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I. SUMMARY AND RECOMMENDATIONS

The 5-to-year exploration program on the Elizabeth group has been completed. Moderately successful results were obtained on the West Vein where a small ore shoot of good grade was found at about its predicted position. On the other hand, the much wider Main Vein was found to contain disappointingly low gold values. The estimate of tonnage and grade made by Dr. Thompson is considerably less than that made herein, but in each report the basic assumptions necessary to making an estimate are clearly stated. The disparity is due to uncertainty about the reliability of sample results and continuity of values - problems all too common when dealing with high grade gold quartz deposits at an early stage of development. Perhaps the truth lies somewhere between the two estimates, but it should be remembered that a few tons of "jewelry ore" can make a dramatic change in the financial picture.

The following recommendations are made with the view of keeping the capital costs as low as possible commensurate with the risks incurred. Only the first three need be considered carefully at the present time.

1. That a small stope be started on the West Vein on a test basis, the ore being shipped to a smelter. The decision to continue or stop the operation should be made on the basis of early smelter returns. Working capital of \$3000 should be available to initiate this test.
  2. That 1000 ft. of diamond drilling be done to test "D" Vein and the Main Vein. Estimated cost: \$6000.
  3. That surface exploration be done. Estimated cost: \$3000.
  4. Long-range recommendations for further underground work will depend entirely on the success of the mining test.
  5. Further development of the No.9 Vein is recommended as a rather high-risk venture, that in any case should not be undertaken until the economics of narrow vein mining in that area have been established.
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## VI. PRODUCTION POSSIBILITIES OF THE WEST VEIN

No great difficulty is foreseen in stoping the ore shoot from the 7220 Level to the surface. It could be mined by shrinkage stoping but this is a non-selective method liable to the risk of high dilution. Although somewhat more costly, a cut-and-fill method adapted to narrow veins, permitting a good deal of selection and lateral movement, would be preferable. The unit cost of mining a 2 foot vein by selective cut-and-fill is estimated to be \$10.00 per ton. The unit cost of selective mining of a very narrow vein such as the No.9 might run as high as \$20.00 per ton.

Rough calculations show that the most economical treatment of the ore would be shipping to a smelter. Smelter rates are omitted from the cost estimate given below as these are a matter of lengthy negotiation - in some instances a premium is paid for high grade siliceous ore.

Assumptions: Tons of ore ..... 1575  
 Total gold content ..... 4378 oz.  
 Net smelter price for gold ..... \$32.00 oz.

Unit costs : Loading bin, stoppe preparation.....\$ 1.00  
 Road improvement ..... 2.00  
 Supervision & maintenance ..... 2.00  
 Direct mining ..... 10.00  
 Truck haulage ..... 12.00  
 Rail haulage ..... 13.00  
 Total cost per ton..... \$40.00

Total production cost ..... \$63,000  
 Total value of gold produced..... 146,000  
Indicated profit ..... 77,000

It is recommended that ore from the West Vein be mined and shipped as outlined above on a test basis. With only minor equipment changes the present mining plant is adequate. The risk involved, hinging mainly on the uncertainty of tonnage and grade, is not great because smelter receipts from the first few shipments would give a definite answer. If the operation proved unprofitable it would be stopped promptly with little loss of capital.

## II. PROGRESS IN 1957

Mining began on July 2nd and continued until August 20th. In this period the drift on the West Vein was advanced 230 feet northward, attaining a total length of 305 feet, and a 10-foot slash was taken southward on the Main Vein. Mining was stopped at that time because of depleted funds. However, the objective on the West Vein was reached. A proposed drive of some 50 feet on the Main Vein was abandoned after one round when it was found that the loose nature of the ground would necessitate expensive timbering.

The total length of underground workings driven in the two-year period - a working time of about 140 days - amounts to 721 feet. I consider this an excellent record made under difficult conditions and with minimum crew and funds, for which great credit is due the foreman, Mr. T.W. Illidge.

## III. CURRENT FINANCIAL POSITION

Funds for this exploration program include \$29,500 from each of the Companies involved and a \$2000 Government road grant - a total of \$61,000. At September 15th, 1957, total expenditures amounted to \$60,851.19, leaving \$148.81 cash in the bank. Outstanding accounts, including Dr. Thompson's charges and 6 weeks pay for Mr. Illidge, amount to about \$2000.

At the property is a complete mining plant suitable for exploration or modest production, having an inventory value of about \$12,000. Thus, the costs and expenses of the operation amounts to \$51,000, of which the participating Companies contributed \$49,000.

## IV. GEOLOGICAL & ASSAY RESULTS - 1957

### MAIN VEIN

As stated above, on account of the loose nature of the ground, only one round was taken southward on this vein. This shows only that the footwall ~~shkxtx~~ ~~xfzgtxxi~~ vein of this complex structure, about 3 feet wide, persists with no improvement in gold values.

Bill White

## WEST VEIN

From the cross-cut northward for 100 feet the vein, dipping about  $78^{\circ}W$ , is of simple structure, marked by a tight footwall and a gougy fault on the hangingwall. At this point another fault, evidently a split off the hangingwall fault, diverging slightly and with a little flatter dip, becomes the footwall of the vein. From here to the face this second strike-fault is either on or near the footwall of the vein. When drifting this section Mr. Illidge reported that the footwall fault repeated the vein at breast-height and that the lower segment but not the upper contained free gold.

Between 145 and 175 feet from the cross-cut the vein is cut and slightly displaced by three easterly-striking, high angle, faults. The wallrock, particularly on the hangingwall side, is rather strongly altered.

Beyond the cross-faults the vein abruptly changes in strike about  $10^{\circ}$  more northerly, and 40 feet farther on it pinches out against a mass of serpentine that enters the drift from the west, i.e. hangingwall, side.

For the next 40 feet the vein is missing, represented only by a strongly sheared zone in altered quartz diorite and serpentine. However, at 250 feet the vein re-appears as a series of quartz lenses in strongly silicified quartz diorite and continues to the face. The vein is 2.9 feet wide at the face where serpentine again appears, this time on the footwall side.

There are two places in the drift on the West Vein that carry interesting gold values. The first is at 130 feet from the cross-cut, where a single channel sample assayed 1.94 oz gold per ton across a width of 2.5 feet. This is about where Mr. Illidge observed free gold in the lower segment of the vein where it is repeated by the footwall fault. At the moment the significance, if any, of this occurrence is unknown.

A section of greater interest extends from footage 185 to 215. This is the vein segment adjoining the serpentine mass. Results of seven consecutive channel samples are as follows:

Footage	Width ft.	Assay oz/T	Re-assay oz/T
185	2.4	0.48	.59 0.70
190	3.0	0.20	.18 0.16
195	2.4	0.96	.905 0.85
200	2.3	1.43	1.34 1.25
205	1.9	0.34	.36 0.38
210	2.0	10.40	9.175 7.95
215	0.8	1.58	1.64 1.70
Weighted Averages:	2.1	2.00	1.86

1.93

V. ESTIMATE OF INFERRED TONNAGE AND GOLD CONTENT - WEST VEIN

The original discovery of high-grade gold-quartz on the property at elevation 7500 feet was trenched to relatively fresh material and channel sampled in 1941 by Bralorne. This ore shoot is no longer visible, being covered by a snow field but its position is known from Bralorne maps. Results of this sampling were as follows:

Width ft.	Assay oz/T.
1.8	6.78
1.5	6.62
2.5	1.50
1.3	6.56
1.4	1.32
1.9	1.14
covered northward	
<u>Wt. Average: 1.8</u>	<u>3.62</u>

Assuming that the surface ore shoot and that in the drift are one and the same; that dimensions and values persist; and that the average of the channel samples is representative of the actual value, the tonnage and total gold content is:

Length:	35 feet	
Width:	2 feet	
Av. Assay:	$\frac{3.62 + 1.93}{2} = 2.78$ oz/ton	assume $\frac{3+1}{2}$
Tonnage factor	12 cu. ft./ton	
Height:	270 ft.	= 2 oz
Tonnage	$= \frac{35 \times 2 \times 270}{12} = 1575$ tons	ton
Gold content:	$1575 \times 2.78 = 4378$ ounces.	average

Because of the large interval between the sampled sections and the chances of structural complexities in this interval, these figures must be placed in the "Inferred" category. However, short of actual mining, there seems no way whereby the reliability of the assumptions can be further checked.

$$1575 \text{ Tons} \times 2 \text{ oz} = \textcircled{3150}$$

$$3150 \times \$345 \text{ US Funds} = 1,086,750$$

$$= \$1467,112 \text{ Canadian Funds}$$



## VII. EXPLORATION POSSIBILITIES - ELIZABETH GP.

The ore-making chances are by no means exhausted. Of the possible prospecting operations suggested below, some can be recommended on their own merits; others depend on the outcome of the mining operation outlined above.

"D" VEIN: This is a vein lying about 400 feet west of the West Vein, discovered by Bralorne by diamond drilling from the face of the low level cross-cut. Two intersections showed that it parallels in strike the West Vein and is much wider. Core assays showed low gold values. Because of thick drift this vein has no surface exposure.

Like the West Vein, this vein may become ore-bearing as it approaches the area of cross-fracturing and serpentine. The position and nature of the "D" Vein, though perhaps not its grade, could be checked most economically by a 500-foot hole drilled westerly from a point in the drift about 180 feet north of the cross-cut. This exploration should not be considered dependant on the outcome of mining the West Vein.

MAIN VEIN: Where it was intersected by the 7220 cross-cut this vein showed excellent structure but disappointingly low gold values. However, before "writing-off" this potential ore-bearing structure it should be tested laterally by several short holes, perhaps totalling 500 feet, drilled from the cross-cut on the hangingwall side of the vein.

WEST VEIN: This vein in the north face of the drift is in an area of structural complexity evidently favourable to ore-deposition. Further drifting to the north is justified particularly if the ore shoot already discovered proves profitable.

DEEPER EXPLORATION: From a point on the main road 200 feet lower in elevation than the 7220 Level another cross-cut could be driven to reach the downward continuation of the West Vein ore-shoot. Its length would be 1000 feet. Such a working would be laid out to cut the Tommy Vein and Main Vein. However, such a project would be considered only after the West Vein ore-shoot had been profitably mined.

**SURFACE EXPLORATION:** Several showings that in the past have received little or no attention warrant further low-cost surface work. One of these is the Tommy Vein that outcrops briefly ~~briefly~~ just below the 7220 Level dump. This vein should be ~~stripped~~ stripped by bulldozer, drilled and blasted to fresh material, and thoroughly sampled.

A second promising area lies about 1000 feet south of the 7220 Level portal and at about the same elevation, and it is near the main serpentine-quartz diorite contact. This is an area of prominent cross-fracturing that evidently contains numerous small and a few larger veins. Spotty and occasional high gold values have been obtained from isolated outcrops. The area could be tested most efficiently by extending the present road southward from the 7220 Level portal. Promising veins would be stripped by bulldozer or by hand, blasted to fresh material, mapped, and sampled.

**RECOMMENDATIONS FOR EXPLORATION:** It is recommended that the diamond drilling and surface exploration programs be carried on concurrently with the mining operation. Savings would be effected thereby in supervisory, camp, compressed air, and transportation expenses. The other exploration possibilities mentioned above should be delayed pending successful mining of the West Vein ore-shoot. The estimated costs of the various exploration projects is as follows:

				<u>1986</u>
"D" Vein - 500 ft. AX DDH @ \$6.00/ft. ....	3000	14	9500	
Main Vein - " " " " " .....	3000		9500	
Surface Exploration .....	3000		10,000	
West Vein - 200 feet of drift @ 65.00/ft. ....	13,000	350	70,000	
New Cross-cut - 1000 ft. @ 60.00/ft. ....	60,000	350	350,000	
.....				<u>449,000</u>

Dr. W. H. White's recommended exploration program would cost approximately \$449,000 edn. in 1986 Dollars.

## VIII. PRODUCTION & EXPLORATION POSSIBILITIES - No.9 VEIN

The No.9 Vein, explored by an 800-foot drift at elevation 7557 feet, is some 2000 feet west of the Elizabeth veins. The ground is owned by Bralorne Mines Limited (NFL). The original discovery of high-grade gold quartz in this vein (made, incidently, by the writer in 1947) was on a steep slope mantled by unstable slide-rock at an elevation some 300 feet above the present adit. The portal is now blocked by ice; hence, little is known of the vein in the adit beyond what can be gleaned from mine maps and from discussions with persons who worked in the adit.

The vein has about the same attitude as the Elizabeth West Vein. Although No.9 Vein is very much narrower, it is higher grade than the West Vein and a greater part of its developed length is gold-bearing. Miners who worked in the adit believe that parts of the No.9 Vein are extremely high-grade. Comparison of the geological and assay plans suggest that the ore shoots, like that of the West Vein, occur in places of cross-fracturing and small strike deflections.

Dr. Thompson has offered some estimates of the possible tonnage and grade of two ore shoots in the No.9 Vein. If these figures are modified on the basis of selective mining and total gold content, and if a somewhat more optimistic view is taken that the ore extends 200 feet above the adit instead of 100, the result is a tonnage of 800 having a total content of 1770 oz. Using these figures the economics of production from the No.9 adit would be roughly as follows:

### Capital Costs:

Ice removal.....	? possibly	\$ 1,000
Track; air, water, vent pipe; labour and stope preparation.....		5,000
Compressor .....		5,000
Drills, etc. ....		2,000
		13,000

### Unit Production Costs:

Direct mining .....	\$	20.00
Others same as Elizabeth ..		30.00
		50.00

<u>Total Production Cost:</u> 800 tons @ \$50.00.....		40,000
<u>Net Smelter Value of Gold</u> @ \$32/oz .....		57,640
<u>Indicated Profit:</u> .....		\$17,640



The tonnage and gold content of the No.9 Vein are even less certain than the figures for the West Vein, and before establishing a mining operation here it would be highly desirable to check the figures and also to increase the ore reserves.


The topography at the No.9 offers an excellent opportunity for exploration by drifting one the vein at an elevation about 230 feet below the present adit. Such a drift starting directly on the outcrop would develop backs rapidly and give the necessary information on the continuity and grade.

This work would require a mining plant similar to that at the Elizabeth, but some equipment not needed at the latter, i.e. mucking machine, jack-leg drills, could be used at the No.9. If both operations were carried on at the same time, savings would be effected in camp, transport, and supervisory costs.

This program is recommended as a venture with a fairly high risk. Probably it should not be undertaken until the economics of mining the Elizabeth West Vein have been determined. If it is undertaken, funds should be provided for not less than 800 feet of drifting - about \$50,000.

Respectfully submitted,

September 28th, 1957.

  
W. H. White