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ORE RESERVES AND ORE POSSIBILITIES OF THE
MASTODON-HIGHLAND BELL MINES LTD.
BEAVERDELL, B.C.

SUMMARY AND CONCLUSIONS

The Mastodon-Highland Bell Mines is comprised of five distinct vein-type ore bodies, namely, the Wellington-Sally, Rob-Roy, Bell, Beaver and Lass - "Lower Mine". These ore bodies are generally in dioritic rocks and are arranged in an east-west en echelon pattern. Each ore body shows varying degrees of mineralization and grade. Post ore block-faulting is pronounced and in the Bell is of such intensity that the vein is repeated and confined in a horizon only approximately 100 vertical feet.

In spite of past production it is the writer's opinion that there is a sizeable amount of ore left in the old workings and that there are sound geological indications for additional ore.

A total of 857,780.0 tons of "possible ore" based mainly on geological interpretations have been calculated. To elevate this tonnage or say 30% of it into the "proven" and "probable" categories should be within reasonable costs. It is believed that the present capability of the mine can meet such cost.

The method of long hole sampling as a development tool is stressed.

ORE RESERVES AND ORE POTENTIAL

(a) General

The method used in calculating ore reserves is the result of an attempt to establish procedures that would be applicable to and compatible with the present method of exploration and development. Most of the proven ore reserve figures are based on diamond drill intersections as only such intersections afford assay values. Since sampling has never been a routine operation, blocks appearing on cross sections as fully defined could only be included under the "probable ore" category. Also, since no cut-off value has been established, assay values as low as 5 ounces per ton are included.

Three categories of ore reserves, namely proven, probable and possible are used. The definitions of these categories as discussed in Special Volume 9 of CIMM are not strictly adhered to since problems such as structural complexities, lack of assay values, etc., are taken into consideration.

(b) Interpretations

Familiarity and experience with the character of the ore are the main factors in interpreting the continuity of each ore block as well as the area of influence of an assay value. For diamond drill intersections, a rectangular dimension of 15 feet along strike and 10 feet down dip represent an area of influence. In areas of satisfactory correlation, corresponding increase or decrease in areas of influence are made. This particularly applies to closely spaced intersections as well as intersections occurring between a number of exposures in drifts and stopes.

For probable ore the concept of structural continuity with a minimum of geological inference is applied. Most of the unit blocks under this category are the pillars where mineralized rock is exposed but where no sample has been taken. Assay values assigned to these blocks are average figures from adjacent stopes samples taken over a period of 5 years. Also included under the probable ore category are old dumps which are generally of submarginal grade. Tailings, although satisfactorily defined as to tonnage and grade are included under "possible ore" due to their low grade.

Unit blocks calculated and arrived at mainly from geological interpretations are grouped under "possible ore". In the lower mine these blocks are mostly projections made along established structural trends. In the Lass and Bell they are missing blocks projected along fault planes.

(c) Method of Computations and Recording

Diamond drill holes and their intersections are plotted on vertical sections that are 25 feet apart. The true widths of these intersections are corrected whenever possible and the assay values as recorded in the ore reserve tabulations are weighted over 3 feet for veins dipping more than 45° and 5 feet for veins dipping less than 45° . For different unit blocks other than those derived from diamond drilling, volume dimensions are measured off from the vertical sections and plans. On longitudinal sections these blocks usually have irregular outlines which make planimetric measurement more convenient.

The character of the ore bodies dictates the use of a more exhaustive method of compiling data describing each ore block. After the unit blocks are tabulated each is transferred to a system of punch cards which

allow for simultaneous recording of various information such as grade, tonnage, level, etc. as well as easy sorting out of such information as may be required.

The established tonnage factor of 11 cubic feet per ton for ore in place is used. For broken muck 19 cubic feet per ton is used and for tailings 22 cubic feet per ton was arrived at by actual measurement.

(d) Ore Reserve Summary

Ore Body	POSITIVE			PROBABLE		
	Tons	Grade	Ounces	Tons	Grade	Ounces
Lower Mine	12,835.0	18.0	231,030.0	6,066.0	16.0	97,056.0
Lass	626.0	20.0	12,520.0	864.0	24.0	20,736.0
Bell	3,475.0	12.0	41,700.0	7,154.0	10.0	71,540.0
Beaver	533.0	15.0	8,118.0			
Rob Roy				859.0	17.0	14,603.0
Sally	1,963.0	22.0	43,186.0			
Switchback	2,272.0	15.0	34,080.0	2,272.0	15.0	34,080.0
Pueblo				9,090.0	15.0	136,350.0
Lass Dump				1,000.0	8.0	8,000.0
Bell Dump				1,000.0	~ 7.0	7,000.0
Rob Roy Dump				1,500.0	~ 8.0	12,000.0
Beaver Dump				2,000.0	~ 7.0	14,000.0
TOTALS	21,704.0	Av=17.0	370,634.0	31,805.0	Av=10.0	315,365.0

(e) "Possible Ore" Summary

Ore Body	Tons	Expected Ave. Grade	Remarks
Lower	- 28,385.0	17.0 oz/T	
Lass	283,984.0 ✓	15.0 "	Includes backfill
Bell	45,145.0	12.0 "	
Rob Roy	98,701.0	12.0 "	#6 & 7 veins & backfill
Sally	77,943.0	12.0 "	#1, 5, 6 veins & Wellington Vn.
Switchback	64,637.0	15.0 "	
Tailings	258,885.0	3.5 "	
TOTAL	857,780.0		

The backfills were calculated as 40% of total broken muck .
occupying all old stopes in the Lass and Rob Roy. Except for the grades of the Lower "orebody", switchback vein and tailings expected grades are pure

guesstimates. It can be mentioned though that backfill from the Lass has been averaging 12. oz per ton while in the Rob Roy old samplings of fines in the stopes show an average of 21.0 oz per ton for 23 samples.

Until a suitable method of sampling can be used the potential of old "waste" dumps could hardly be evaluated. The tonnages for these dumps are as follows: Rob Roy - 54,000.0, Beaver - 18,000.0, Bell - 43,000 and Lass - 27,000.0 showing a combined total of 142,000.0 tons.

SAMPLING

The only form of sampling that has anything to do with ore reserves are those taken from diamond drill intersections. Only lately has channel sampling been started and is being applied at the 3800 level. Car samples from stopes are taken as routine although their immediate usefulness and reliability is in question. The present method of visually determining ore is, to say the least, disconcerting since the presence of sulfides does not necessarily indicate silver values. The introduction of a sampling procedure for stopes, drifts and long holes is suggested.

DIAMOND DRILLING

Since 1961 to the present an average of 43% of all diamond drill holes intersected ore values above 12.0 oz per ton. The percentage in 1966 was 58% and during the last six months was in the order of 27%. This decrease in percentage may be offset by the possibility of considering values down to 5.0 oz per ton as economic. At present, at least 25% of diamond drill holes properly located are expected to intersect ore values above 12.0 oz. per ton. This would mean that only 5 intersections per month would be possible at our present rate of drilling.

RECOMMENDATIONS

The present proven and probable ore reserve stands at 53,509.0 tons. In contrast to this figure is a "possible ore" potential of 598,895.0 tons from undefined although geologically attractive areas. Exploration and development by diamond drilling, long hole sampling and underground work is recommended for the following general areas and structures, in the order of their importance:

1 - Lower Mine

- (a) Long hole sampling of all pillars indicated as "possible ore" in sections.
- (b) Diamond drilling of parallel structure on hanging wall of main ore body. The presence of this parallel structure has been verified above the 3005 stope area.

2 - Bell

- (a) The previous program to re-open the Bell orebody through the Rob Roy 150 level should be accelerated. Long hole sampling of pillars particularly in the "Intermediate A" level is called for.

3 - Lass

- (a) The southwest extension of the Lass orebody towards the west terminal fault should be probed at by diamond drilling. The area should be accessible through a drift from the main winze at 5 level or through a crosscut to the south from the Day crosscut.
- (b) The 6, 7 and 8 levels should be made accessible through the main winze for an expanded diamond drilling program.

4 - Rob Roy

- (a) Level 3 should be made accessible to (1) check backfill possibilities and (2) establish diamond drill setups to explore below the level.

5 - Sally

- (a) Diamond drill for intersections above and below 4 level on the vein. The convenience of using the Wellington No. 5 level should depend on the result of such diamond drilling program.