REPORT
To
THE DIRECTORS
of the
VAN EMMETT GOLD MINING COMPANY
1929.
By
S. J. Burris, Jr. E.M.

Report received from W.H. Dwinell,
Pueblo, Colorado.
Baxter Springs, Kansas,
August 6, 1929.

To the Directors of
The Van Emmett Gold Mining Company,
Pueblo, Colorado.

Gentlemen:

Pursuant to your request I submit herewith a brief report on your mining property based upon my knowledge of same gained during the time that I worked there as an assayer and sampler in 1911-12, as a lessor in 1914 and again in 1916 and from such other data as I have in my files.

Location and Claims

For the purpose of this report it is not necessary to describe in detail the location, mining claims comprising your property, past history and production and such other general information usually given in a mining report, suffice to say that this property is located in La Plata County, Colorado and consists of 12 patented lode mining claims.

Past Operations and Production

Past mining operations have shown a gross production of some $300,000.00 in gold values of which some 50% was net profit. Such operations were carried on entirely by lessors who discovered the ore at grass roots and merely gutted the mine without doing any development. Such operations exposed an appreciable tonnage of mill grade ore and pointed the way for a logical and justifiable program for the future development of this mine.

The past mining operations were confined to two claims of your group and the same possibilities for the development of commercial ore bodies exist on the other ten claims by virtue of proven production in contiguous mines and a duplication of the same geological conditions associated with such production. Your present development program, though, at this time should be confined to the Incas claims where the mining operations have been carried on in the past. While the other claims undoubtedly are of potential value and the ground covered thereby is to be considered as virgin, a more definite line of development is suggested on the Incas claims by the ore occurrences to date.

Other Reports

You already have a report on your property by Chas. Chase, a mining engineer of Denver, Colorado. His report is quite complete in all details and his estimates of the tonnage and value of the proven ore reserves are very conservative. In my opinion, Mr. Chase is overly conservative in some of his estimates, wherein he assumes that only 50% of the tonnage to be derived from the "Gob" and the dumps will prove to be mill ore. I was assayer and sampler at this mine during the time that this stopes fill or so-called "Gob" and the dumps were produced and I know, therefore, that 100% of such material will prove to be mill ore of a grade equal to or greater than his estimate. At the time that he made his examination he was handicapped in that he was not able to sample all of this material. It is very evident from his report that he is very well impressed with the possibilities for development that this mine offers and feels that you have sufficient developed ore reserves to justify the building of a 50 ton cyanide mill to treat same. While he does not make definite recommendations for the future development of the mine it is obvious from reading his report that he favors developing the so-called "verticals" or fissure veins below the La Plata limestone stratum or bed, and is of the opinion that the mineralization has resulted from ascending mineralising solutions along these so-called "verticals".
Past mining operations have developed three sources of mill grade ore, namely: (1) the stope fill in the blanket stope on the La Plata limestone bed known as the "Gob," (2) the ore exposures in the backs of the old stopes on the so-called "verticals" or veins mined in the past and (3) dumps derived in part from the "parting sandstone" and from development of the "verticals." In mining the bedded deposit in the limestone bed it was necessary to strip such ore of an overlying bed of sandstone which was much crushed and broken and was known as the "parting sandstone." This "parting sandstone" averaged about three feet in thickness and in places was enriched to the extent of being of a shipping grade which could only be determined by daily sampling. Such sampling disclosed that this "parting sandstone" in the immediate vicinity of the so-called "verticals" was not of any better grade than that overlying the bedded limestone ore and that the enrichment was quite uniform throughout the entire extent of the bedded ore deposit. In past mining operations this "parting sandstone" was back-filled and now makes up the so-called "Gob" and represents a positive tonnage of mill grade ore.

In my opinion you are safe in estimating that you have a positive tonnage of mill grade ore as follows:

(1) Stope fill or so-called "Gob" - 4,000 tons @ $10.00 per ton or $40,000.00 gross.

(2) Tonnage to be derived from so-called "verticals" - 4,000 tons @ $12.00 or $48,000.00 gross.

(3) Tonnage to be derived from dumps - 5,000 tons @ $8.00 or $40,000.00 gross.

Total gross value of positive ore ---- $112,000.00

To the above positive tonnage an allowance of 100% for ore probable and possible to be derived from mining operations above the limestone bed would be a very conservative estimate. Such a production, though, is to be considered merely in the light of your prospective production and is of course not assured but very probable and possible.

The prospective tonnage to be derived from possible extensions of the known vertical ore-shoots on the "verticals" below the limestone bed which possibilities can be reasonably anticipated from a consideration of the apparent genesis of the orebodies mined to date and the associated geological conditions offers in my opinion one of the greatest potential assets you have. A prospective gross production of some $600,000.00 could well be expected.

Profits from Milling Operations.

Cyanide tests by both the Dorr Company and myself indicate that this ore is readily amenable to treatment by cyanidation, that 90% extraction is to be expected and 95% might well be obtained.

Based upon milling your present tonnage of positive ore reserves we would then have:

$112,000.00 gross value @ 90% extraction gives a gross recoverable value of $100,800.00
Deduct the cost of:

- Re-claiming 4,000 tons of stopes fill at 50¢ per ton
  $2,000.00
- Mining 4,000 tons of ore @ $2.00 per ton
  $8,000.00
- Re-claiming 5,000 tons of dump material at 25¢ per ton
  $750.00
- Milling 11,000 tons @ $2.00 per ton
  $22,000.00
- General expense on 11,000 tons @ $1.00 per ton
  $11,000.00
- Cost of 25 ton cyanide mill
  $25,000.00

Net return after deducting all costs including the cost of the mill

$32,050.00

You will note that I have figured on a 25 ton cyanide mill instead of 50 ton as given in Mr. Chase's report. The limited tonnage of ore reserves developed hardly justifies the cost of a 50 ton plant. To start with a 25 ton unit would suffice and could be added too as development of the mine justified.

The above net profit of $32,050.00 is assured in that it represents the profits from the mining and milling of your positive ore reserves. The profits to be derived from the mining and milling of your probable and possible ore reserves will probably be as follows:

11,000 tons of probable and possible tonnage @ $10.00 per ton and 90% extraction gives a gross value of

$99,000.00

Deduct the following operating costs:

- Mining - 11,000 tons @ $2.00 per ton
  $22,000.00
- Milling - 11,000 tons @ $2.00 per ton
  $22,000.00
- General Expense @ $1.00 per ton
  $11,000.00

Net profit from probable and possible ore reserves after deducting all operating costs

$44,000.00

From the above it is obvious that you have an assured net profit of $32,050.00 and a probable profit of $44,000.00 or a total net profit of $76,050.00.

The cyanide tests on this ore show that only a 20 mesh grind with a 2 lb. cyanide consumption is required to affect from 90 to 95 percent extraction in some 32 hours leaching. This calls for a cyanide plant of simple flow-sheet and small initial cost. The size of the grind required and the cyanide consumption will result in a low milling cost and I feel sure that I have over estimated if anything this item of cost.

When mining ore for smelter shipment in the past it has cost about $2.00 per ton to mine with hand steel and the general expense amounted to about $1.00 per ton or a total of $3.00 per ton. In mining the mill grade ore I believe this cost could possibly be lowered as the same care would not be required as in mining shipping ore.

At one time I figured I could build a small 25 ton cyanide plant for some $15,000.00 when using second hand equipment which I had in mind as a simple leaching plant is all that is required to mill this ore.
There would be, of course, some other items of expense in starting up which I have not attempted to cover in the above estimate but such would be comparatively small and not enter into the question of the desirability of building this plant.

Future Development

While the mill grade ore reserves form an appreciable asset, it is my opinion that the potential possibilities of the future development of this mine are of a considerably greater importance and should be so considered at this time.

You should keep in mind that all of the past mining has been done by lessors, that they discovered the ore cropping at the surface and merely proceeded to get the mine in the shortest time possible and with the least amount of development work. Such a procedure naturally was not conducive to developing the future possibilities of this mine. When the shipping grade of ore had been mined they were content to quit.

If the ore mined in the past had been mined on company account and under the proper supervision I am sure that the development work which is now warranted would have been done in conjunction with the mining operations and that it would have proven that this mine's productive possibilities are not confined to the present workings.

In considering the future possibilities for the development it is necessary to have an intimate knowledge of the ore occurrences mined to date as well as the associated geological conditions. The success of the undertaking is then measurable in a large degree to the proper interpretation and correlation of all contributing factors disclosed in former operations. To this end a discussion of the associated geological conditions and the character of the ore occurrences mined to date is given in order that one might have a comprehensive understanding of the possibilities that exist in the future development of this mine. Matters such as these should not be based upon one's hunches but upon the proper consideration of all known factors pertaining to the problem.

Geological Conditions

The geological formations consist of the Mo Elmo sandstones, the La Plata sandstones and the Red Beds sandstones, all conformable with each other and dipping slightly to the southwest. The Red Bed sandstones are basal and are overlain by the La Plata and the latter by the Mo Elmo. The La Plata sandstone series is to be considered the favorable ore horizon for the mines in this district based upon the orebodies disclosed to date. This series of sandstones is some 400 feet thick and contains a stratum of blue siliceous limestone usually about 6 feet thick which occurs about the middle of the series and divides it into what is known locally as the Upper and Lower La Plata sandstones. The La Plata sandstones are white in contrast to the Red Beds and the Mo Elmo which is also a reddish sandstone. This makes the location of the ore horizon quite easy as the La Plata sandstones stand out in bold contrast to the other formations. Monzonite porphyry dikes have been intruded into the sediments in several places and have been closely associated with the orebodies mined to date and might well have had some genetic bearing upon the formation of such orebodies.
Two systems of faulting in the district are recognized, namely post-mineral and pre-mineral. The former usually trend east-west and show displacements up to several hundred feet, whereas the latter usually trend north-south and show displacements of only a few feet. The latter faulting system has resulted in the formation of a number of mineralized fault-fissure veins striking north and south. These fissure veins have proven to be persistent from the Mo Elmo thru the La Plata and into the Red Beds, but have only proven productive in general in the La Plata sandstones, both the Upper and Lower divisions and also have produced bedded deposits in the La Plata limestone stratum.

From the above we are justified in making the following assumptions. (1) the Mo Elmo and Red Beds are not favorable horizons for ore deposition, (2) that the La Plata sandstone formation is a favorable horizon for ore deposition throughout its entire thickness as proven by the mining done to date in this district. The vertical extent, therefore, of the orebodies will in all probability be limited to this particular horizon in general but in a few cases there have been exceptions to this rule. In the case of these exceptions, though, the ore disclosed has not been of any commercial consequence.

Ore Occurrences

Two types of ore deposits have been mined at your property in the past, namely: (1) vertical oreshoots occurring in the so-called "verticals" or what are fault-fissure veins and (2) a bedded deposit in the La Plata limestone stratum associated with the ore in the verticals.

The "verticals" showing a slight displacement of the sediments of some 3 to 4 feet which faulting has crushed and brecciated the sandstone beds to varying degrees depending upon the friability of the different beds. In the past 5 mineralized veins have been developed and mined in the Mo Elmo workings. Four of these veins are roughly parallel to each other and strike west of north and the other intersects these four at an oblique angle.

The ore mined to date in these "verticals" has occurred in vertical shoots but in mining in the past only the shipping grade of ore has been extracted which had a tendency to conform to definite horizontal horizons within the vertical ore-shoots and the rest which was of mill grade was left.

The vein material or filling consisted of crushed and brecciated sandstones and at times assumed a sheeted structure due to the displacement along the fissuring. The vein width has averaged some 3 feet although in places the ore has been broken as wide as 15 feet.

The gold values have occurred finely disseminated throughout the vein material. It was seldom found possible to pan colors even from a 2 ounce gold ore on account of the gold being so fine and so thoroughly disseminated through the rock. Occasionally the gold was found in association with pyrite but usually the pyrite mineralization precluded the presence of gold values. Outside of an occasional seam of vein quartz and in places a little pyrite mineralization there was not any other associated gangue mineralization. It usually was only possible to distinguish between ore and waste or between shipping ore and mill ore by sampling and assaying. All mining was done by assay control.
The vein walls were usually well defined structurally and the mineralization uniform throughout the vein width. No evidence of oxidation in the vein material was encountered except in the surface workings. The grade of the ore mined in the deepest workings was equally as good as that mined from the surface workings. In fact in the highest grade ore shipped was from the deepest workings consisting of a few carloads assaying some 10 ounces gold or $200.00 per ton.

A knowledge of the ore occurrence in these verticals would suggest that the ore was of primary origin and not enhanced in value by residual enrichment resulting from downward working waters which might have dissolved out base metal sulphides and so enriched the gold values. The fissures have been tight and have not shown any evidence of oxidation or the former presence of base metal values. The strongest evidence that this ore has been of primary origin is that the ore mined from the deepest workings was of equally as good grade as that mined from the upper workings.

One can logically deduce from the evidence at hand that the ore mined in the past was of primary origin and was produced by ascending mineralizing solutions rising along the "verticals" as channels and enriching the much crushed, brecciated or sheeted sandstone forming the vein filling as a result of an impregnation of the gold values into the vein filling.

To date all mining has been confined to the Upper La Plata sandstone horizon and the La Plata limestone bed. In such operations unfavorable horizons corresponding to certain sandstone beds have been encountered within the vertical ore-shoots but the same did not preclude the finding of ore above and below such horizons. The only attempt to prove the continuation of the mineralization below the La Plata limestone bed has been somewhat disappointing. The vein where exposed some 20 feet vertical depth below the La Plata limestones bed shows that the fissuring is persistent and also the mineralization but not to the extent of producing commercial ore. It is my opinion that this merely suggests the possibility of an unfavorable horizon corresponding to the particular sandstone beds encountered and that such does not in any degree preclude the possibility of proving that these five veins mined to date in the Upper La Plata sandstones will not prove equally as productive in the Lower La Plata sandstones. Past mining operations at least support such a deduction.

The bedded deposit in the La Plata limestone stratum associated with the "verticals" undoubtedly resulted from the same source of mineralization as the ore in the verticals therefore a discussion at this time of such ore occurrence is not pertinent to a consideration of the possibility of proving the persistency of the known vertical ore-shoots below the limestone stratum.

Development Justified

In view of the fact that all evidence points to an ascending condition of mineralization, that the fissures will prove persistent with depth due to such being true fault-fissures and not gash veins, that the ore mined to date apparently has been of primary origin and that in view of the fact that there have been unfavorable horizons encountered in mining the verticals in the Upper La Plata sandstones such a duplication of conditions might well be found in the Lower La Plata sandstones, the following development is justified and should be done.
Drop down the hill some 150 to 200 feet vertically below your No. 3 tunnel level along the strike of No. 1 vein and locate the contact of the Lower La Plata sandstones and the underlying Red Bed sandstones. Drive a tunnel from this elevation along No. 1 vein and you will just about hold the level of the formations, i.e., the contact between the Red Beds and the La Plata sandstones as the dip of the sandstone beds is practically at right angles to the strike of No. 1 vein. By driving this tunnel some 600 feet you will develop No. 1 vein through this extent and cut the other four veins which have been productive in the upper workings as well as the porphyry dike which has been so closely associated with the ore mined to date.

If the ore-shoots mined in the upper workings persist into the Lower La Plata sandstone horizon you will have from 150 to 200 feet of stoping backs and with the same degree of concentration of values as in the upper workings a production of some one-half million dollars could be reasonably anticipated.

In this connection I wish to call your attention to the fact that in the Idaho mine to your west the mineralization along the Idaho fissure extended from the contact of the Red Beds up to the La Plata limestone bed where the mineralization spread out and laterally enriched the La Plata limestone bed to varying degrees and extent from the fissure. The concentration of values in the Lower La Plata sandstone horizon and in the limestone bed evidently depleted the mineralizing solutions of their gold content as the bulk of the production from this vein was from the Lower La Plata sandstone horizon. From a shoot of ore only some 400 feet along the vein with a vein width of some 10 inches and a vertical extent of some 200 feet this mine produced considerably over one million gross production. Shipment ranging up to $5,000.00 per ton were not unusual. I merely cite this to show that you will merely be prospecting in a geological horizon that has proven highly prolific in a neighboring mine. In mining this ore we also encountered unfavorable horizons within the vertical extent of the ore-shoot. It should be kept in mind that whereas the ore occurs in vertical shoots that there are to be expected unfavorable horizons corresponding to certain sandstone beds where the mineralization has been weak and also at times the fissuring but such unfavorable horizons do not preclude the continuity or persistency of the mineralization above or below such horizons. If the wall rocks forming the vein filling had not had any genetic relationship to the orebodies you would no doubt not have encountered such horizons both in the Incas and the Idaho mines. I worked at the Idaho mine for over a year and am for this reason thoroughly familiar with their ore-body and it is for this reason that I am so anxious to see you develop your property along the lines suggested.

Cost of Development:

If you are willing to disregard the time involved the cheapest way to do this development is with hand-steel. You could contract this work for about $8.00 per foot and it would take from 12 to 14 months to complete at a total cost to you of $46,000.00. At one time I could have contracted with responsible parties whose past work in the district insured me that they would carry the work to completion for this figure. You of course would have to plan upon some cost of supervision as one would have to lay out this work and inspect it from time to time to see that it was progressing properly. In view of the fact that you would be drifting on No. 1 vein the possibility of developing ore would be present through the entire extent of this tunnel which would justify periodic inspections by some competent man. I would say that you should anticipate some $1,000.00 to cover such necessary supervision.
If you would care to carry this work to conclusion in less time it could be done in some four months if you purchased a small compressor and the necessary rock drill and other equipment. Off hand I would say that this would add some three thousand to the cost.

Recommendations

In view of the small amount of money required to prove up the potential possibilities of your property, this work is certainly justified as outlined above. I only wish that I could have been able to finance same at the time that I had your properties under lease.

I recommend that you undertake the development as outlined and suggested above at this time and hold the question of milling in abeyance until you see what it develops, as such development might have a direct bearing upon your future milling plans.

I trust that I have been able to cover this situation in a way that is comprehensive to you and will give you all the necessary information that you desire. To further this end I have made an ideal sketch map from such data as I have in my files so as to more clearly indicate the work that I propose you undertake. The map accompanies this report. If there are any other points in question I would be glad to elaborate further.

Very truly yours,

(Signed) S. J. Harris, Jr. E.H.
Mining Engineer

LIBRARY
COLORADO SCHOOL OF MINES
GOLDEN, COLORADO