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REPORT ON THE
CENTRAL ZEBALLOS MINE
Zeballos, B. C.

To
Central Zeballos Gold Mines Ltd.
207 Yorkshire Building,
Vancouver, B. C.

By
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March 4, 1947.

THE CENTRAL ZEBALDOS MINE

INTRODUCTION: Four and a half days were spent in the mine and instudying other data in the office.

Mr. N. F. Brookes gave every possible assistance and furnished maps, assays, and other data all of which I believe to be entirely dependable.

I am informed that the Reno Gold Mines Ltd. have given your Company notification of their intention to drop their lease agreement, and this report is written on that assumption.

PRESENT STATUS: (See map "Section on East-West Plane")

With the exception of some broken ore in "503" stope, which will be drawn and milled before the Reno Company retires, the only ore remaining is of marginal grade, blocks "507" and "520", situated between levels 4 and 5.

The back of the first lift of "507", 45 feet long, averages 1.739 Oz. gold over a width of 0.44 feet. This block might be expected to produce, including dilution, 1900 tons of about \$9.00 ore.

The back of the first lift of "520", 50 feet long, averages 1.66 Oz. over a width of 0.78 feet. This block might be hoped, more or less uncertainly since the ore above on No. 4 level is lean, to produce, including dilution, 1100 tons of about \$12.00 ore.

Physically the mine is in good condition. The power plant, mill and camp are in good condition for further operation, except that one cylinder of the Fairbanks-Morse engine driving the main compressor and the mill is said to be somewhat worn, and the smaller Ruston Hornsby engine, driving the small compressor, is overloaded and subject to periodical breakdowns.

From the time the mill started on August 12th, 1946, to the end of January 1947 production was \$36,246 from 3,068 tons of ore milled, after sorting, or \$ 11.16 per ton.

GEOLOGY: Dr. J. S. Stevenson of the British Columbia Department of Mines, after considerable geological work in the district, divided the plutonic (granitic) rocks of the region into two distinct formations rather than local differentiations of the same rock during the cooling of the magma, as formerly supposed. As Dr. Stevenson's report has not yet been published and as he discussed the matter with Mr. Brookes the following is taken from Mr. Brookes' report to your Company for the month of September, 1946, and from verbal discussion.

Dr. Stevenson divides the plutonic rocks into (A) Granodiorite, the older, a somewhat porphyritic rock in appearance, especially when weathered, and -

(B) Quartz-Diorite, the younger, a coarse but more even grained rock.

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The quartz-diorite formation occupies the western side of the stock, or batholith, and the granodiorite the eastern side. The contact at the surface is just west of all known Central Zeballos vein outcrops. This classification places the Spud Valley, Key Oro, White Star, Prident and other northeasterly striking veins in the quartz-diorite, leaving the easterly striking Central Zeballos (Bibb) vein as the only known ore-bearing vein in the granodiorite.

Due to the fact that the contact dips easterly at about 45 degrees a big proportion of the lower workings of the mine are in the quartz-diorite. The contact is exposed in the long No. 9 level crosscut, about the middle of the west drift of the No. 5 level, and just below the No. 6 level station in the raise from No. 9 level. These points of contact are fairly definite though somewhat irregular. (See "Section Map")

All stoping in the Central Zeballos mine has been done on portions of the vein lying between walls of granodiorite with the exception of a small stope on No. 9 level of low grade ore which lies in quartz-diorite; whether this orebody continues downward is not known.

In the western 210 feet of No. 5 level west drift, which is in the quartz-diorite, the gold content of the vein is below marginal grade except for a 45 foot stretch of vein containing marginal ore assaying 1.32 Oz. gold over 0.41 feet width.

In considering the ore possibilities of the mine below the No. 5 level three geological possibilities must be considered --

- (1) That the ore is essentially confined to the part of the vein lying within granodiorite walls.
- (2) That the decrease in the value of the ore below No. 4 level is due to depth, as distinguished from the kind of wall rock.
- (3) That No. 5 level is accidentally at a leaner than average horizon.

We have no certain answer to any of these possibilities without extensive further development being done, however inferences may be drawn from the following observations.

The general lack of ore found in the 600 feet of drifting and 280 feet of raising in quartz-diorite underneath the main ore-bearing section of the mine could apply to either (1), (2), or (3) but more definitely to (1) than to either of the others.

In passing from granodiorite to quartz-diorite

on No. 5 level the vein shows only slight change in character and size, but it contains somewhat less sulphides and less gold than on level No. 4 directly above in granodiorite, and the quartz is slightly more massive with smaller and fewer interstices between the crystals.

In the raise from No. 9 to No. 5 levels the vein is not well opened up and appears, where exposed at all below No. 6 level, to consist of irregular stringers and branches. This may be due to its quartz-diorite walls, although a somewhat similar condition on a smaller scale occurs on No. 3 level east in the granodiorite.

On No. 9 level, which is in quartz-diorite, the vein contains quartz, gouge, and weak sulphides which are more similar in appearance to the low grade parts of the vein in the eastern end of the mine than to those parts of the vein more immediately above the contact. One notable feature of the vein on this level is that the vein through most of its exposed length has a normal east-west strike, but just east of the main crosscut and again at 50 feet west of the crosscut it makes a sudden turn to South 60 degrees west, in the first case for about 40 feet and in the second case it has not been followed beyond the turn. The south 60 degrees west strike is approximately that of the Spud Valley and other veins mentioned above as occurring in the quartz-diorite.

Assays show a 60% decrease in the amount of gold locked up in the sulphides from 1940 concentrates to those of 1946, a small increase in copper, lead, and zinc, and more than 50% decrease in the amount of arsenic. This implies that much of the gold may be associated with arsenopyrite, also the abnormal amount of sulphides deposited comparatively close above the contact would suggest that the mineralizing solutions may have come up along the contact, and tend to confirm (1) - that the ore is chiefly confined to the granodiorite.

In regard to (3) - if No.3 level had been driven 50 feet higher the only ore that it would have cut would have been that in 320 and 322 stopes, which is little more than was found in the No. 5 level; also 105 sub-level cut no ore and probably would not have done so if it were longer. It is, therefore, entirely possible that No. 5 level also is lean because it is a little too high.

The writer's opinion inclines to hypothesis (1) - the importance of the granodiorite wall-rock - but the possibility that (3) is also true should be taken into consideration.

The object of the foregoing discussion is to point out that the development of further ore in depth is

not hopeless, and to indicate the proper theory on which to base the plan of development, which is that the class of wall-rock has governed ore deposition. On this basis the following recommendations are made:-

Extend No. 5 level east an additional 100 feet eastward along the vein.

Cut No. 6 level station and drift east along the vein for 600 feet, and drift west for 100 feet.

This work will be all in the granodiorite except the latter part of the west drift.

Note that at No. 6 level the cutting of the station has only been started, and that the vein has been located at five feet back in the footwall of the raise at that level.

No.6 level, rather than No. 7, is recommended for development because the vein is probably stronger and not broken up at that level, as appears to be the case lower down. Also experience has shown that levels should not be too far apart in order to cut all the ore-shoots, some of which are of rather limited vertical extent.

FUTURE OF THE PROPERTY: Since there is no exposed ore left in the mine of better than marginal grade, on which no profit can be realized under present conditions, it is necessary that stoping and milling be discontinued.

Your Company is then faced with three alternatives:-

(A) Do development now, as outlined above.

(B) Do similar development at some future time when operating conditions may have improved.

(C) Hold the property, either with or without the mill and other equipment, for a possible sale.

Disposal of the power plant, mill, and other equipment will to a considerable extent depend on the decision as regards the above alternatives. It seems greatly to your Company's advantage to do the development outlined at once, even at a somewhat greater cost than at some future time, in order that it may be quickly proven, on the one hand, that the mine still has promise of future profitable production when better conditions of labor and costs occur, or on the other hand, if the results of development should be disappointing arrangements could be made for the sale of all equipment before its value is decreased by deterioration, cost of watchman, insurance, etc., and while the present high price for used machinery is still in effect.

Development cost of drifts in 1946 were \$16.80 per foot including all costs except general overhead, or on the same basis \$13,440, plus overhead, for the 800 feet recommended. It should be possible to contract the driving of such development for \$16 or \$17 per foot, covering everything except a minimum of supervision, but not less than \$20,000 should be provided to cover any contingencies.

(Note that in the case of contract work a Company mechanic should be employed to operate the Fairbanks Morse diesel engine which is too valuable to entrust to a contractor. The Ruston Hornsby engine would probably prove unsatisfactory.)

SUMMARY AND RECOMMENDATIONS:

The mine workings and the surface plant are in good condition except that the mine is practically out of ore.

A new concept of the geology of the district has been worked out and the theory that the ore of the Central Zeballos vein occurs only between walls of granodiorite. This theory while not yet proven, seems plausible and worthy of development to confirm it.

On the strength of this theory, as well as other indications, the writer makes the following recommendations:-

- (1) Do the following development work this year (1947) if your Company has, or can raise, the necessary funds:
 - (a) Drift east on No.5 level 100 feet.
 - (b) Drift east on No.6 level 600 feet.
 - (c) Drift west on No.6 level 100 feet.

The cost of this work should be somewhat under \$20,000.

- (2) If justified by the results of the above work, maintain a watchman until labor and general conditions warrant the re-financing of the Company and the resumption of milling, or until the property and equipment may be sold as a whole at a fair price.
- (3) If the development work (1) should fail to show appreciable amounts of ore sell all equipment and abandon all except the following Mining Claims:-
Extension Nos. 5, 6, and 10 (Lots 1048, 1049, 1712),
A. E. Lot 1046, A. D. Lot 1047, and Mon Fraction Lot 1878.
- (4) If impossible to finance development (1) within a reasonable time sell equipment and abandon claims as in (3), since an uncertain, and perhaps considerable, time will elapse before the price of gold is raised, the former efficiency of labor again attained, or costs materially reduced.

CONCLUSION: From the purely geological viewpoint conditions at the Central Zaballos mine warrant rather extensive development, either with or without dependence on Dr. Stevensons theory. However it must be realized that on account of the narrow vein and the small profits realized in the past the cost of extensive development, even if moderately successful, would be too great for the mine to bear. Therefore only what is, in my opinion, the bare minimum amount of development which is necessary before the mine can with any degree of safety be said to be worked out, is recommended.

It not infrequently happens that a mine may have a poor or barren level followed by good levels below, and this alone without any encouraging features, of which some are present, would, I believe, justify my recommendations for development.

Respectfully submitted,

Chas. C. Starr

Two maps accompany
this report.

March 4, 1947.