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KERR ADDISON MINES LIMITED
405 - 1112 WEST PENDER STREET
VANCOUVER 1. B.C.

820598

COPY

P. M. Kavanagh

W. M. Sirola

Liard Copper Mines, Shaft Creek Property -
R. H. Seraphim Report - January, 1969.

January 29, 1969.

Seraphim's report indicates that during 1968, Hecla drilled 9 diamond drill holes totalling 13,081 feet. Seraphim has added the "ore" intercepts in the different holes and these total to 4,932 feet with an average grade of 0.43% Cu and 0.048% MoS₂. From this he concludes that the waste to ore ratio is 1.65:1 as compared with a 2.77:1 ratio in the previous drilling. He uses the term 'waste to ore ratio' rather loosely because his figures do not begin to represent the customary 'waste to ore' used in designing open pits.

Both Seraphim and Phil Conley appear to be optimistic about the potential of the property and Hecla seems to have every intent of continuing.

In my discussions with Phil Conley I learned that no area within the property could as yet be designated as a probable open pit because there has been insufficient density of drilling to permit such a designation. Patently the property is a long term "hold" but the long term outlook for copper prices appears to be good.

W. M. Sirola.

WMS/1k
Encl.

R. H. SERAPHIM
PH.D., P.ENG.
GEOLOGICAL ENGINEERING

427-470 GRANVILLE
VANCOUVER 2, B.C.

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KERR ADDISON MINES LTD.

Per.....

SUMMARY REPORT ON

LIARD COPPER MINES

SCHAFT CREEK PROPERTY

By
R.H. Seraphim, P. Eng.

January 1969

This summary will bring up-to-date the report by Dr. Seraphim of
August 1967

Hecla Mining Company signed an agreement under which it acquired control of the Schaft Creek property in the spring of 1968. During the year, Hecla completed magnetic and induced polarization surveys, the former being the first magnetic survey on the property, and the latter, at 500-foot intervals, interpolated Asarco's data which was 1000-foot intervals, and thereby provided more detailed control. Bulldozer trenching and geological mapping were continued over larger areas than heretofore. Nine diamond drill holes were completed, totalling 13,081 feet.

The complete report of August 1967 supplies most of the earlier basic information and is referred to herein.

The work indicated some geological contacts which might form the east and west boundaries of the porphyry-type mineralization, but left the north and south limits fairly well open. The general area now known to carry copper mineralization, and partly drilled, is about 2000 feet wide on line 2000 south, and 3000 feet wide on line 1000 north. A 'V'-shaped structure, with the open end to the north, is a preliminary hypothesis which will likely be changed as work progresses. The southern point of the 'V' is not determined, and is most likely irregular, but three short Asarco drill holes on line 2000 south contain marginal material, about 0.35% Cu and 0.02% MoS₂. Three similarly short holes on line 3000 south showed no significant mineralization. The north limits are not known.

The east limb mineralization can be followed along a N 15 deg. E trend from 1000 south to about 1600 north, where a contact with a 'cap-rock', apparently flat dipping, precludes further surface exploration. A contact of massive andesite with the fractured, feldspathized, fragmental andesite indicates the east contact of the east limb 'porphyry' mineralization.

TABLE OF DRILL HOLES

Hole	Dip	Vert. Depth to Bedrock	Total Length	Intercept	Length	% Cu	% MoS ₂	oz. Au	oz. Ag
30	50° W	23	1,000	70-400	330	0.35	0.027	--	--
				590-790	200	0.50	0.024	0.02	0.05
31	50° W	18	640	290-460	170	0.92	0.028	0.01	0.30
32	50° W	9	1,500	1110-1560	450	0.54	0.04	0.01	0.01
				or 510-1560	1050	0.44	0.03	0.01	0.01
33	50° W	18	1,200	780-1110	330	0.50	0.04	0.01	0.05
34	50° W	31	1,600	430-850	420	0.43	0.03	0.015	0.06
				1270-1300	30	0.44	0.04	--	--
35	50° W	42	1,350	1340-1370	30	0.41	0.02	--	--
				1410-1630	220	0.36	0.04	--	--
36	50° W	2	2,002	460-540	80	0.46	0.01	0.01	0.03
				690-890	200	0.40	0.04	0.01	0.02
				930-1010	80	0.31	0.04	0.01	0.03
				1150-1190	40	0.30	0.07	0.01	0.03
				1280-2002	722	0.34	0.12	0.01	0.03
or 690-2002	1312	0.32	0.08	0.01	0.03				
37	50° W	35	1,600	770-990	220	0.81	0.07	--	--
38	50° W	72	1,589	310-850	540	0.38	0.03	--	--
<u>AVERAGE</u> -			13,081		4932	0.43	0.048		

The "waste to ore" ratio is 8149/4932 or 1.65 to 1.0. The grade could be increased with greater selection at the expense of a higher stripping ratio. The comparable results in the previous drilling in the same area were 4930/1774 or 2.77 "waste" to 1 "ore", with grade of 0.645 Cu and 0.037 MoS₂.

The breccia zone appears to be a separate structure from the main large area of 'porphyry' mineralization. If continuity is assumed for the 500 feet between the two sections drilled, and a further 250 feet on strike each way, the zone would contain about 10 million tons to 500 ft. depth. The indicated average grade - 0.8% Cu and 0.04% MoS₂ - is such that it could provide the 'sweetener' desired for the lower grade 'porphyry' mineralization.

Most of the drilling and surveys explored the main porphyry zones. The east limb of the postulated 'V' structure is shown by drilling and a few surface trenches to be about 1000 feet wide and 3000 feet long before meeting the 'cap-rock' to the north. Much more work is necessary to confirm its continuity since it is drilled mostly on 1000-foot lines, and even these are incomplete. However, the north-trending zone does have a geological basis in that fracturing, feldspathic alteration, irregular monzonite dykes, magnetics, and induced polarization response all have the same north-northeast trend. The dip is by no means certain but is suggested to be steeply east. The grade of the mineralization is indicated by the long cross-sectioning drill holes:

<u>Section</u>	<u>Drill Hole (all 50° W)</u>	<u>Core Length ft.</u>	<u>% Cu</u>	<u>% MoS₂</u>
1000 North	36	1312	0.32	0.084
0	32	1050	0.44	0.03
1000 South	33	330	0.50	0.04
	38 plus	540	0.38	0.03
	<u>AVERAGE</u> -	1080	0.39	0.055

These holes reach to about 700 feet vertical depth. Thus, if continuity is assumed for the 3000 ft. indicated length, the zone may contain about 200 million tons.

The west limb of the 'V' has practically no outcrop, has been drilled at only 1000-foot intervals, and lacks geological and geophysical indications to confirm its trend except possible parallelism with the north-west trending lineament and possibly the breccia zone previously discussed. The holes testing this possible west limb are 34 and 35 on line 1000 north, and 30 on 0 line. The possible zone would merge with the east limb zone on the 1000 south line. A steep easterly dip is again suggested, but far from proven. The holes show aggregate widths of about 400 feet of similar grade material to that in the east limb, but intersections are so ragged that the zone can only be suggested to contain perhaps one-quarter to one-half the tonnage of the east limb zone on the basis of results to date. It is, however, considered to have good chances of added tonnage, particularly to the northwest and north.

The work completed in 1968 points to many areas which are attractive for further work. The more important of these are:

1. Completion of the 1000-foot interval cross-sectional drilling.
2. Interpolation drilling on at least 500-foot interval sections.
3. Exploration of the ground to the north on each limb of the 'V'.
4. Exploration of the west breccia zone along strike and dip.

Respectfully submitted,



R.H. Seraphim, PhD., P. Eng.
Consulting Geologist

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P. M. Kavanagh

W. M. Sirola

Paramount - Hecla Agreement

January 29, 1969.

Herewith a brief summary of the enclosed agreement. Work commitments are as follows:

From signing of agreement to February 29/70	\$ 37,500
March 1/70 to February 28/71	50,000
March 1/71 to February 28/72	75,000
March 1/72 to February 28/73	<u>75,000</u>
Total	\$237,500

If, at March 1/73, Hecla decides to place the property into production, they have a 4-year period in which to do so.

Should Hecla decide that the property is non-economical at that time, then no further expenditures are required but the feasibility study must be renewed every 4 years. If there is disagreement between Hecla and Paramount regarding the feasibility study and an umpire sides with Paramount, then Hecla may extend the examination period on a year-to-year basis by spending \$75,000 per year up to February 28, 1988.

All of the work commitments mentioned above are subject to review at the end of each year and Hecla may withdraw at any time.

If Hecla decides to place the property into production then after the return of preproduction costs and capital expenditures to Hecla on the usual 80% - 20% basis, Hecla is to share the net profits with Paramount on a 70% - 30% basis.

Kerr Addison's commitments for examination periods mentioned above would be as follows:

To Feb. 28/70	\$ 1,377.67
To Feb. 28/71	1,836.90
To Feb. 28/72	2,755.35
To Feb. 28/73	<u>2,755.35</u>
Total	\$ 8,725.27

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Apparently if the Hecla - Paramount agreement is consummated, Hecla plans to drill on both Liard Copper and the Paramount property. You may recall that the Liard I.P. anomaly extends into the Paramount ground and has been found by drilling to contain weak copper mineralization. The copper grades encountered on the Paramount ground are certainly nothing to write home about but the feeling in Hecla circles is that the limited drilling does not reflect the true potential of the property. By the same token, it must be realized that the topography on most of the Paramount ground does not lend itself to an open pit operation.

I have no very strong sentiments about our participation in the Paramount option but it is not an expensive participation and I feel that we should go along. I also feel that it is in order for us to put up a very small amount of money which represents our share in paying the bills which Liard has incurred during the past year. Our share of the \$6,000 requested by Silver Standard for the Liard treasury would be approximately \$682.00.

W. M. Sirola.

WMS/1k

Encl:

- 1) Draft dated January 17/69 - Mining & Option Agreement Between Paramount Mining Ltd. and Hecla Operating Company.
- 2) Draft dated January 17/69 - Boundary Determination Agreement Between Paramount Mining Co. and Liard Copper Mines and Hecla Operating Co.
- 3) Draft dated January 17/69 - Supplemental Agreement Between Liard Copper Mines and Hecla Operating Co.

SILVER STANDARD MINES LIMITED
(NON-PERSONAL LIABILITY)

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JAN 27 1969

KERR ADDISON MINES LTD.

Per.....
January 24, 1969

Mr. W.M. Sirola, P. Eng.
Kerr Addison Mines Ltd.
402 - 1112 West Pender Street
VANCOUVER, B.C.

Dear Bill:

I enclose now draft dated January 17, 1969 of Mining and Option Agreement between Paramount Mining Ltd. and Hecla Operating Company.

Enclosed also is a copy of a Summary Report which Dr. Seraphim has prepared after examination of the results of Hecla's 1968 drill program. A set of geological and assay plans and sections are available for examination in this office.

Yours very truly,

SILVER STANDARD MINES LTD. (N.P.L.)


A.C. Ritchie, P. Eng.
Executive Vice-President

ACR:dn
Encls.

SILVER STANDARD MINES LIMITED
(NON-PERSONAL LIABILITY)

January 21, 1969

Mr. W.M. Sirola, P. Eng.
Kerr Addison Mines Ltd.
402 - 112 West Pender Street
VANCOUVER, B.C.

Dear Bill:

Re: Liard Copper Mines Ltd.

I enclose for your review the following:

1. Draft dated January 17, 1969 of Boundary Determination Agreement between Paramount Mining Co., Liard Copper Mines, and Hecla Operating Co.
2. Draft dated January 17, 1969 of Supplemental Agreement between Liard Copper Mines and Hecla Operating Co.

Because it would have taken some time to reproduce more copies, I have not included a copy of the Underhill plan that will be attached to the final draft.

After you have perused the drafts, I should appreciate having your comments.

Yours very truly,

SILVER STANDARD MINES LTD. (N.P.L.)


A.C. Ritchie, P. Eng.
Executive Vice-President

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