WHITEHORSE COPPER MINES

FUTURE EXPLORATION -- 1973 ONWARDS

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D. Tenney
Chief Geologist

SUMMARY

Present ore reserves are expected to be mined out during 1977, so that in the coming four years new sources of ore must be found if production is then to continue. A further one years supply of ore will possibly be found within reach of the Little Chief underground workings and the exploration joint venture with Hudbay and Amcan may be successful in finding new ore deposits on the northern half of the mine property.

Whitehorse Copper should make an effort to drill on selected targets south of the Little Chief, and also review the possibility of mounting a modest exploration program for skarn type orebodies in the immediate region around Whitehorse where our experience of skarn type deposits will be an asset to us.

INTRODUCTION

At a milling rate of 2,000 tons per day, existing reserves in the Little and Middle Chief underground orebodies will be exhausted during 1977. By that time some new sources of ore must be made available. The Hudbay - Amcan agreement to spend a minimum of $300,000.00 on the joint venture claims north of Little Chief over a period of three years may well be expected to find at least some ore grade material. If past results in the area are a guide any new ore zones which are discovered will be smaller lenses of relatively good grade copper similar to the mined ores at Arctic Chief and Pueblo. These small lenses are rather more characteristic of skarns in general than the rather larger Cowley Park, Little Chief and War Eagle zones. These larger zones give recognizable geophysical evidence of their existence; the smaller ones may not.

EXPLORATION COSTS

During the years 1967 to 1971 a total of three million tons of ore were treated. As of January 1973 the ore reserves also stood at close to three million tons. The total cost to date of finding this six million tons of ore is estimated at $1.5 million, or about 25 cents per ton. This figure, however, is misleading as most of the six million tons has been found below surface showings which cost almost nothing to locate in the first place. The number of tons of "ore" which can be directly attributed to the highly sophisticated exploration methods (including exploration diamond drilling) used in the past then dwindles to the tonnage contained in the Black Cub South and Arctic Chief East deposits. We may well conclude from this that our actual exploration costs per ton of ore found are:

$$\$1,500,000.00^{*} \div 400,000 \text{ tons} = \$3.75/\text{ton}.$$

*Figure theoretically should not include any costs chargeable to the 5.6 million tons (6.0 million minus .4 million) above. This is hard to guarantee owing to the accounting procedure used.

The truth of the matter clearly lies at the present time somewhere between these two amounts (ie 25cents and $3.75/ton) since most of the more obvious exploration targets have been drilled, costs approaching the higher figure are likely to prevail. That the $3.75 will be reduced by any allowable taxation concessions does not seem too comforting. Certainly the grade of ore which would have to be found to cover such an exploration cost would be relatively high.

THE TIME ELEMENT

The time element in finding new ore is important as we have about four years mining in the Little Chief and Middle Chief, with the possibility of an additional years production from Big Chief and deep (below 1700 level) Little Chief ore in combination. At least a part of this ore I feel is relatively assured giving a figure, possibly somewhat optimistically, estimated at five years in which to get another major source of ore into production. The new source should be found at the latest in 1974 if continuous mill operation is to be achieved. A discovery date in 1974 would allow three years for development work prior to production.

PROPOSED ACTION

1. Surface diamond drilling at depth those surface showings remaining undrilled. (in part being done by Hudbay)

2. drilling selected geophysical targets

3. increasing coverage of geophysical surveys in selected areas (induced polarisation mainly)

4. Re-examination of presently drilled off deposits to see if any part is amenable to mining under present economic conditions either by underground or open pit methods.

5. Exploration along diorite contacts northwest of Whitehorse for skarn type orebodies similar to Little Chief and War Eagle -- such deposits are known for a distance of 130 miles in this direction.

1a) Little Chief

Underground diamond drilling below 1700 level could produce an extra one half a million tons of ore, at least a part of which is relatively assured and in addition to the present reserves below 1700 level.

1b) Middle Chief

The present reserves of around ½ million tons of 2% copper do not appear to justify a very sophisticated mining method since both grade and tonnage are low by comparison with Little Chief. The orebody is practically drilled off and significant large extensions do not appear likely.

1c) Big Chief

The down dip portion of the Big Chief has never been drilled and this should be our first priority in any plan to develop new reserves in the area. The structural control of the quartzite limestone contact is well established in the Little Chief and Middle Chief, and it should be traced into the Big Chief and beyond to the North. There are extremely good prospects of finding more ore along this contact where it is close to diorite. Two surface drill holes each up to 1,000 feet deep are proposed for drilling during 1973.

1d) Valerie

Below the quartzite intersected at the end of underground exploration hole LCU-116 it is expected that some limestone will occur. (the sedimentary cycle above is repetitive limestone and quartzite). The footwall contact of this limestone with any quartzite underlying it may well be mineralized. Dips in this area are at a flat angle to the west. An investigation of the geology of the area will be made but it seems that at the present time that we will be best advised to consider steeply dipping surface drill holes possibly 1,500 to 2,000 feet deep. A flat hole similar to LCU-116 may also be considered from the 1700 level haulage drift when the drift is completed. This hole would intersect the diorite contact in the Valerie Zone at about 400 feet below the deepest drilling done to date. (LCU-116)

1e) Cowley Park

Cowley Park offers the possibility of mining large ore tonnages at a relatively low grade. Deep drilling is being considered.

2) Induced Polarisation Anomaly Cowley Park Line 116E 38 South

This induced polarisation anomaly has all the makings of an orebody.

a) adjacent to diorite

b) in or adjacent to limestone

c) high changeability reading of 52 milli-seconds

d) localized high changeability: probably 200 feet or so below surface and less than 800 feet in length - dipping south.

e) Anomaly near apparent swing and/or fault in the diorite contact.

I agree with the 300+ foot hole proposed by K. Hendry in his report of August 31st, 1971 (Spartan Aero project #71153) and strongly recommend drilling this anomaly during 1973. I estimate 500 feet of drilling to complete the hole.

3) New Geophysical Coverage

New geophysical coverage in the form of induced polarisation is warranted on the recently staked WE19 - 34 claims north of War Eagle. Some work must be done in order to keep this ground.

4) Old Surface Showings and Pit Zones

An examination should be made of all old pitting zones with a view to reassessing their value not only for pitting but also for underground mining. The most likely zones seem to be:

Cowley Park
Black Cub North (and south)
Kodiac Cub
Gem
Keewenaw

Particularly in the Gem to Black Cub South Zone it may be possible to develop a series of small stopes, but mining would have to contend with particularly poor ground conditions especially around Black Cub. Access could be by shaft or decline from the Keewenaw or Black Cub South Pits.

5) Outside Explorations

Several areas in the vicinity of the Whitehorse Copper Belt are known to contain skarn-type copper mineralization. Of particular interest are the Ibex Creek -- Jackson Creek Drainage System and the northeast side of Fish Lake which is largely covered with overburden. 130 miles from the mine promising skarn type copper has been examined on the east side of Ashihik Lake. (on strike?) All of these areas are worthy of our attention and can be explored using a combination of prospecting with geochemical sampling, followed by airborne magnetic and electromagnetic surveys. We would have some advantage over others in these areas owing to the experience gained on the Whitehorse Copper Belt where the geology is similar.

D. Tenney
March 1st, 1973