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HART RIVER MINES LTD.

MARK GROUP

116 A 10 Mayo Mining District

Yukon Territory

Report by

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March 20, 1968
Vancouver, B. C.

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1. INTRODUCTION

During the summer of 1966, new showings of copper-zinc-lead in pyrite-pyrrhotite and of lead-zinc in shears were discovered in the Hart River area and staked as the Mark group. This group is now held by Hart River Mines Ltd. (N. P. L.).

The writer examined these showings, and others in the general area, on July 10, 1967.

Later in the season, geochemical and electromagnetic surveys were carried out by Alrae Explorations Ltd. under the direction of J. A. C. Mackie, P. Eng., and two short core-holes were drilled with a packsack drill.

The writer has been requested to assess the results of this fieldwork, embodied in reports by Mr. J. A. C. Mackie, and to evaluate the potential of these discoveries.

The following sources have been used by the writer.

- 1) Larsen Creek Map area, 116-A, G. S. C. paper 62-7, Map 14 - 1962.
- 2) Field notes, and assays on samples taken by the writer July 10, 1967.
- 3) Report on the Mark Claim Group, Hart River Area, Y. T. by J. A. C. Mackie, P. Eng., October 24, 1967.
- 4) Report on the Mark Claim Group, by J. A. C. Mackie, P. Eng. February 6, 1968.
- 5) Assay reports by J. R. Williams & Sons Ltd. and by Bondar-Clegg & Co. Ltd.

2. PROPERTY

The property consists of the following 38 claims.

<u>CLAIM NAME</u>	<u>RECORD NUMBER</u>
Mark 1 4	Y 6283 6286
Mark 5 - 24	Y 6462 - 6481
Mark 25 & 26	Y 14037 & 14038
Mark 27 - 34	Y 6912 6919
Mark 35 38	Y 14039 - Y 14042

The claims lie in the Mayo Mining District on claim sheet 116-A-10. The writer has personally observed the claim posts near the main showings, and all the claim posts have been examined in the field by Mr. J. A. C. Mackie, P. Eng., who has certified that they have been correctly staked according to the Yukon Quartz Mining Act. This certificate appears in Mr. Mackie's report of February 6, 1968.

3. LOCATION, ACCESS

The Mark showings lie at Latitude 64° 38' N and Longitude 136° 50' W, at elevations between 3500' and 4500', claim sheet 116-A-10, on the east side of a valley

draining into the Hart River about 12 miles to the North.

A system of broad valleys and low passes connects the Hart River Basin with the Dempster Highway about 40 airmiles to the West.

Several branches of the West Hart River provide potential road access to the Mark claims from approximately mile 50 on the Dempster Highway, with maximum elevations lying slightly over 4000'

The area is one of permafrost and moderate snowfall. Fair timber is present in the Hart River basin below elevations of 3000'. Water supply is good in the main valleys and quite abundant in summer in the creek near the Mark claims.

4. HISTORY

Little prospecting has been carried out in the area, but some other showings had been discovered by trappers as early as 1957 elsewhere in this belt.

The Mark showings were found in 1966, and some 256 lineal feet of trenching was done in 12 trenches and pits at that time.

These trenches located massive pyrite with base-metals in place over a width of about 35'.

A geochemical and an electromagnetic survey were carried out in 1967, followed by 72' of core drilling in two packsack holes.

In 1961, reconnaissance mapping by L. H. Green and J. A. Roddick of the G. S. C. was carried out as "Operation Ogilvie", resulting in preliminary map 14-1962, Larsen Creek. No airborne magnetic surveys have been conducted in this area by the G. S. C.

5. GEOLOGY

The showings occur near the axial plane of a regional WNW trending anticline outlined by Cambrian-Ordovician-Silurian dolomite and limestones overlying unconformably Precambrian grey green argillites and orange weathering dolomites.

The area is intruded by rocks identified on Map 14-1962 as orange to brown weathering diorites and gabbros (formation 20 on map 14-1962).

According to the map, these are comparable to the diorites invading the Keno Quartzites and Schists of pre-Middle Jurassic age.

In the field, however, these intrusions are essentially dyke-like masses very similar to the Mississippian-Devonian volcanics, and could also be related to early Paleozoic volcanics.

The writer definitely questions a Mesozoic age for these volcanics.

The showings occur in the late Precambrian argillites with quartzite beds.

The main Mark showing No. 1 appears to be conformable with the bedding and lies

near the contact of the argillites with large dyke-like volcanic mass, in a small saddle on a ridge.

The lead-zinc showing No. 2 lies near a creek along and within a volcanic dyke cutting thin bedded dark blue argillites with narrow limy beds.

Showings elsewhere in the area are also controlled by volcanic dykes of andesitic material.

6. ORE

The main showing (No. 1) consists of decomposed massive pyrite on surface; drilling at depth has shown a mixture of pyrrhotite and pyrite with economic base metal values.

The writer, on July 10, 1967, took two representative samples of the material exposed in partly caved trenches near the saddle.

Other samples available are those reported from the drilling (4 in Hole 1, 5 in Hole 2).

There is good correlation between the various samples, taking into account the normal enrichment in silver and lead and solution of the zinc and copper in decomposed pyrite.

<u>No.</u>	<u>Width</u>	<u>Pb</u>	<u>Zn</u>	<u>Cu</u>	<u>Ag</u>	<u>Au</u>
PHS 213	35' ?	1.3	2.4	1.35	3.32	.04
PHS 214	35" ?	2.0	tr.	0.63	3.30	.08
DD #1	24' core	0.54	2.29	1.58	1.58	.04
DD #2	28' core	0.15	1.80	1.94	1.61	.04
Average DD #1 & 2		0.33	2.02	1.75	1.60	.04

PHS 213 & 214: Assays by Whitehorse Assay Office,
report No. 3847-4

DD #1 & 2 Assays by J. R. Williams & Sons,
reports 298952/955 and 297066/070

The showing strikes about E-W with a 70° S dip, which is about parallel to the adjacent argillites. The regional strike of the latter is N 50° W with a 20° - 40° SW dip. This indicates local folding in the showing area.

Detailed drill results were as follows

	<u>Length</u>	<u>Core</u>	<u>Pb</u>	<u>Zn</u>	<u>Cu</u>	<u>Ag</u>	<u>Au</u>
DD #1	0 8	Nil		O v e r b u r d e n			
	8 - 15	7'	0.35	2.50	1.30	1.10	.04
	15 20	5'	0.60	2.75	1.40	1.90	.05
	20 25	5'	0.25	2.50	1.65	1.50	.04
	25 32	7'	0.90	1.60	1.95	1.90	.04

	<u>Length</u>	<u>Core</u>	<u>Pb</u>	<u>Zn</u>	<u>Cu</u>	<u>Ag</u>	<u>Au</u>
DD #2	0 12	Nil	O v e r b u r d e n				
	12 - 20	8'	0.30	2.88	1.45	1.00	03
	20 25	5'	0.10	0.80	1.75	1.25	04
	25 30	5'	0.15	3.20	2.15	1.50	03
	30 - 35	5'	0.09	1.10	2.20	1.70	04
	35 - 40	5'	tr.	0.35	2.45	2.95	06

DD #1 -90° DD #2 -60° at 175° bearing
Location of collars: Line 97W at 49 + 70N.

Reported core recoveries: DD #1, 8' 32' 60% DD #2, 12' 40' 81%

In both holes the regular increase in silver and copper with depth is noteworthy and suggests that at depth, the unweathered ore may assay over 2% cu and over 2 oz/t Ag.

The gold content is significant and in some of the original surface samples values up to 0.30 oz/t Au have been reported.

The ore of showing No. 1 is of a type likely to form large bodies of either interbedded type or the shear-filling type. Local conditions suggest that this body may be interbedded.

Showing No. 2

The sample collected by the writer over a 4' width compares well with the sample collected by Alrae Explorations over a 4' width including some stringer type mineral in the walls omitted by the writer in his sample.

The mineralization lies within and along a volcanic dyke and consists of fine grained galena and minor sphalerite in patches of carbonate and altered rock along a sheared zone following the dyke and striking N 80° E with an 80° N dip.

	<u>Width</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>	<u>Au</u>
Alrae sample	5'	19.0	6.95	3.10	02
PHS sample 215	4'	29.6	8.9	3.69	01

This showing lies about 3200' SE of showing No. 1 and is exposed in the creek bank. It was discovered by tracing small galena pebbles in the creek to their source.

7. GEOCHEMICAL SURVEY

601 soil samples were taken at 100' intervals on lines from 200' to 800' apart, covering an area of some 1.8 square miles around the showings.

Background and peak values are as follows in p. p. m.

	<u>Pb</u>	<u>Zn</u>	<u>Cu</u>
Background	20 - 30	50 100	8 - 40
Peak (No. of samples)	1000-5850 (9)	+ 1000-5250 (15)	400-2200 (5)
Samples over:	100 p. p. m. :73	200 p. p. m. :99	100 p. p. m. :79

The samples consisted of residual soil immediately underlying the organic layer. 358 samples were tested for copper. All assays were by atomic absorption after hot HNO₃ HCl extraction.

A. Copper - Within a zone about 3700' long and extending from showing 1 to showing #2, all copper values lies in the 100 - 680 p. p. m. range, with a high of 2200 p. p. m. near showing #1.

B. Lead - Nearly all leads of over 100 p. p. m. within a one mile long zone including both showings. No. 1 showing lies within a 2600' long zone of over 1000 p. p. m. and No. 2 showing lies close to a 1500' long zone of over 200 p. p. m. lead and over 1000 p. p. m. zinc.

C. Zinc No. 1 showing lies within a 3000' long zone of over 1000 p. p. m. straddling the discovery saddle.

Lack of detailed topographical data precludes an accurate estimate of what reflects dispersion and what is directly related to the underlying bedrock. The bulk of the anomalous base-metals however, lies across the talus slope and is obviously related to an in site source area extending from showing 1 to showing 2.

8. ELECTROMAGNETIC SURVEY

A Ronka EM-16 survey was completed over all the lines where soil samples were taken, i. e. a total of 12.6 line-miles.

A very strong conductor coincident with showing #1 and the main geochemical anomaly was located over a length of over 1200'.

Several other and weaker conducting zones were obtained, which due to topographical effects and lack of geological mapping, cannot yet be interpreted accurately.

The extension of the main conductor to the West is covered by a thick layer of talus on the slopes and by overburden in the main valley and no work was done over the Easterly extension of the main conductor and of the main geochemical anomaly, which are both open in this direction.

9. SUMMARY AND RECOMMENDATIONS

Copper-zinc-silver (lead) ore of a type likely to form large bodies and in a geological environment favorable for the occurrence of economic deposits of this type, has been discovered in the Hart River area.

Geochemical and electromagnetic surveys have indicated very significant anomalies centered on the two showings discovered so far.

Very limited packsack drilling has indicated a satisfactory grade of better than 2% Cu and 2 oz/t Ag in the fresh ore some 30' below the surface.

The indicated true width of the ore zone is between 20' and 40'.

The probability that the Mark showings reflect the presence of a multimillion ton

body is high, and overall conditions suggest a minimum target size of the order of 3000-5000 tons per vertical foot.

Transportation-wise the Mark prospect lies some 50 road miles from a major highway.

A two stage drill program to assess the true dimensions and grade of this occurrence is recommended, to be preceded as early as possible by geological mapping on a scale of 1" = 400' to direct the drilling in the most efficient manner.

Initial drilling will require about 4000', and in case of success a second drill should be added for another 10,000' of drilling.

The cost estimate is as follows:

First Stage Drilling

1. Preparatory mapping	\$ 6,000	
2. Mobilization and demobilization	12,700	
3. Camp Service	9,800	
4. Engineering	6,000	
5. Direct drill cost @ \$12.00 foot	48,000	
6. Contingencies	8,000	\$ 90,500

Second Stage Drilling

1. Mobilization and demobilization	12,700	
2. Camp Service	9,800	
3. Direct drilling cost @ \$12.00 foot	120,000	
4. Contingencies	12,000	154,500
	Grand Total	<u>\$245,000</u>

Respectfully submitted

P. H. Sevensma, Ph. D. P. Eng.

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B. C. do hereby certify that:

1. I am a graduate of the University of Geneva, Switzerland, (Physics and Chemistry, 1937; Geology and Mineralogy, 1937) where I obtained my Ph. D. in Geological and Mineralogical Sciences in 1941.
2. I am a consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.
3. From February 1948 until December 1965, I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.
4. I have personally examined and sampled the showings which are the subject of this report, on July 10, 1967. I have had full access to all the data and reports on the field work carried out by Alrae Explorations during the 1967 season.
5. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Hart River Mines Ltd.

Respectfully submitted

P. H. Sevensma, Ph. D. , P. Eng.

PHS/cm
Vancouver, B. C.
March 20, 1968.

CYPRUS EXPLORATION CORPORATION, LTD.

INTER OFFICE MEMO

VANCOUVER OFFICE

~~TO~~ BY: D W. Tully

DATE March 7th 19 68

~~FROM~~

SUBJECT: Hart River Copper Prospect - Yukon Territory

FILE
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A meeting was held on March the 6th with Mr. Alex Briden of Alrae Explorations Limited, concerning the subject prospect.

The prospect is situated near the head quarters of the Hart River about 100 miles northeast of Dawson, Yukon. It is controlled by Mr. Alex Briden. This sulphide zone was discovered in 1966 by Mr. Briden and is being financed in part by Mr. Patrick Collison.

The mineralized zone is composed of massive sulphides carrying about 1% copper across a width of about 20 ft. and exposed at intervals for a strike length of 2000 ft. The main minerals are pyrite and pyrrhotite and chalcopyrite. Two short diamond drill holes have been drilled into the zone, to depths of about 50 ft. each, the result indicate the silver and copper values may be increasing with depth.

The geological structure, the electromagnetic and geochemical work done by Briden was correlated by Newmont Mining Corporation in the autumn of 1967.

Briden plans to drill a vertical diamond drill hole on the mineralized showing in the summer of 1968 which is almost vertical dipping.

We are welcome to examine this prospect next field season.