E. Defty made the favorable report which caused the Lamb Brothers to finance the Oro Grande Co. I have seen the report but have not ascertained Mr. Defty's present views.

Replied by
Holland

ORO GRANDE.

Further Notes by G. M. Colvocoresses,

October, 1937.

In 1934 or '35 I tried to do business with Mr. Upton but we could never agree on any terms. It was my idea to operate the mine for a year in order to thoroughly test the value of the ore by mill runs on several representative portions.

During the past three years small operations have been carried on at intervals and Upton has also tried to work the mine himself.

I have been informed that parties who operated in 1936 milled over 1000 tons of what they believed to be the average grade ore (outside of the ^{two} higher grade shoots) and recovered \$2.66 per ton at present prices.

They estimated that the ore in the two pay shoots would be limited to about 10,000 tons that would carry \$6.00 to \$8.00 per ton and that \$2.66 would represent the average value of the balance of the mineralized area.

If this conclusion is correct the mine certainly does not constitute an attractive investment, but I still consider it most interesting from a geological standpoint and would want to confirm these last figures before expressing a personal opinion.

ORE GRANDE MINE

by G. M. Colvocoresses

Visited Second time 1/21/32 with E. S. Upton.

Last mill run, 80 tons @ \$4.20 per ton recovered and 243 tons @ \$3.00 per ton recovered.

This makes it appear doubtful if average grade of ore body will equal \$3.00 since Upton was trying to take out a high grade^{of} ore (if he could find it,) but he thinks that he got an average grade.

One Frenchman claims there is outcrop of ore on top of hill and some 200' above shaft and 1500' to the south of it. At this point there is an adit run in 30' to the S. and a winze from it 30 feet deep. Looks like a fair grade of ore in the breccia, but no samples seem to have been taken. About 500' north of this adit, i.e. 1000' south of the shaft there is a shaft 100' deep sunk in the hanging wall which is said to have bottomed in ore but no reliable information available.

On 100' level there is a long drift to the south and a cross cut has been started to the east and is now in 30', all this work is in the hanging wall and Upton thinks that they should catch the ore in another 10-15' or advance, judging by the location of the outcrop in the gulch above.

Present equipment is small gas hoist which should be O. K. to raise 50 ton from 300' level and take care of necessary development.

Portable compressor (borrowed or rented) up 160 cu. ft. which could be operated if power were available. The old type oil engine in the mill has only sufficient power to run the mill and is very wasteful of fuel. A new engine preferably a Diesel of 125 H.P. or more should be installed to run both mill and compressor.

Mill crusher is O. K, but it would be advantageous to follow this with a small gyratory or Simonds disc to send finer ore to the stamps and permit proper installation for samples which would obviate necessary of frequent clean-ups in the mill.

In the mine the percentage of waste to ore is said to

2- Oro Grande

decrease in 200' level and to be practically nil in 300'.

Am told that Place, engineer for Morton of Los Angeles, had the 300' level unwatered and sampled this in 1929 and Hussen says that his samples ran over \$3 but it is presumed that he found sulphides at this depth and very low values--no deal resulted.

Konselman has visited mine and thinks that grade of ore is very low and says that this opinion was reached by an engineer of the United Eastern Co. who turned it down.

Krutttschmidt of A. S. & R. Co., visited the mine briefly and thought the tonnage small and some think that the good ore is merely confined to a series of small pockets and balance of breccia is waste; I think this could only be proven by systematic sampling.

To operate mine and mill @ 50 ton per day would require about 20 men and cost say \$150 per day, which would be covered if \$3.00 per ton was recovered.

Capital investment required for thorough test.

1 Engine	\$7000
1 small crusher & sampler.	1000
Table & change in mill.	1000
Incidentals	<u>1000</u>
	\$10,000

Payment to Upton ?

It is said that the liens against the property (now Jan.32) amount to about \$5000 which would probably have to be paid before test could start.

Capital expenditure as above	\$15,000
Preliminary exam. surveying etc.	2,000
Operating loss (maximum \$50 per day, 300 days.)	15,000
Overhead, etc.	<u>3,000</u>
Total risk	\$ 35,000

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

April 19th. 1935.

A 4/24
35

Mr. G. M. Colvocoresses,
1108 Luhrs Tower,
Phoenix, Arizona.

Dear Mr. Colvocoresses:-

Replying to yours of the 10th., addressed to Eugene; We do not know the exact tonnage we put through the mill in 1931; We put about three hundred ton through the crusher but there was between 80 and 100 tons left in the bin when we shut down; The Mint receipt was. I believe, \$460, something over \$2.00 per ton.

This ore was taken from two raises I started from the 100 level, with the intention of raising to the surface and later raising from a proposed incline shaft above the 200, connecting the two at the 100 level; The ore was low grade where these raises were started, but I know that raises started any place in the ore body will pass through lenses of high grade ore.

There is no record of the run made by the parties who had the property tied up in 1933; They claim to have run 400 tons but the mill was left open from 5:00 P. M. until morning, with amalgam on the plates, with a crew of men who stole tools or anything of value they could get away with. Dan Finlaysen told the man in charge that they were not amalgamating; that the plates were like glass; They would not give me any information; They quit when I refused to extend time on a payment and the owner of engine was insisting on the balance due. They burned the large lodging house and tried to collect the insurance.

In regard to a deal on Oro Grande, will you kindly outline what you would be willing to do: You know about what my terms are; I am willing to make reasonable concessions provided we are able to take care of taxes, assessment work, payments on indebtedness and a reasonable sum to live on until production is increased; I think, with the present price of gold, that it would be good business to install a ball mill and start with 150 tons production; Also know that unless tests are made from raises, one would never know the value of the ore body; The incline raise, following the floor of the present developed ore body with finger raises to the surface, would be the most practical method of sampling and put the mine in condition to produce 1,000 tons per day by glory hole method of mining; I also believe that it would be a mistake to make a test run without trying out a suitable ball mill and either the Gibson or the kind of amalgamator used by the Homestake Co. We have proven that no other flow sheet than straight amalgamation is necessary as tailings can be kept down to a trace by careful milling.

I have notified New York parties who have had the mine under consideration for some months and with whom I have agreed on terms,

G. M. C. #2.

that it will be necessary for them to act without further delay; Unless they decide definitely within the next few days, I will call the deal off, although their terms are by far the most favorable that have been put up to me.

Would like to hear what you and your associates are willing to do.

Very truly yours,

J. B. Upton,

12/17/36

NOTE RE ORO GRANDE

Arthur Murphy says that in his opinion the better grade of ore is confined to two shoots or chimneys which contain a very limited tonnage (possibly 10000 tons) of \$6.00 to \$8.00 ore as was mined in the old mill runs.

The balance of the mineralized ground, he says, was thoroughly sampled by parties who recently had an option and who milled over 1000 tons which averaged 0.076 oz. au -- \$2.66 per ton and this will not pay to work.

Morton is of a similar opinion

Oro Grande Consolidated Mines

CAPITAL \$3,000,000

Wickenburg, Arizona

May 17, 1935.

Mr. G. M. Colvocoresses,
Luhrs Tower,
Phoenix, Arizona.

Dear Mr. Colvocoresses:-

Since our conversation the other day I have been giving considerable thought to the matter and this letter has been delayed because I was engaged on a couple pictures which had to be finished by a specific time.

As you know I am attempting to find a common ground between what is fair and customary to investing capital and the ideas of my father.

The first point which requires consideration is that when the property is turned over to a party for one year for testing we are of course renouncing all other opportunities to deal. Therefor some consideration is due us. This is partly provided in the monthly payments we discussed and the expectation of benefits at the expiration of the time. These expected benefits should be sufficient to make the deal attractive to the owner and there should be also assurances that the program would be carried forward without interruptions or premature termination which would be injurious to the owner.

These assurances, I think, should consist in a proper guarantee to thoroughly sample at least a certain minimum portion of the ore body by milling a certain minimum tonnage. I offer the suggestion of five thousand tons to be selected so that the test will have been conclusive for at least a definite portion of the present developed ore body; understanding of course that as much more may be handled as the investor desires. The returns from such milling, over and above the minimum royalties paid to us, to apply upon payment for the equipment installed for the testing operation. In case of failure to comply with the minimum requirements and termination of the test title to such equipment to pass to the owner without further compensation. In case of completion of the test to an unsatisfactory conclusion the owner to be credited on the cost of such equipment by the amounts realized in the testing operation.

As a commentary on this point and answer to possible objection, my father is very desirous to induce the optionee to step up the capacity of the present mill by installation of classifier, ball mill, larger crusher etc. This has been carefully checked by several competent engineers who agree the cost would be small and would raise the tonnage to 125 to 150 tons per day. This would result in not only a saving but an actual profit to the tester and diminish the testing time by fifty or seventy per cent. Father is satisfied that a profitable operation could be carried on with such a tonnage, and feeling so has a conviction that he should not be penalized if the investor wishes to

A. 5/20/35

sacrifice the time and money involved in the longer slower method. I suggest that it is possible that the investigator might, after starting with the present capacity of the mill, decide to increase the capacity, and in this case some further concession might be arranged.

In the event the test has satisfied your people it is understood that fifty-five per cent of the stock would be delivered in return for equipment and initiation of operation of the property, together with the necessary development for handling the present tonnage. You have suggested a minimum plant of three hundred tons capacity. My father has always insisted upon at least five hundred. Inasmuch as this constitutes a consideration for fifty-five percent of the stock it would appear to me that the equipment should be of sufficient capacity to be a reasonable compensation. When it is considered that even the present mill can with the expenditures of less than \$7,500 be made to handle half of that tonnage it will be apparent that the actual cash involved for control of the mine would be unjustly small. Parrish in making his estimate of tonnage takes into consideration no ore above the collar of the shaft, nor the greater width of the ore body. Had he done so the tonnage estimate should have been vastly greater.

Since the forgoing I have received your letter of May 16. I am afraid the changes you have made are hardly "slight." and regret that I must disagree with you as to their reasonableness.

In the first place an option and lease is asked for one year during which a royalty minimum or rental of not less than \$500.00 would be paid, "after the end of the first two months covered by the lease." This might be construed to mean ninety days, but at least sixty days after signing of the lease. Meaning that for no compensation and with no guarantees we would turn over the property.

What assurance does this give us that any mill test would ever be made at all. Mere verbal assurances in a business deal are worthless. Otherwise why should not our verbal assurances as to values and operating costs be accepted without question. The investor justly demands full protection to ascertain for himself what is there. It is therefore useless to say that checking by mill test is the intention. The opinions of engineers on that point vary. What assurance would we have that after we had resigned control over the property engineers for your people might not conclude that at least a preliminary hand sampling would suffice or be necessary? What could we do about it. Why should we put ourselves in such a position and allow people two months in which to do so if they please, during which we could do nothing with others. We have steadfastly refused to permit it while we still held the property. Surely it would be folly to depart from that policy.

Our answer on that point would have to be emphatically "No." I have covered that point and the reasons in the first part of this letter. Which also negates your suggestion of the right to cancel the lease at any time by giving thirty days notice.

We should have to have the further assurance that inasmuch as the present pilot mill only was used for testing that some control of selection of the ore be covered by the contract in order to protect us from highgrading. Again I can only repeat that mere verbal assurances are worthless. If for any of a host of reasons unconnected with the value of the mine your parties decided to end operations they could concentrate their work on certain portions of the mine and make a mighty sweet thing by gutting certain high grade portions. It would therefore have to be stipulated that ore for testing purposes only and not to exceed reasonable amounts be taken from any given place.

The requirement that when you decided to exercise the option we should deliver to you fifty-five per cent of the stock in the property free of all debts and incumbrances, would be practically impossible to comply with without some greater income during the trial year than is proposed. Of course arrangements might be made to cover that by the first payment on the additional block of stock to be purchased.

Now the consideration for this fifty-five percent of the stock is the "developing and equipment of the mine -- on the basis -- of a minimum of 200 tons of ore per day." This would involve a ridiculously small expenditure. I have not the time now to hunt out the cost sheets and estimates, but it has been carefully worked out by fathers and others and machinery quotations received. However it is below \$50,000. In your estimate as to further stock prices there is computed \$500,000 profit at \$1.00 per ton, therefore 500,000 tons, net. This, which is less than half the net commercial developed ore, would require seven years to mill with such a plant. If the actual tonnage is allowed, almost fifteen years!

True you state that it would be to the company's object to put on as large a plant as possible. But that again is a mere empty verbal assurance. I think that if a minimum plant of five hundred tons is considered allowable the size of the plant should be made contingent upon the available and proper protection given to the owner in the contract.

The point might be covered by guaranteeing to the owner a definite minimum annual dividend, and leave the purchasers free to exercise their judgement in that respect, but I can assure you that annual dividend would have to be somewhere within reason. On a basis of 200 tons per day a profit of \$1.00 per ton would make our income from the proposed fifteen per cent remaining to us approximately \$10,000 per year.

I can conceive of many circumstances whereunder the interests of an unscrupulous control would suggest manipulating the management so that we should have a discouragingly small fraction of that, and so be willing to clear out. It has been done. I am however casting no aspersions, but it is to obviate all such possibilities however remote that contracts are drawn between the most ethical and well meaning of persons.

I should certainly say that if an ore body of the size and with the natural advantages of the Oro Grande could not be exploited in a manner to assure the owner an income of \$25,000 per year, it would be better left as worthless or exploited by more competent managers.

You suggest that an option on an additional thirty percent of the stock be given. This cuts what we discussed by twenty five percent, reducing us to fifteen percent interest in the property with a potential or suggested income of \$10,000 with luck over a period of years.

I consider that unsatisfactory, but it might be compensated if, there were a sufficient cash compensation, which brings me to what I consider the crux of your letter.

I shall not here go into your estimates of costs and tonnage except to call your attention to father's mining and milling costs with a ten stamp mill, paying thirty cents per gallon for distillate and drilling by hand, and in some cases handling the ore underground several times. These charges did not include development but inasmuch as this entire deal seems to be estimated entirely upon the basis of commercial ore blocked out, I should say that our discussion could ignore development.

It must be born in mind that the only element of uncertainty in this proposed transaction incurred by your people would be the expense of satisfying themselves as to exactly what is the extent, value and cost of exploiting the developed ore body. A portion of that testing expense is bound to be returned from operation, and by your own suggestion they would be feeling their way even then so that they never would get in very deeply.

So the ultimate nature of the deal is that they would simply buy a certain tonnage of known value and before the option was exercised they would know what they were going to make. It is proposed that the cost of the plant and development be deducted as part of the operating cost. In short fifty-five percent of the stock of the company would be the price of advancing to their own concern the amount which they are absolutely assured for repayment before starting the enterprise. In addition to this there is a certain profit, (else they will not deal) of three hundred percent. In addition to this of course are the further potential ores and consequent profits. And this is based upon the very lowest estimate of profit you consider feasible, and an ore body of a gross value of two million dollars.

To all this I have no objection to offer.

But when in addition it is proposed to buy from us thirty per cent additional of the stock, which even at your estimate represents \$150,000, paying for it \$25,000, or in other words buying \$150,000 by paying for it 16-2/3%, I feel that is offering a pretty tough deal. For values higher than that estimated you propose to pay five percent. I have heard of borrowing money for five percent, although I have never had the experience, but when it comes to buying it outright for that I think you will have to admit it sounds fantastic.

In other words the value of thirty percent of the stock on your estimate of the ore is worth \$25,000. On the same basis our proposed fifteen percent would be worth in your mind \$12,495. In short we turn over a property containing an ascertained two million dollars for cash and other considerations totalling \$37,495.

I am sure such cannot be the customary practice in buying or selling mines. In my activities concerning the Oro Grande I have contacted many reputable concerns, and though their

ideas varied somewhat I never encountered anything remotely resembling this.

In view of these facts I believe it would be best to forget the matter as I am sure the divergence of opinion between us is too great to be adjusted.

Thanking you for your suggestions, I am

very truly yours,

E. S. Upton

NOTES ON ORO GRANDE MINE

By: - G.M. Colvocoresses

Visited Oro Grande Mine December 11, 1931, and went underground with Geo. B. Upton and Hussen, the Mine Foreman, - formerly at Humboldt. Just five miles by road from Wickenburg, and good going except in bad weather when crossing of Hassayampa River might not be possible. It is located in a low range of hills not far from river. Water is pumped to Mine from a side Canyon.

On the surface, portable compressor and hoist, ten stamp Mills driven by gas-engine and equipped with plates. Said to make 97% recovery of gold of which 75% is coarse and caught in the battery-boxes. Mill is in good condition and works economically; might pay to put concentrating table after plates on which Pt (which is said to occur in substantial quantity) might be recovered and perhaps some additional gold.

Vertical shaft in good shape, now working on 50', 100' and 200' levels, but 300' level is under water. Ore to mill being drawn from old stopes and broken in the backs of some of them. Best grade of ore now being taken and said to run \$7.00 to \$8.00 per ton and mill is now working only one shift, but two shifts planned soon.

Seventeen men employed, all of whom are paid entirely in stock of Company, (presumably the bullion only pays for supplies).

Ore is in a breccia or conglomerate thru which there are many horses of barren rock. Values are probably erratic, but Upton estimates a tonnage of 1,200,000 down to the 300' level and at an average grade of \$4.00 per ton. Mining and milling should be cheap and including development, not over \$2.50 per ton and working on a large scale this might be reduced to \$2.00.

This property undoubtedly contains a very large tonnage of mineralized ground, and it could be very cheaply mined and milled. Some of the ore carries \$7.00 or more in gold per ton, but the average grade of the mass or any substantial portion of it could only be determined by milling large blocks of ground from different sections of the mine as it is practically impossible to sample by hand.

It seems possible that one might take over the property and with a small investment (\$5,000 to \$10,000) continue the development and operation and pay for this work with the bullion produced until definite information is gained which, if favorable, would bring the property to a position where it would certainly appeal to large capital. This would require very careful engineering work and close supervision.

TERMS:-

Upton and Associates want \$250,000 for 75% interest in the property. They talk of expecting a payment of \$25,000 after the property has been thoroughly examined and option taken and the balance of the payments to be made at the rate of \$75,000 per annum over three years.

I think that those terms could be modified and a royalty on the output substituted for payments, provided the parties holding the option would relieve the present owners of all operating expense and agree to do a certain amount of development per month as long as they hold the option.

Note. Samples showed no Pt & lower gold values than Upton claimed. They were merely taken for general information & not expected to be representative.

Phoenix, Arizona. 12/16. 31

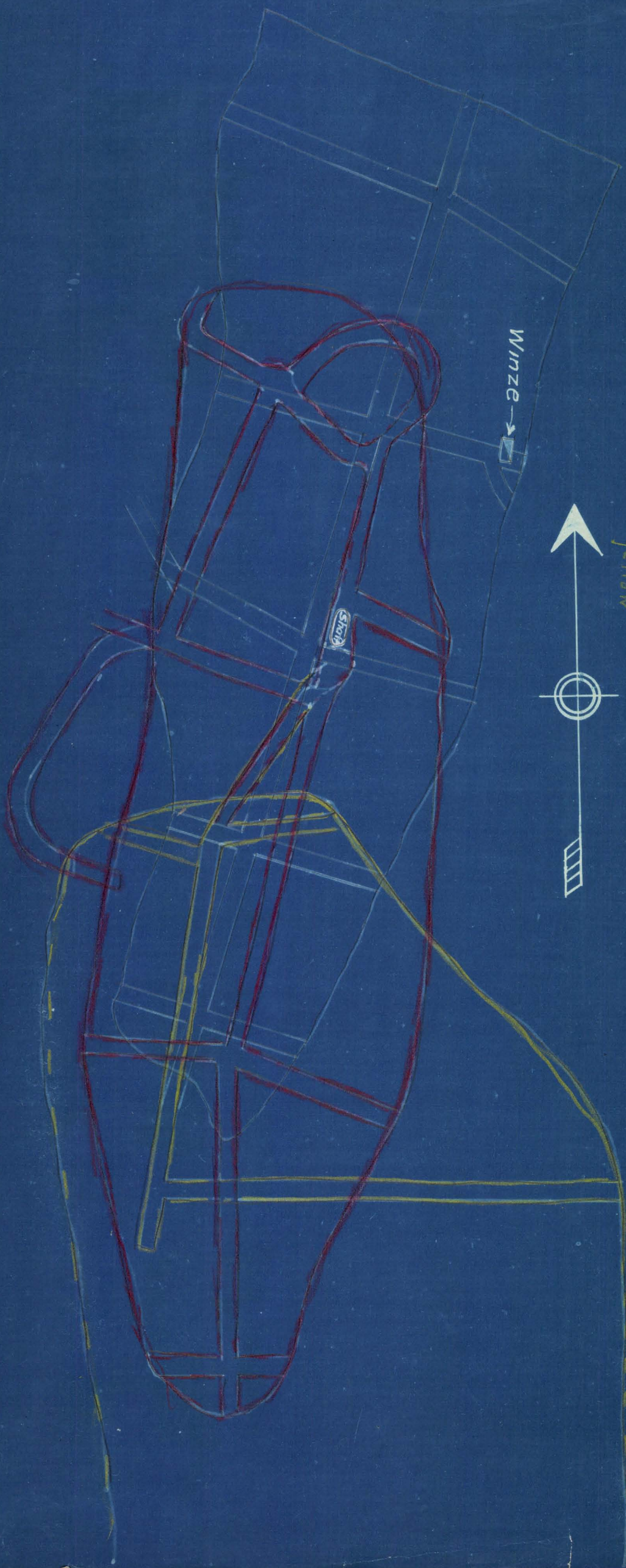
OTO GRANDE MINES CO.
Black Rock Mining District
Yavapai County ARIZONA.
Scale 1" = 40' (WR)

PLAN SHOWING OUTLINE OF ORE BODIES AS DEVELOPED

^{White}
— Purple Lines = 100' LEVEL
— Red Lines = 200' LEVEL
— ~~Green~~ Lines = 300' LEVEL -
^{Yellow}



Winze →



ORO GRAND MINE
 Longitudinal Section on line of 1st Level
 Scale 1" = 60'
 JWR 6-9-16-



Drawn on scale 1" = 40'

