#10

810728

PRELIMINARY FEASIBILITY STUDY

GNAWED MOUNTAIN MINERAL DEPOSITS

HIGHMONT MINING CORP. LTD.

CHAPMAN, WOOD & GRISWOLD LTD.

John F. Fairley, P.Eng.

E. P. Chapman Jr., P.Eng.

July 6, 1967

CONTENTS

LIST OF EXHIBITS

CONTAINED IN SEPARATE BINDER

I

INTRODUCTION

At the request of Mr. W. G. Hainsworth, P.Eng., we have carried out a study and evaluation of all available data pertaining to the property of Highmont Mining Corp. Ltd. situated near Gnawed Mountain in the Highland Valley area of the Kamloops Mining Division of British Columbia. The purpose of this work was to assess the potential of mineral deposits containing copper, molybdenum and minor amounts of gold and silver indicated to be present by results of a comprehensive drilling programme and to recommend the type and amount of additional work which, in our opinion, will be required to determine the feasibility of putting the property into production.

The property was visited on March 21, 1967 by Mr. H. J. Toohey of the C.W.&G. Ltd. staff, who inspected sampling equipment and techniques used in conjunction with percussion drilling. On May 24th, E.P. Chapman Jr. inspected surface trenches and examined diamond drill core at the Highmont camp.

Geophysical results were reviewed by Dr. S. H. Ward, Professor of Mineral Technology at the University of California. Preliminary metallurgical test work was carried out by Britton Research Ltd. of Vancouver.

Topographic maps of the property on a one inch to 400 feet scale were prepared from available air photography by McElhanney Associates.

The conclusions and recommendations set forth in this report are based primarily on analysis of drill logs and assays furnished to us by

Highmont Mining Corp. Ltd. using the additional information resulting from the work cited above. John F. Fairley, P.Eng., was in charge of the evaluation under the supervision of E. P. Chapman Jr.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1. An extensive programme of diamond core and percussion drilling has partially delineated two mineralized zones which, if drill hole assays are representative of true grade, contain sufficient amounts of copper and molybdenum to possibly support a large scale mining and concentrating operation on a profitable basis.

2. The copper and molybdenum values appear to be distributed throughout the deposits in a very erratic manner. This is particularly true of the molybdenum and is apparent in both vertical and horizontal dimensions.

3. Mineralization of economic importance is largely confined to filling in narrow steep dipping fractures. Since most drillholes were drilled vertically, mineral distribution may not be quite as erratic as drill results indicate.

4. On the basis of percussion drillhole results, the partially delineated mineral reserves have been estimated as follows:

	Tons (Millions)	Cu %	MoS_2 %
DRILL INDICATED			
Potential Ore*	26.592	0.300	0.098
Low Grade	7.263	0.185	0.044
Waste	8.928		
INFERRED	30.282		
PERIPHERAL WASTE	12.06		
OVERBURDEN	3.900		

* The word "potential" is used to emphasize that in this grade range amenability to concentration into readily marketable products, metal prices, and extractibility by low cost mining methods must all be favourable to permit profitability.

If the INFERRED category above breaks down into the same distribution as does the DRILL INDICATED, reserves would be:

Potential Ore	45,397,000 tons
Low Grade	12,411,000 tons
Waste	15,257,000 tons

The ratio

Waste + Low Grade to Potential Ore is 0.87: 1

and the ratio of

Waste to Low Grade + Potential Ore is 0.47:1

after removal of overburden in both cases.

5. The deposits are open for extension both in depth and laterally. The chances of developing additional reserves at approximately the drill indicated grade while maintaining an acceptable waste to ore ratio are considered good.

6. Preliminary bench scale flotation tests conducted by Britton Research Ltd. gave results indicating that the Highmont potential ore responds well to standard concentration procedures. Based on these tests Mr. Britton anticipates that 87% of the copper can be recovered in a concentrate assaying 25% Cu and 80% of the molybdenum can be recovered in a concentrate assaying 55% Mo (91.7% MoS_2).

7. Reduction of impurities in the molybdenum concentrate to the point at which they conform to industry specifications has not been achieved. However, it is probable that these impurities can be brought within desired limits by a combination of cyanide and acid leaching.

8. At current metal prices (Cu 38¢ U.S. per pound and Mo $1.62 U.S. per pound contained in concentrates), the drill indicated potential ore in the Highmont deposits at anticipated mill recoveries and after estimated freight and treatment charges would have a value at the mine of $3.28 (Can.) per ton. Estimated direct mining and milling costs, including overhead but before taxes and amortization, range from $1.55 to $1.70 per ton at 10,000 tons per day.

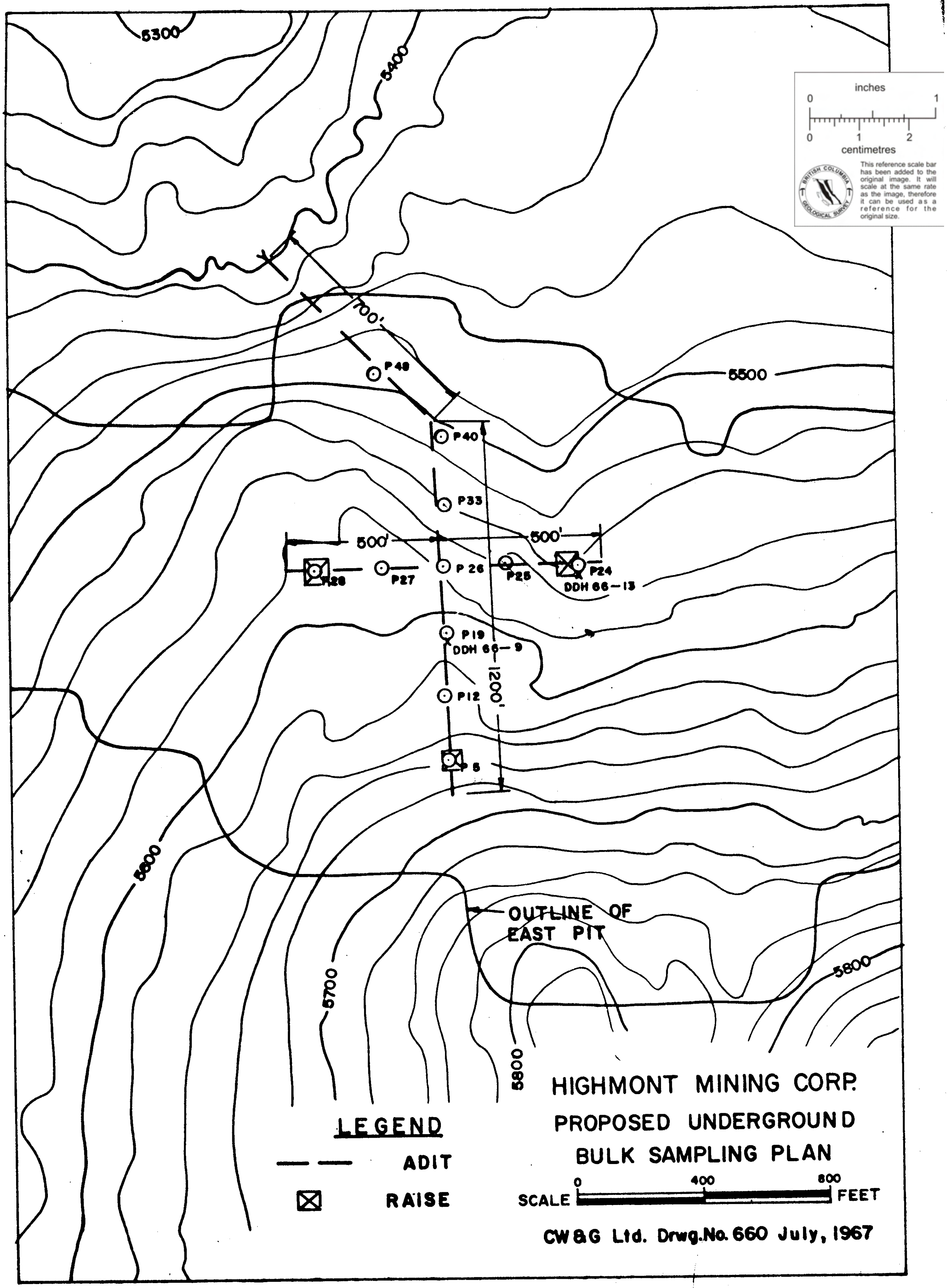
9. If validity of drill indicated results on tonnage, grade and distribution can be established and bench scale flotation test results confirmed in continuous pilot plant operation, and if current tax laws continue to be in effect, it is our opinion that the Highmont property can be placed in production at a milling rate of 10,000 tons per day and that the profits resulting from such an operation will permit repayment of the required capital plus a minimum return of 10% per annum on the initial investment at current and foreseeable metal prices.

10. We recommend a staged programme of further evaluation of the Highmont deposits, each stage being contingent upon favourable results in the preceding phase.

A. Stage 1

a) Drive 2,900 feet of adit and 625 feet in raises (proposed location shown on drawing No. 660) to provide bulk samples as a conclusive check of drill results.

b) Install a temporary crushing and sampling plant to permit accurate sampling of each round mined from underground workings.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P28
P25
P24
DDH 66—13
P19
DDH 66—9
P12
P5
OUTLINE OF
EAST PIT
HIGHMONT MINING CORP.
PROPOSED UNDERGROUND
BULK SAMPLING PLAN
LEGEND
ADIT
RAISE
SCALE
0
400
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FEET
CW&G Ltd. Drwg. No. 660 July, 1967
inches
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BRITISH COLUMBIA
GEOLOGICAL SURVEY

c) Install sample storage and stockpiling facilities.

d) We estimate that this programme would require approximately 180 days and cost about $500,000.

B. <u>Stage 2</u>

When Stage 1 has been one third to one half completed, and if results are favourable, we recommend that Stage 2 be implemented.

a) Install a pilot flotation plant capable of treating at least 100 tons per day.

b) Install an assay laboratory capable of turning out molybdenum and copper analyses with sufficient accuracy throughout the broad range required to properly guide and evaluate operation of the pilot plant.

c) Estimating the time and cost requirements for Stage 2 is very difficult at this time. If an existing plant in B.C. is made available to Highmont on a rental basis very considerable savings would result. The time required to finalize operating procedures and attain satisfactory results may vary from 90 days to more than six months. The minimum cost is estimated in the range of $500,000 and the ultimate cost may be double this amount.

C. <u>Stage 3</u>

This phase, consisting of additional drilling and geophysical work might also include preliminary mill design, detailed studies of water and power sources and surveys of tailing and waste disposal areas. The size, scope, nature and cost of this programme will largely be dependent upon the results of Stage 1. For preliminary budgeting purposes we believe an additional $350,000 should be contingently allotted to this stage. The work, if justified, should have high priority and would probably be carried out contemporaneously with Stage 2.

11. Although further investment in a deposit in the very low grade range indicated to be present in the Highmont properties is admittedly speculative and carries a certain degree of risk, we believe that the possible rewards justify the proposed programme.

12. We recommend that funds be made available to carry out Stage 1 and that the additional stages be implemented without delay if and when results confirm current grade and tonnage estimates.

Respectfully submitted,

CHAPMAN, WOOD & GRISWOLD LTD.

John F. Fairley

John F. Fairley, P.Eng.

E. P. Chapman Jr.

E. P. Chapman, Jr., P.Eng.

July 6, 1967

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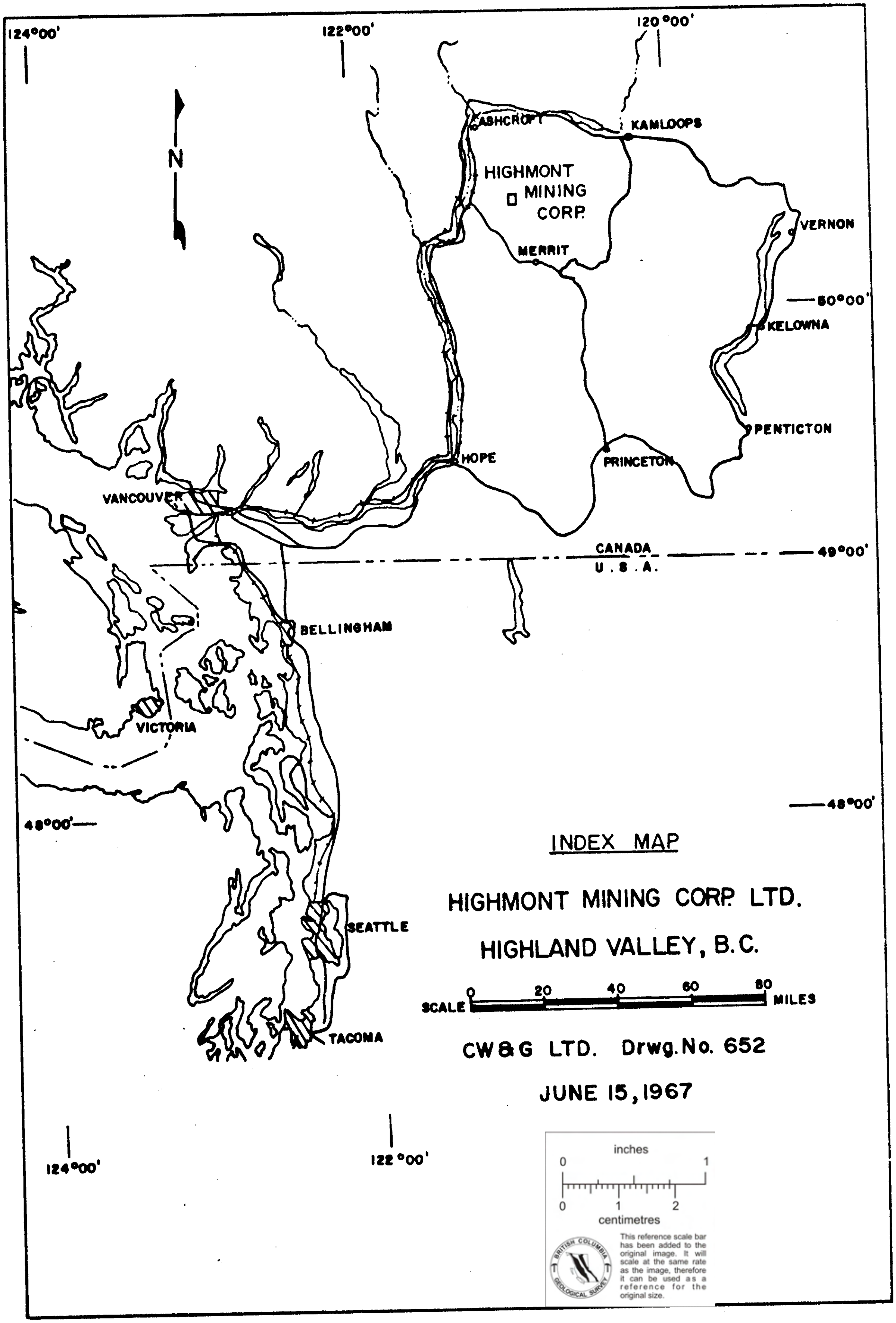

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BRITISH COLUMBIA GEOLOGICAL SURVEY

III

LOCATION AND ACCESS

The property discussed in this report is on the westerly slopes of Gnawed Mountain, which is on the south side of Highland Valley, some 25 miles southeast of Ashcroft, B.C. Its approximate coordinates are 50°25' North and 121°00' West.

Access to the area is by the Ashcroft - Highland Valley - Merritt secondary improved gravel highway. It is some 25 miles southeast from Ashcroft or 45 miles northwest from Merritt to the property service road. This five mile mining road is in good condition for jeep or truck operation.

- excerpt from Progress Report, Hainsworth, Dec. 14, 1966.

Ashcroft is on the CPR and CNR mainlines, and on Trans-Canada Highway No. 1, approximately 210 miles from Vancouver, or 385 miles from Tacoma.

IV

POWER

No difficulty or unusual expenses are anticipated in the event of Highmont connecting to the hydro-electric grids probably in existence by mid-1969.

Elapsed time from request to completion of such a link is approximately one year provided the B. C. Hydro and Power Authority is forewarned of the possibilities and potentials in accordance with exploration stages.

Mr. C. Nash of the B.C. Hydro and Power Authority, Vancouver (Mu 3-8711, Local 3378), handles such long range planning problems, and he is aware that C. W. & G. Ltd. has undertaken this evaluation.

V

WATER

Water rights on existing sources provide enough water for exploration needs and a pilot mill, but are not capable of producing the eight to ten million gallons per day probably necessary for production schedules.

It is reported that artesian supplies at Bethlehem have not been too reliable, and the prospects are for much the same situation at Lornex. Based on this information, Mr. W. A. Ker observes:

> "It appears to me that Highmont and Lornex are liable to experience serious difficulty in obtaining adequate quantities of groundwater for their proposed mills and I feel that it is highly probable that they will have to pump water from the Thompson River. This would involve a pipeline of some 10 to 12 miles in length, with a pumping lift in excess of 4,000 feet, and would involve a considerable amount in capital cost. It would appear to make sense therefore if Lornex and Highmont were to consider constructing a joint water-pumping system utilizing the Thompson River as the source."
>
> \- excerpt from letter from Mr. W. A. Ker of Ker, Priestman, and Graeme Engineering Ltd., June 19, 1967.

In view of the high level of mining exploration activity in the area, and the many problems frequently encountered when obtaining water licenses, we suggest that a water survey is a high-priority project.

C

VI

CLAIMS

Following is a list of claims and expiry dates as supplied by Highmont Mining Corp. Ltd.

<u>Claims held by Highmont Mining Corp. Ltd., June, 1967</u>

Name of Claim	Record Number	Expiry Date
AM 1 to 4 inc.	31188 to 31191 inc.	Feb. 18, 196~~8~~ 9
AM 5 and 6 Fr.	31192 and 31193	Feb. 18, 1972
AM 7 to 11 inc.	31194 to 31198 inc.	Feb. 18, 1972
IDE 1	24994	Dec. 11, 1973
IDE 3	24996	Dec. 11, 1973
IDE 4 and 5	24997 and 24998	Dec. 11, 1973
IDE 6 to 8 inc.	24999 to 25001	Dec. 11, 1972
IDE 12 to 16 inc.	25710 to 25714	Mar. 19, 1972
IDE 17	25715	Mar. 5, 1972
IDE 18	25716	Mar. 19, 1972
NEW IDE 19	64034	May 8, ~~1968~~ 1973
NEW IDE 20	64036	May 8, ~~1968~~ 1973
ANN 3 Fr, 4 Fr. and 7 Fr.	45132, 45133 and 45136	Feb. 21, 1973
ANN 18 Fr.	46153	May 20, 1972
ANN 20 Fr.	46155	May 20, 1973
NEW ANN 11 Fr.	64030	May 8, ~~1968~~ 1973
PHYLLIS Fr.	48513	Feb. 5, ~~1968~~ 1973

No examination of validity of ownership, title, or expiry date was done by C.W.&G. Ltd.

The expiry date of AM 1 to 4 inclusive should be noted and further assessment work applied against these important claims prior to the expiry date.

VII

HISTORY AND BIBLIOGRAPHY

The claims were originally staked by Amador Mines, Highmont Resources Ltd. in 1955 and 1956. American Smelting and Refining Co. optioned the property in 1957 and did a limited amount of churn drilling and geologic mapping. In 1959 Kennco Explorations (Western) Ltd. optioned the property for a brief period and carried out some geologic mapping, limited trenching, reconnaissance geochemistry, a broad induced polarization survey, and two short drill holes. Torwest Resources (1962) Ltd. became the property owners and completed 5,816 feet of diamond drilling in 20 holes, more extensive trenching and localized induced polarization surveys. This property was part of an option to Anaconda American Brass Ltd. in 1964 and 1965. Geological, geophysical and geochemical surveys were carried out and one 569 foot hole was drilled. Highmont Mining Corp. Ltd. became owners in August 1965. Geochemical surveys performed on claims IDE 19 and 20 delineated only some narrow bands of low-intensity copper concentration in the soil. At approximately the same time an agreement with Rio Tinto Canadian Explorations Ltd. allowed them to complete a limited induced polarization survey and eleven percussion holes in five weeks on IDE 19 and 20 plus some adjacent ground.

Highmont numerical data used in this evaluation are totally derived from the present programme. This includes an extensive rotary percussion drilling programme on 100 foot centres and 250 feet depth, 7,768 feet of BQ wireline diamond drilling in 11 holes and 400 feet of NX diamond drilling in four holes, an induced polarization survey by McPhar Geophysics Ltd.

covering the western three-quarters of the property, and an up-to-date survey of coordinates and elevations.

D

Bibliography

1) Progress Report on Highmont Mining Corp. Ltd., Highland Valley, B.C. W. G. Hainsworth, P.Eng., Consulting Geologist, Dec. 14, 1966.

2) Geology and Mineral Deposits of Nicola Map Area, British Columbia. W. E. Cockfield; G.S.C. Memoir 249, 1961.

3) The Geology and Mineral Deposits of Highland Valley, B.C. Wm. H. White, R. M. Thompson and K. C. McTaggart; CIMM Transactions, Vol. LX, 1957, pp 273-289.

4) Geological Map of the Highland Valley Area, B.C. Geology by J. M. Carr 1957-62 and R. Lee 1958. Preliminary Map, May 1966, Sheets 1 and 2.

5) Gnawed Mountain Option, Highland Valley, B.C., South Sheet, Geological Map. J. McA., Anaconda American Brass Ltd., Western Exploration Division, Nov. 1965.

6) Preliminary Feasibility Study, Gnawed Mountain Mineral Deposits, Highmont Mining Corp LTD. Chapman, Wood and Griswold Ltd. July 6, 1967

7) An Investigation of Samples of Copper-Molybdenum Ore submitted by Highmont Mining Corporation Ltd. Progress Report No 2. Britton Research Limited April 18, 1968

8) The Report on Metallurgical Tests of Highmont Copper-Molybdenum Ore, March 1968. Nippon Mining Co. LTD.

9) The Report on Metallurgical Test of Highmont Copper-Molybdenum Ore Progress Report #2, April 1968 Nippon Mining Co Ltd

VIII

GEOLOGY

Regional and local geology is well covered in detail by several papers mentioned in the bibliography. The most comprehensive report with respect to the property is undoubtedly Hainsworth, Progress Report, Dec. 14, 1966, reproduced in part here:

> The area is underlain by granitic rocks of the Guichon batholith. This is a complex batholith and more than one type and age of granitic intrusion is present. The general dating of the batholith has been established as Jurassic and later.
>
> On the property, outcrop is fairly plentiful in the east central portion, where it makes up from 10% - 15% of the surface area. To the west, the prevalence of terminal moraines and glacial outwash make outcrop scarce.
>
> The oldest rock type in the claim area is Skeena granodiorite. The name is derived from its type occurrence on the nearby Skeena claims. This medium grained granodiorite is most notable in the northern portion of the property. Government mapping of the area has applied the name "Bethlehem" to this intrusive. Intrusive into this is the Bethsaida quartz diorite which comprises the greater amount of the rock outcrops. It is a medium grained intrusive with large, conspicuous euhedral quartz crystals.
>
> The copper minerals are normally of a disseminated variety but tied in to the fracture system. Chalcopyrite will often line the slip planes of the fractures and will emanate from here to the surrounding rock. Bornite normally appears as a fine pin-point mineral finely disseminated throughout the rock. The molybdenum is more frequently tied in with the siliceous veinlets as are heavier concentrations of bornite.
>
> Structurally, the claims show no serious rock disruption. No strong fault structures have been revealed in the drilling, geological mapping or trenching, nor can any be implied from surface lineation. There are two sets of fracture patterns throughout the property, the stronger and more prevalent being a set trending N 15°- 25° W and dipping from the vertical up to 15° in either direction, although the majority of dips favour the west. The second and weaker set strikes N 70° - 80° W with flatter dips generally to the south. Horizontal jointing is very noticeable. Mineralization tends to favour the stronger set, although the east-west group is noticeably mineralized. The horizontal structures show little affinity for the metals.

Perusal of the literature and data, inspection of some drill core, and a brief inspection of trenches and development by E. P. Chapman Jr. indicate that the most important geological details are:

1) the N 15°-25° W and N 70°-80° W steep fracturing which controls mineralization

2) the great number of chloritized shear zones which may provide boundaries to differing mineral concentrations and which can also lead to milling problems

3) mineralization apparently occurs in all rock types on the property, although there is some rude correspondence to the contact of the "Skeena" and intrusive "Bethsaida"

4) the comparatively low-intensity alteration.

IX

GEOPHYSICS

The results of geophysical surveys by earlier investigators on the ground now controlled by Highmont Mining Corp. Ltd. are not available to us. Under Highmont direction, a considerable portion but by no means all of the property has been surveyed by the alternating current induced polarization method.

In our original examination of I.P. results, resistivity, percentage frequency effect and metal factors were plotted separately in plan for each electrode separation. Very little correlation between observed mineralization and any of these I.P. parameters could be discerned.

However, analysis by Dr. S. H. Ward, consulting geophysicist and Professor of Mineral Technology at the University of California, Berkeley, California, revealed that by using smaller contour intervals and shaping contour trends to conform with fracture and mineralization trends (without departing from strict and proper contouring procedures), there appeared to be a striking correlation between percentage frequency effect and metal content of the underlying rock as indicated by percussion drilling.

Dr. Ward's informal letter report in this regard is repeated below and the correlation between first separation percentage frequency effect and indicated copper and molybdenum is shown on the attached drawing No. 659 and overlays.

May 12, 1967

I have made a preliminary study of the resistivity and induced polarization data on the Highland Valley property of Highmont Mining Corporation Limited. The following comments are pertinent.

1. There is a loose correlation between resistivity highs and copper and/or moly mineralization.

2. There is an excellent correlation between percent frequency effect and combined moly-copper mineralization and a good correlation where only one metal is present.

3. The correlation between mineralization and metal factors is not good, because of the resistivity pattern, except a modest correlation where the combined values are highest.

These observations were made on the basis of studying contour plans of first and second separation electrical parameters overlain on a plan showing average assay for each hole. No attempt was made to study the quasi-sections and the drill sections. To obtain the excellent correlation between frequency effect and average assay values, I recontoured some portions of the frequency effect data. Where a choice was possible, the contours of percent frequency effect was aligned with the assay values. This is a legitimate process of contouring information obtained at wide data intervals using other information as a guide. Even without this recontouring, there is an evident correlation between percent frequency effect and average assay values. It is essential that PFE data on the Highmont property be contoured at every one percent change, since anomalies only range up to 6% and values above 1.5% are clearly anomalous.

By copy of this letter I am asking John Fairley to provide a sketch showing the correlation between PFE contours and average assay values for an area bounded roughly by 100,000E; 130,000E; 81,000N; and 85,000N.

I would recommend that all of the resistivity and PFE data, for all separations, be contoured in the fashion shown in the example John Fairley will submit. Further, I would recommend that the main area of mineralization be surveyed with induced polarization to assist in outlining the limits of mineralization and in guiding any subsequent drilling. As you noted, the above recommendations should only be followed if the economics of the deposit appear favourable.

X

GEOCHEMISTRY

Available geochemical soil-survey data is localized and inconclusive. No weight has been placed upon it in this report.

One area located centrally upon the East Pit zone was sampled on 100 foot intervals. The results apparently do not predict mineralization trends on surface or at depth.

XI

SAMPLING

Representative sampling is the largest single problem of this property.

Rotary percussion holes are $2\frac{1}{4}$ inches in diameter and samples were taken on 10 foot intervals. Molybdenum assay samples were composite 40 or 50 foot samples. Water circulation for full length of hole (maximum 250 feet) returns cuttings which are split in a "Humble" rotary splitter, then dried, bagged and shipped. Sample recovery and preparation methods are considered adequate.

BQ size diamond core drilling showed good to excellent core recovery (generally above 95%, as low as 80%). The core was split for assay with 10 foot sample intervals. Again the molybdenum sample was a composite. The sludge sample is collected in a box, hand baled at the end of a sample run, dried, reduced in a Jones riffle, and weighed, before assay. Though sludge collection and preparation might be improved, the method is considered adequate.

Four NX size holes were drilled for metallurgical purposes. Sludge samples were taken on two holes.

Sludge assays are generally higher than their core counterparts; and salting is frequently obvious, especially in higher grades (see hint of this in the graphical comparison of 66-4, P-243 and P-243A, following).

The highly variable and erratic distribution of indicated metal values as seen on drawings No. 657 and 658 is characteristic of all the sampling results. These two sections illustrated are adjacent and also indicate the apparent lack of trends in the deposit. MoS_2 trends do not parallel the Cu trends; however, the general areas of higher metal content fortunately do coincide.

Many coincident hole pairs of percussion versus diamond drill, and one pair of holes, percussion versus percussion, have been drilled in an attempt to obtain reasonable correlations. Briefly, consistent trends and correlations on coincident drilling do not appear possible and further experiments in this direction are not considered useful. A table of weighted averages for comparison and a graphical comparison of three coincident holes follow.

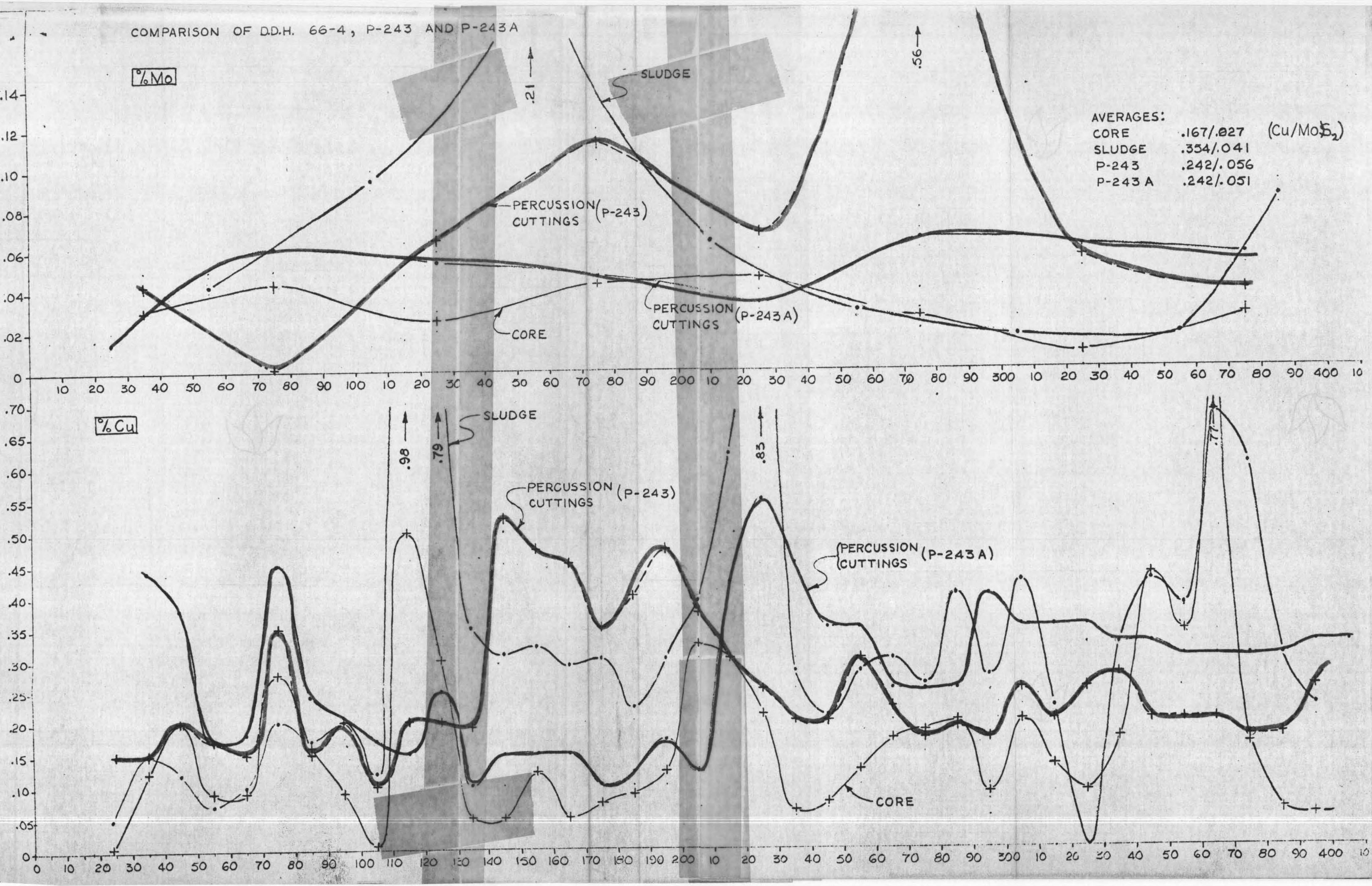
TABLE OF

WEIGHTED AVERAGES

(Cu %/ MoS_2 %)

(Biasing of core - sludge for DDH averages by weight of sample; biasing of individual percussion assays by weight of sample)

Hole Pair					
DDH No.	Percussion No.	Core	Sludge	Combined	Percussion
66-1	P 20	.209/.046	.276/.081	.218/.053	.437/.105
66-3B	P 242	.209/.029	.370/.072	.234/.038	.171/.032
66-4	P 243	.173/.029	.371/.042	.204/.031	.239/.056
66-5	P 241	.312/.058	.582/no samples	.394/.058	.188/.059
66-6	P 240	.161/.046	.133/.018	.156/.041	.115/.012
66-7	P 40	.136/.041	.191/.048	.152/.042	.237/.038
66-8	P 33	.294/.020	.436/.096	.349/.047	.262/.045
66-9	P 19	.213/.019	.323/.083	.232/.031	.359/.084
66-10	P 5	.377/.010	.457/.041	.392/.017	.436/.038
66-11	P 134	.288/.144	.329/.220	.300/.166	.216/.156
66-12	P 10	.183/.018	none - NX size		.361/.041
66-13	P 24	.169/.006	none - NX size		.362/.077
66-4	P 243 A	.173/.029	.371/.042	.204/.031	.242/.051
66-5	P 241 A	.312/.058	.582/no samples	.394/.058	.309/.080


COMPARISON OF D.D.H. 66-4, P-243 AND P-243A
%Mo
%Cu
SLUDGE
.21
.56
.98
.79
.83
.77
PERCUSSION CUTTINGS (P-243)
PERCUSSION CUTTINGS (P-243A)
CORE
AVERAGES:
CORE .167/.027 (Cu/MoS2)
SLUDGE .354/.041
P-243 .242/.056
P-243 A .242/.051

Averaging a number of holes comparing percussion versus diamond drilling indicates a rough comparison; eg. for those previously listed the ratio of "combined" core-sludge to "percussion" is 1.14 for copper and 1.35 for molybdenite. It is obvious that by suitably biasing core and sludge values an even closer comparison may be attained. Thus, it would seem likely that the overall percussion averages are near truth on the basis of statistical volume.

However, it is painfully obvious that we cannot predict where values will lie. NX size diamond drill cores 66-14 and 66-15 were drilled from expected grade areas of .3% Cu and .08% MoS_2. They obtained .32% Cu/.010% MoS_2 and .30% Cu/.047% MoS_2.

We suggest the reason for this lack of correlation is the apparently "blocked-out" nature of the ground by the aforementioned chloritized shear zones and possibly that drilling is vertical upon vertical mineral-bearing fractures.

Until one can be certain that averages presented in "Reserves" are indeed reproducible in magnitude and position there must be a measure of uncertainty to reserve calculations.

We suggest the only method of leveling the erratic nature of metal distribution, or finding the true nature of the distribution, is by underground bulk-sampling.

XII

ASSAYING

All assaying included in the Reserve calculations has been done by J. R. Williams & Sons Ltd.

Two types of check assaying have been carried out; one on split-core rejects as distributed by Highmont Mining Corp. Ltd. and the other on core-pulp rejects as prepared by Britton Research Ltd. prior to metallurgical tests.

The following table was provided by Highmont Mining Corp. Ltd. of check assays on split-core rejects.

Comparison of Assays

Cu %

		Coast Eldridge	Original Williams	% Difference
P-9	110-120	.14	.15	7
P-15	120-130	.60	.45	33
P-19	210-220	.17	.25	47
P-22	150-160	.49	.45	8
P-25	170-180	.57	.47	17
P-29	150-160	.17	.17	-
P-33	120-130	.23	.25	9
P-35	110-120	.18	.25	39
P-36	200-210	.03	.05	67
P-40	150-160	.73	.60	22
P-41	110-120	.07	.10	43
P-42	220-230	.21	.25	19

It will be noted that Williams appears to assay higher on samples below .2% Cu and Coast Eldridge assays higher on the samples above .2% Cu. Within the economic copper ranges it is felt that these checks are within reason for split-core rejects.

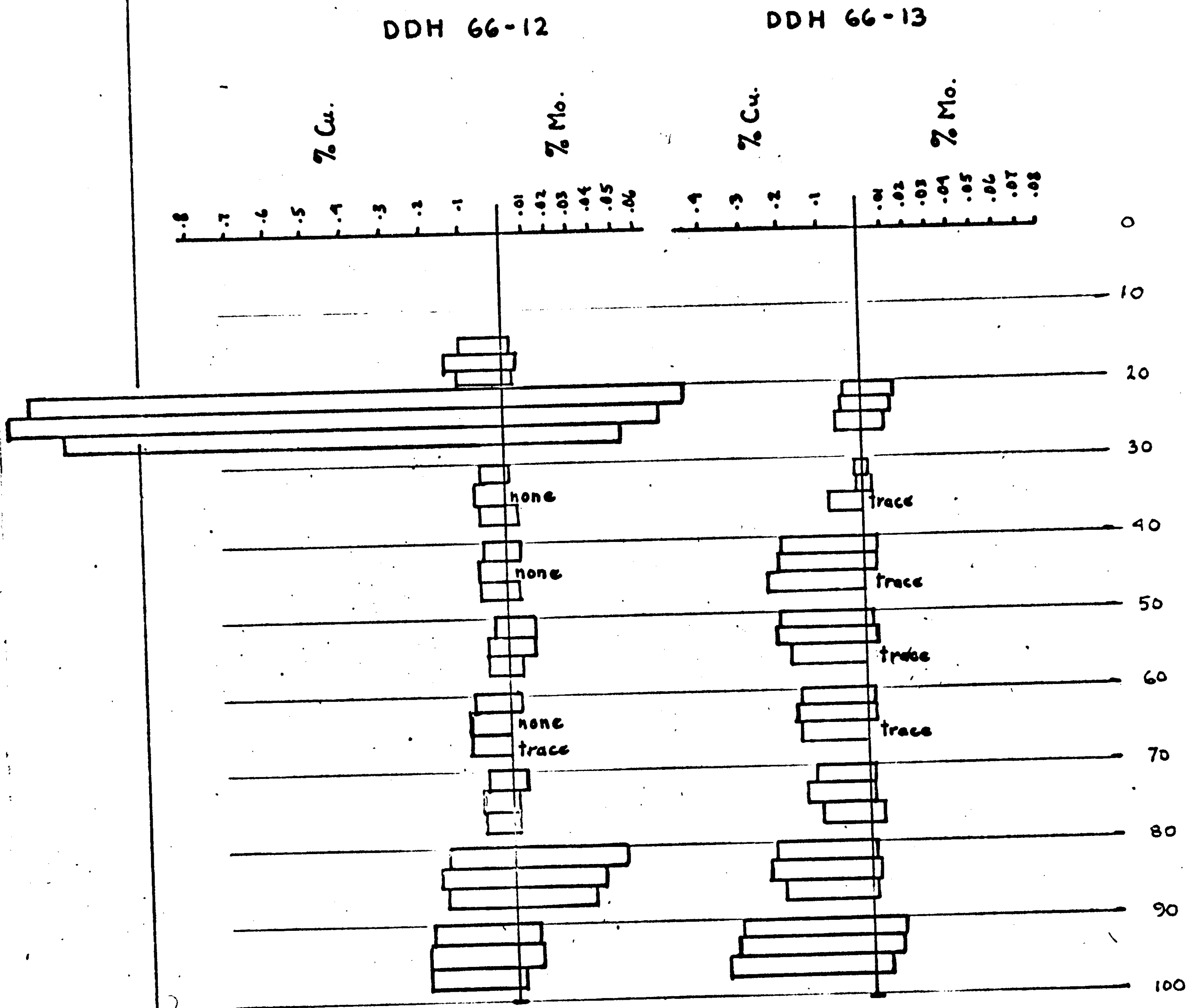
NX size core was prepared by Britton Research Ltd. in the following prescribed manner. The total core of each 10 foot interval was ground to 100% less than 100 mesh (Tyler) and was thoroughly rolled and mixed prior to splitting into four equal portions. One portion was retained by Britton, one sent to Brenda Mines Ltd. laboratory, one sent to J. R. Williams & Sons Ltd., and one to Union Assay Office, Inc. A graphical representation of the remarkably close correlation appears over-leaf and assay certificates appear in the folder.

In the course of metallurgical testing, Britton Research Ltd. had one further series of check assays run by Williams and Coast Eldridge. The results follow on page 26.

It will be noted that Williams again tends to assay lower than Coast Eldridge in the economic ranges. For the present this disparity can be regarded as a safety factor (eg. against possible caving and salting in percussion hole samples).

We are of the opinion that assays as presented to us were within reasonable bounds of accuracy.

HIGHMONT MINING CORP. LTD.
COMPARATIVE ASSAYS.



NOTES: ALL SAMPLES PREPARED BY BRITTON RESEARCH LTD. (FROM NX CORE ONLY, GROUND TO MINUS 100)

CU% & MO% SCALES CONSTANT

VALUE = $2.00 / IN' (.30$/LB CU., $1.74/LB MO., RECOVERIES 85%)

LEGEND: ASSAYS FOR 20-30' INTERV[AL]

20

BRENDA MINES LTD

UNION ASSAY OFFICE INC.

J.R. WILLIAMS & SON LTD.

ASSAYS FOR DD HOLES 66-14 AND 66-15

Hole No.	Interval (ft.)	Total Cu % Coast Eldridge	Total Cu % Williams	Total Mo % Coast Eldridge Gravimetric	Total Mo % Coast Eldridge Colorimetric	Total Mo % Williams
66-14	15-20	0.43	0.40	0.006	0.001	Trace
	20-30	0.25	0.19	0.008	0.004	0.005
	30-40	0.31	0.26	0.007	0.004	0.005
	40-50	0.43	0.37	0.015	0.016	0.021
	50-60	0.57	0.50	0.013	0.010	0.013
	60-70	0.17	0.11	0.006	0.001	0.006
	70-80	0.31	0.20	0.008	0.003	0.006
	80-90	0.55	0.46	0.007	0.003	0.005
	90-100	0.52	0.35	0.015	0.010	0.005
	100-110	0.19	0.19	0.013	0.001	Trace
	110-120	0.31	0.25	0.013	0.001	Trace
	120-130	0.32	0.28	0.007	0.005	0.003
	130-140	0.19	0.17	0.013	0.002	Trace
	140-150	0.20	0.21	0.013	0.003	0.008
	150-153	0.10	0.10	0.007	0.001	Trace
	Arithmetic Average	0.32	0.27	0.010	0.004	0.005
	Weighted Average	0.34	0.28	0.010	0.005	0.006

(cont'd)

ASSAYS FOR DD HOLES 66-14 AND 66-15 (cont'd)

Hole No.	Interval (ft.)	Total Cu % Coast Eldridge	Total Cu % Williams	Total Mo % Coast Eldridge Gravimetric	Total Mo % Coast Eldridge Colorimetric	Total Mo % Williams
66-15	11-20	0.34	0.30	0.017	0.011	0.004
	20-30	0.12	0.14	0.006	0.002	0.007
	30-40	0.21	0.25	0.011	0.004	Trace
	40-50	0.21	0.20	0.007	0.001	Trace
	50-60	0.89	0.80	0.500	n/a	0.536
	60-70	0.81	0.67	0.032	0.028	0.010
	70-80	0.39	0.35	0.008	0.002	Trace
	80-90	0.33	0.47	0.016	0.010	0.086
	90-100	0.11	0.10	0.007	0.003	0.020
	100-110	0.09	0.07	0.007	0.001	Trace
	110-120	0.12	0.12	0.009	0.002	Trace
	120-130	0.24	0.30	0.010	0.006	Trace
	130-140	0.11	0.16	0.007	0.002	Trace
	140-150	0.09	0.12	0.016	0.013	0.013
	Arithmetic Average	0.30	0.29	0.047	0.042	0.048
	Weighted Average	0.44	0.40	0.075	0.070	0.081

XIII

RESERVES

Terms of Reference and Controls

Percussion drill hole assay data as supplied by Highmont Mining Corp. Ltd. (all assaying by J. R. Williams & Sons Ltd.) was the only data used in reserve calculations.

From inspection of graphed grade distributions (available upon request) and consideration of present machine capabilities, a maximum bench height of 50 feet was selected for an open-pit mining scheme. Assuming elevations as surveyed are correct, multiples of even 50 foot elevations appeared to fit metal distribution very well, and were assumed for computing interval averages from drill holes.

Individual assays were biased according to the weight of sample when computing 50 foot bench-interval averages. Copper assays were given on 10 foot intervals and for intermediate divisions, as on a 50 foot elevation height multiple, the weight of sample was apportioned by the appropriate fraction of 10 feet. MoS_2 composite assays were taken as applying individually to each 10 foot aforementioned interval, then handled in the same manner as above.

Orthorhombic prisms of influence to an interval average were assumed to extend vertically to the base of drilling or the surface or a 50 foot bench elevation, and horizontally half-way to the next drill hole data, unless further constrained by the conditions of classification given below.

"Drill Indicated" reserves are those delineated by a maximum lateral influence of 100 feet from drill hole data. "Inferred" reserves are those delineated by a maximum lateral influence of a further 100 feet beyond "drill indicated" reserves on the periphery of drill information but any reasonable distance between "drill indicated" reserves.

"Drill Indicated" reserves are further subdivided into categories of potential ore, low grade, and waste. Subdivision is done according to expected gross recoverable values (in $ Canadian) per ton of ore milled:

potential ore	-	greater than or equal to $2.00/ton
low grade	-	greater than or equal to $1.50/ton but less than $2.00/ton
waste	-	less than $1.50/ton.

To these ends, 85% recovery for both copper and molybdenum, and net smelter returns of $0.30 per pound of contained copper and $1.74 per pound of contained molybdenum, were assumed as guidelines.

The adjective "potential" has been applied since the term "ore" implies that costs, prices and mineral dressing will allow metal extraction at a profit. Some details of metallurgy have yet to be investigated before a saleable molybdenum concentrate is a surety; and some costs may give values close to borderline economics.

"Inferred" reserves are not subdivided but will probably assume the same proportions of potential ore, low grade, and waste as the "Drill Indicated" reserves.

For ease of calculation, no differentiation between "Drill Indicated" or "Inferred" was applied to the peripheral waste.

A summary of reserves as of June 1967 follows. Comprehensive listing is available upon request.

EAST PIT

	Cu %	MoS_2 %	$V \times 10^6 ft^3$	$T \times 10^6$ (@12 ft^3/T)
DRILL INDICATED				
Potential Ore	.335	.083	259.98	21.657
Low Grade	.182	.045	82.52	6.877
Waste			88.65	7.387
INFERRED (Likely equivalent to proportions above)			296.665	24.722
PERIPHERAL WASTE (Indicated plus Inferred)				9.67

RATIO OF WASTE/ORE PLUS LOW GRADE .46/1

RATIO OF WASTE PLUS LOW GRADE/ORE .92/1

OVERBURDEN

Yards	2.294×10^6 yd^3
Tons	2.949×10^6 T (@ 21 ft^3/T)

WEST PIT

	Cu %	MoS_2 %	$V \times 10^6 ft^3$	$T \times 10^6$ (@12 ft^3/T)
DRILL INDICATED				
Potential Ore	.144	.162	59.13	4.927
Low Grade	.231	.033	4.64	.387
Waste			18.49	1.541
INFERRED (Likely equivalent to proportions above)			66.718	5.560
PERIPHERAL WASTE (Indicated plus Inferred)				2.36

WEST PIT (cont'd)

RATIO OF WASTE/ORE PLUS LOW GRADE .54/1

RATIO OF WASTE PLUS LOW GRADE/ORE .66/1

OVERBURDEN

Yards	$.739 \times 10^6$ yd^3
Tons	$.950 \times 10^6$ T (@ 21 ft^3/T)

ALL RESERVES

	Cu %	MoS_2 %	$V \times 10^6 ft^3$	$T \times 10^6$ (@ 12 ft^3/T)
DRILL INDICATED				
Potential Ore	.300	.098	319.11	26.592
Low Grade	.185	.044	87.16	7.263
Waste			107.14	8.928
INFERRED (Likely equivalent to proportions above)			363.383	30.282
PERIPHERAL WASTE				12.06

RATIO OF WASTE/ORE PLUS LOW GRADE .47/1

RATIO OF WASTE PLUS LOW GRADE/ORE .87/1

OVERBURDEN

Yards	3.033×10^6 yd^3
Tons	3.900×10^6 T (@ 21 ft^3/T)

Since the limited amount of diamond drilling to depth indicated no assay walls vertically or laterally, the chances are good of developing a total tonnage that will be economic at the grades indicated.

XIV

METALLURGY

To determine the amenability of the mineralized material in the Highmont deposits to normal concentration techniques, preliminary bench scale flotation tests were carried out by Britton Research Ltd. of Vancouver.

Fresh uncrushed material for the tests was provided by drilling NX sized diamond core drillholes in portions of the deposit chosen to give samples as close as possible to the drill indicated reserves in copper and molybdenum content.

In further confirmation of the erratic nature of metal distribution in the deposits, core from the first two holes (DD 66-12 and DD 66-13) were both well below the anticipated grade in both copper and molybdenum.

Flotation tests to concentrate both metals into a bulk sulphide product were run to investigate the behaviour of lowgrade in a normal bulk flotation circuit which would precede separation of molybdenum from copper. Results as reported by Mr. Britton are tabulated below:

TEST 143-1

Sample - Hole 66-12, 30 to 100 feet

No.	Product	Weight %	Assays % Cu*	Assays % Mo	Units Cu*	Units Mo	Distribution % Cu*	Distribution % Mo
1	Final concentrate	0.16	42.83	5.20	6.85	0.832	62.8	66.1
2	2nd cleaner tailing	0.12	10.23	1.12	1.23	0.134	11.3	10.6
3	1st cleaner tailing	1.09	0.52	0.05	0.88	0.085	8.0	6.8
4	Scavenger concentrate	6.44	0.23	0.03	0.10	0.013	1.0	1.0
5	Scavenger tailing	97.59	0.019	0.002	1.85	0.195	16.9	15.5
6	Head (calculated)	100.00	0.109	0.013	10.91	1.259	100.0	100.0
6	Head (direct assays)		0.103	0.011				

Cumulative results:

No.	Product	Weight %	Assays % Cu*	Assays % Mo	Units Cu*	Units Mo	Distribution % Cu*	Distribution % Mo
1	Final concentrate	0.16	42.83	5.20	6.85	0.832	62.8	66.1
1+2	Concentrate after 1 cleaning	0.28	28.86	3.45	8.08	0.966	74.1	76.7
1 to 3	Rougher concentrate	1.97	4.55	0.53	8.96	1.051	82.1	83.5
1 to 4	Rougher + scavenger concentrates	2.41	3.76	0.44	9.06	1.064	83.1	84.5

* Total Cu

CHAPMAN WOOD & GRISWOLD LTD.

TEST 143-2

Sample - Hole 66-13, 40 to 100.6 feet

No.	Product	Weight %	Assays % Cu*	Assays % Mo	Units Cu*	Units Mo	Distribution % Cu*	Distribution % Mo
1	Final concentrate	0.56	31.77	0.46	17.79	0.258	77.1	63.2
2	2nd cleaner tailing	0.12	5.13	0.10	0.62	0.012	2.6	3.0
3	1st cleaner tailing	1.80	1.25	0.02	2.25	0.036	9.8	8.8
4	Scavenger concentrate	0.48	0.42	0.01	0.20	0.005	0.9	1.2
5	Scavenger tailing	97.04	0.023	0.001	2.23	0.097	9.6	23.8
6	Head (calculated)	100.00	0.231	0.004	23.09	0.408	100.0	100.0
6	Head (direct assays)		0.214	0.004				

Cumulative results:

No.	Product	Weight %	Assays % Cu*	Assays % Mo	Units Cu*	Units Mo	Distribution % Cu*	Distribution % Mo
1	Final concentrate	0.56	31.77	0.46	17.79	0.258	77.1	63.2
1+2	Concentrate after one cleaning	0.68	27.07	0.40	18.41	0.270	79.7	66.2
1 to 3	Rougher concentrate	2.48	8.33	0.12	20.66	0.306	89.5	75.0
1 to 4	Rougher + scavenger concentrates	2.96	7.05	0.11	20.86	0.311	90.4	76.2

* Total Cu

If the extremely low grade of the material being treated is considered, these results are surprisingly good.

In a further effort to obtain samples of "normal" or representative grade, two additional core holes were drilled, 66-14, an inclined hole, and 66-15, a vertical hole. Metal value distribution remained very erratic. However, a composite made up of 15-150 feet in 66-14 and 11-90 feet in 66-15 represented approximately the same vertical range in a portion of the deposit and assayed 0.39% Cu and 0.043% Mo. This was considered to be an acceptable grade for a more comprehensive bench scale test.

Britton's test 143-3 on this composite carried the flotation through separation of molybdenum and copper. Based on results of this test, Mr. Britton makes the following forecase of what would be achieved in a full scale milling operation:

Highmont Mining Corporation Ltd.

Anticipated results, based on test 143-3 for full-scale milling of ore assaying about 0.4% Cu and 0.04% Mo

Molybdenum concentrate

Assays:

Mo	55	% (min.)
Cu	0.3	% (max.)
Pb	0.05	% (max.)
Fe	1	% (max.)
LiO_2	5	% (max.)
CaO	0.5	% (max.)
Bi	0.01	% (max.)

Mo recovery: 80% (min.)

Copper concentrate

Assays:

Au	0.02	oz./ton
Ag	1.1	oz./ton
Cu	25	%
Mo	0.3	%

Cu recovery: 87% (min.)

In making the above estimates, the following assumptions have been made:

1. The ore would have the same characteristics as the sample used for test 143-3.

2. The molybdenum concentrate would be leached with cyanide to remove copper and with hydrochloric acid to reduce the lead assay.

John W. Britton, P. Eng.
June 19, 1967

Since Mr. Britton's formal report is not yet available, copies of his data sheets and letter of submittal appear on pages 37 to 42.

RECEIVED JUN 20 1967

BRITTON RESEARCH LIMITED
Consulting Metallurgists
1612 WEST THIRD AVENUE
VANCOUVER 9, B.C.

PHONE: 738-7195

JOHN W. BRITTON, A.R.S.M., B.Sc., P.Eng.,
President

June 19, 1967

Mr E. P. Chapman, Jr.,
Chapman, Wood and Griswold Ltd.,
133 East 14th Street,
North Vancouver, B.C.

Dear Ted,

Re: Highmont Mining Corporation Ltd.

Confirming our telephone conversation of today, we enclose the following tables:

1. Comparison of assays for D.D.Holes 66-14 and 66-15. (2 pages).
2. Flotation conditions for test 143-3, using composite sample from D.D.Holes 66-14 and 66-15.
3. Test 143-3 results.
4. Spectrographic analysis of test 143-3 molybdenum concentrate.
5. Anticipated results, based on test 143-3, for full-scale milling of ore assaying about 0.4% Cu and 0.04% Mo.

A formal report on the work is being prepared.

Copies of this letter and enclosures are being sent to Nippon Mining Company and Highmont Mining Corporation.

Yours sincerely,
BRITTON RESEARCH LIMITED

John W. Britton, P.Eng.

John W. Britton, P.Eng.
Consulting Metallurgist

cc Nippon Mining Co.
Highmont Mining Corp.

JWB/t

BRITTON RESEARCH LIMITED
1612 WEST THIRD AVENUE
VANCOUVER 9, B. C.

Highmont Mining Corporation Ltd. – Comparison of assays for D.D. Holes 66-14 and 66-15

Hole No.	Section-Feet	Length-Feet	Our sample No.	Total Cu % Coast Eldridge	Total Cu % Williams	Oxide Cu % (Coast Eldridge)	Total Mo % Coast Eldridge Grav.	Total Mo % Coast Eldridge Col.	Total Mo % Williams
66-14	15-20'	5	14A	0.43	0.40	0.005	0.006	0.001	Trace
"	20-30	10	" B	0.25	0.19	0.005	0.008	0.004	0.005
"	30-40	10	" C	0.31	0.26	0.005	0.007	0.004	0.005
"	40-50	10	" D	0.43	0.37	0.005	0.015	0.016	0.021
"	50-60	10	" E	0.57	0.50	N.A.	0.013	0.010	0.013
"	60-70	10	" F	0.17	0.11	N.A.	0.006	0.001	0.006
"	70-80	10	" G	0.31	0.20	N.A.	0.008	0.003	0.006
"	80-90	10	" H	0.55	0.46	N.A.	0.007	0.003	0.005
"	90-100	10	" I	0.52	0.35	N.A.	0.015	0.010	0.005
"	100-110	10	" J	0.19	0.19	N.A.	0.013	0.001	Trace
"	110-120	10	" K	0.31	0.25	N.A.	0.013	0.001	Trace
"	120-130	10	" L	0.32	0.28	N.A.	0.007	0.005	0.003
"	130-140	10	" M	0.19	0.17	N.A.	0.013	0.002	Trace
"	140-150	10	" N	0.20	0.21	N.A.	0.013	0.003	0.008
"	150-153	3	" O	0.10	0.10	N.A.	0.007	0.001	Trace
Average (a)	15-153	138	14A to O	0.32	0.27	N.A.	0.010	0.004	0.005
" (b)	15-150	135	14A to N	0.34	0.28	N.A.	0.010	0.005	0.006

Notes: (a) Arithmetic average ; (b) Weighted average.
"Trace" assumed to be negligible.
N.A. Not assayed.

BRITTON RESEARCH LIMITED
1612 WEST THIRD AVENUE
VANCOUVER 9, B. C.

Highmont Mining Corporation Ltd. – Comparison of assays for D.D. Holes 66-14 and 66-15 (cont.)

Hole No.	Section – Feet	Length – Feet	Cu sample No.	Total Cu % Coast Eldridge	Total Cu % Williams	Oxide Cu % (Coast Eldridge)	Total Mo % Coast Eldridge Grav.	Total Mo % Coast Eldridge Vol.	Total Mo % Williams
66-15	11-20'	9	15 A	0.34	0.30	0.03	0.017	0.011	0.004
"	20-30	10	" B	0.12	0.14	0.01	0.006	0.002	0.007
"	30-40	10	" C	0.21	0.25	0.01	0.011	0.004	Trace
"	40-50	10	" D	0.21	0.20	0.01	0.007	0.001	Trace
"	50-60	10	" E	0.89	0.80	N.A.	0.500	N.A. (d)	0.536
"	60-70	10	" F	0.81	0.67	N.A.	0.032	0.028	0.010
"	70-80	10	" G	0.39	0.35	N.A.	0.008	0.002	Trace
"	80-90	10	" H	0.33	0.47	N.A.	0.016	0.010	0.086
"	90-100	10	" I	0.11	0.10	N.A.	0.007	0.003	0.020
"	100-110	10	" J	0.09	0.07	N.A.	0.007	0.001	Trace
"	110-120	10	" K	0.12	0.12	N.A.	0.009	0.002	Trace
"	120-130	10	" L	0.24	0.30	N.A.	0.010	0.006	Trace
"	130-140	10	" M	0.11	0.16	N.A.	0.007	0.002	Trace
"	140-150	10	" N	0.09	0.12	N.A.	0.016	0.013	0.013
Average (a)	11-150	139	15A to N	0.30	0.29	N.A.	0.047	0.042	0.048
" (b)	11-90	79	15A to H	0.44	0.40	N.A.	0.075	0.070	0.081
" (c)	66-14, 15-150' + 66-15, 11-90'	214	14A to N + 15A to H	0.39	0.34	N.A.	0.043	0.038	0.044

Notes: (a) Arithmetic average; (b) Weighted average; (c) Equal weights of weighted composite samples from hole 66-14, 15-150' and 66-15, 11-90', i.e. sample [illegible] (d) Gravimetric assay (0.500%) used for calculations

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BRITTON RESEAR[illegible] LIMITED
1612 WEST THIR[illegible] [illegible]VENUE
VANCOUVER 9, B. C.

Highmont Mining Corporation — Composite E-Test 143-3
Flotation conditions

	STAGE															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Reagents: Lb/ton of original ore																
CaO	2.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.0
NaCN	—	—	—	—	—	—	—	—	—	—	—	—	0.05	0.05	—	0.10
Na_2S (60/62 %)	—	—	—	—	—	—	0.2	0.1	—	0.1	0.1	—	—	—	—	0.5
Carnea 21 (a)	0.20	—	0.04	—	—	—	—	—	—	—	—	—	0.006	—	—	0.24[illegible]
CX 31 (b)	—	0.06	0.04	0.01	0.005	0.005	—	—	—	—	—	—	—	—	—	0.12[illegible]
Aerofloat 25	—	0.022	—	—	—	—	—	—	—	—	—	—	—	—	—	0.022
Pine oil	0.036	0.017	—	—	—	—	—	—	0.0005	0.0005	0.0005	—	0.0025	0.001	0.001	0.059
M.I.B.C	—	0.014	—	—	—	—	—	—	—	—	—	—	—	—	—	0.014
Pulp volume — Ml (c)	—	35500	35500	2600	2600	2600	500	1200	1200	1200	1200	—	1200	1200	1200	—
% solids	65	33	33	14	10	8	31	15	15	1.9	1.4	—	0.9	0.7	0.7	—
Time — Minutes	—	5	10	6	5	4	5	4	7	3	3	—	8	4	3	—
pH	—	11.2	11.0	10.0	9.3	8.7	—	11.4	11.3	11.3	11.3	—	9.8	10.0	9.4	—
Temperature — °C	—	21	23	19	20	19	—	21	21	19	19	—	21	19	21	—

Notes: (a) Shell Canada Limited; (b) Sodium isopropyl xanthate; (c) Per 15,000 grams of original ore

Stages:
1. Grinding (51% — 200 mesh)
2. Conditioning
3. Bulk rougher flotation
4. 1st cleaning (after thickening)
5. 2nd "
6. 3rd "
7. Conditioning (before thickening)
8. Conditioning (after thickening)
9. Cu/Mo separation
10. 1st cleaning (of rougher Mo conc.)
11. 2nd "
12. Regrinding (77% - 325 mesh)
13. 3rd cleaning
14. 4th "
15. 5th "

BRITTON RESEARCH LIMITED
1612 WEST THIRD AVENUE
VANCOUVER 9, B. C.

Highmont Mining Corporation – Composite E
Test 143-3 results.

#	Product	Weight %	Assays % Cu*	Assays % Mo	Distribution % Cu	Distribution % Mo
1	Final Mo concentrate	0.0494	0.97	54.99	0.12	69.7
2	5th Mo cleaner tailing	0.0023	4.47	31.29	0.03	1.9
3	4th Mo " "	0.0055	4.39	25.31	0.06	3.6
4	3rd Mo " "	0.0145	2.04	2.93	0.08	1.1
5	2nd Mo " "	0.0127	17.13	12.19	0.56	3.9
6	1st Mo " " (2nd Cu conc.)	0.0723	29.06	2.28	5.42	4.3
7	Mo rougher tailing (1st Cu conc.)	1.1992	25.27	0.12	78.12	3.6
8	3rd Bulk cleaner tailing	0.1713	4.46	0.31	2.01	1.5
9	2nd " " "	0.2938	2.59	0.20	1.97	1.5
10	1st " " "	0.9489	1.17	0.09	2.86	2.2
11	Bulk rougher tailing	97.2241	0.035	0.0027	8.77	6.7
12	Head (calculated)	100.0000	0.39	0.039	100.00	100.0
12	Head (direct assays)		0.34	0.041		

* Total Cu

Cumulative results:

#	Product	Weight %	Assays % Cu	Assays % Mo	Distribution % Cu	Distribution % Mo
1	Final Mo concentrate	0.0494	0.97	54.99	0.12	69.7
1+2	Mo conc. after 4 cleanings	0.0517	1.12	53.94	0.15	71.6
1to3	Mo conc. " 3 "	0.0572	1.43	51.18	0.21	75.2
1to4	Mo conc. " 2 "	0.0717	1.56	41.43	0.29	76.3
1to5	Mo conc. " 1 cleaning	0.0844	3.91	37.03	0.85	80.2
1to6	Rougher Mo concentrate	0.1561	15.51	20.99	6.27	84.5
1to7	Bulk conc. after 3 cleanings	1.3559	24.14	2.53	84.39	88.1
1to8	Bulk conc. " 2 "	1.5332	21.86	2.27	86.40	89.6
1to9	Bulk conc. " 1 cleaning	1.8270	18.16	1.93	88.37	91.1
4to10	Rougher bulk concentrate	2.7759	12.75	1.31	91.23	93.3
6+7	Combined Cu concentrates.	1.2715	25.48	0.24	83.54	7.9

Additional assays: Head 0.066 % non-sulphide Cu, 0.0035% non-sulphi
0.36 % S.
#7 Mo rougher tailing (1st Cu conc.) 0.02 oz/ton Au, 1.1oz/ton A
#1 Final Mo concentrate 0.07 % Pb; see also attached spectrographic analysis report.

- CHEMICAL RESEARCH AND ANALYSIS
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HILGER & WATTS LIMITED
SADTLER RESEARCH
ULTRA CARBON CORPORATION
METALS RESEARCH LIMITED

CERTIFICATE OF ANALYSIS

Semiquantitative Spectrographic

REPORT NO. T-07262

SAMPLE(S) FROM Britton Research Ltd., 1612 West Third Ave., Vancouver 9, B.C.

SAMPLE(S) OF Molybdenum Concentrate   Attn: Mr. J. Britton

	Sample 44114	Sample	Sample
Antimony	–		
Arsenic	–		
Barium	.01%		
Beryllium (BeO)	–		
Bismuth	.005%	x	
Boron	–		
Cadmium	–		
Cerium (CeO_2)	–		
Caesium	X		
Chromium	–		
Cobalt	<.001%		
Columbium (Cb_2O_5)	–		
Copper	.8%	x	
Gallium	–		
Germanium	PT		
Gold	X		
Hafnium	–		
Indium	–		
Iridium	X		
Lanthanum (La_2O_3)	–		
Lead	.05%	x	
Lithium (Li_2O)	–		
Manganese	.001%		
Mercury	–		
Molybdenum	H		
Neodymium (Nd_2O_3)	–		
Nickel	.002%		
Palladium	X		

	Sample 44114	Sample	Sample
Phosphorus	–		
Platinum	X		
Rhenium	X		
Rhodium	X		
Rubidium	X		
Ruthenium	X		
Silver	.3oz:t	X	
Strontium	–		
Tantalum (Ta_2O_5)	–		
Tellurium	–		
Thallium	–		
Thorium (ThO_2)	X		
Tin	PT	x	
Titanium	.03%		
Tungsten	–		
Uranium (U_3O_8)	X		
Vanadium	.03%	x	
Yttrium (Y_2O_3)	–		
Zinc	–		
Zirconium (ZrO_2)	.01%		
ROCK FORMING METALS			
Aluminum (Al_2O_3)	LM		
Calcium (CaO)	.5%	x	
Iron (Fe)	.5%	x	
Magnesium (MgO)	.02%		
Silica (SiO_2)	M4%	x	
Sodium (Na_2O)	–		
Potassium (K_2O)	X		

– : not detected

Figures are approximate:

CODE

H — High — 10 — 100% approx.
MH — Medium High — 5 — 50% approx.
M — Medium — 1 — 10% approx.
LM — Low Medium — .5 — 5% approx.
L — Low — .1 — 1% approx.
TL — Trace Low — .05 — .5% approx.
T — Trace — .01 — .1% approx.
FT — Faint Trace — approx. less than .01%.
PT — Possible Trace — Presence not certain.
XXXXXXXXX — Elements looked for but not found
X — Not looked for

DATE June 16/67

SIGNED C.S. Joyce

C.S. JOYCE, B.Sc., Manager of Laboratories

RECEIVED JUN 19 1967

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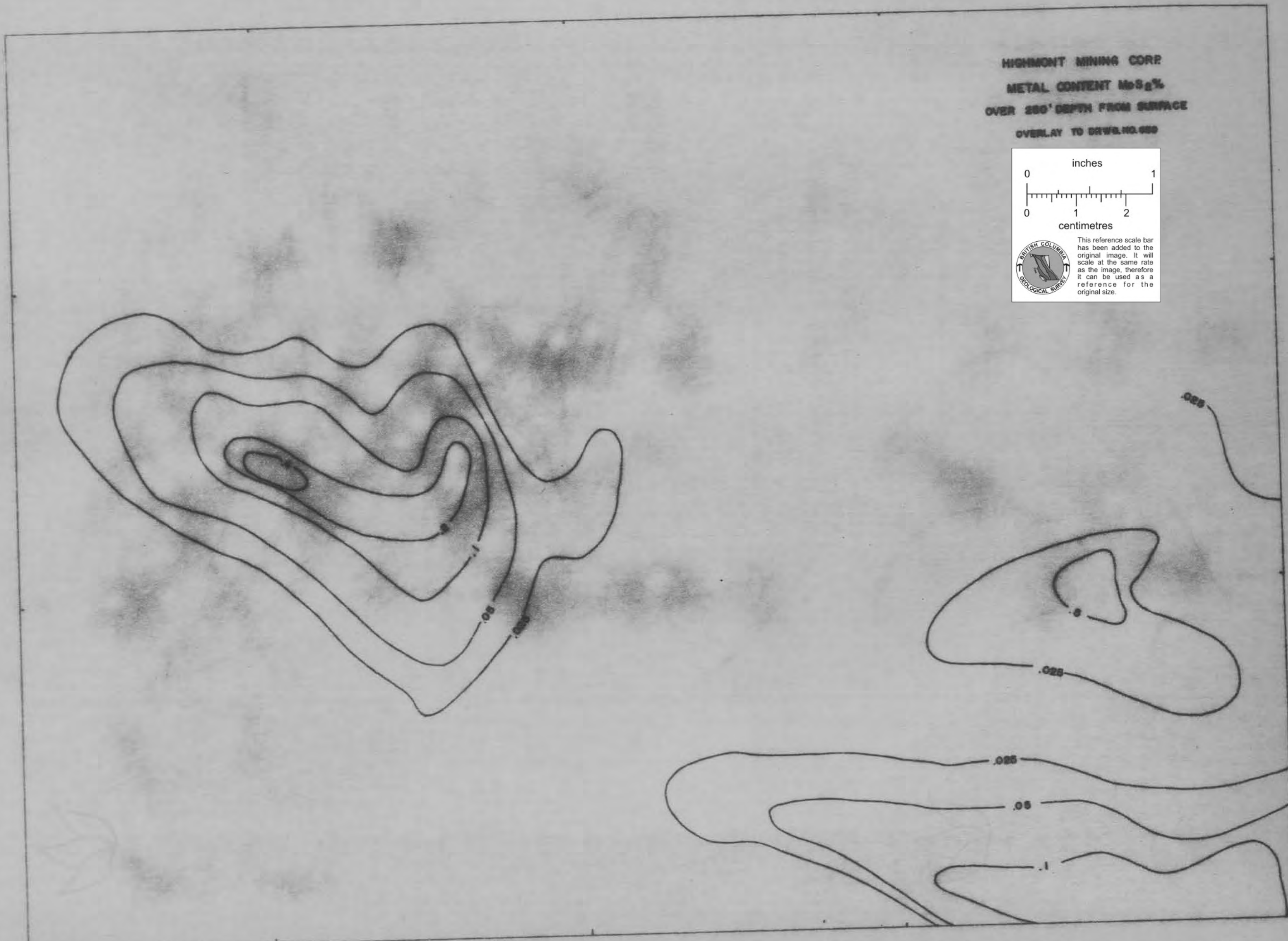
ECONOMIC CONSIDERATIONS

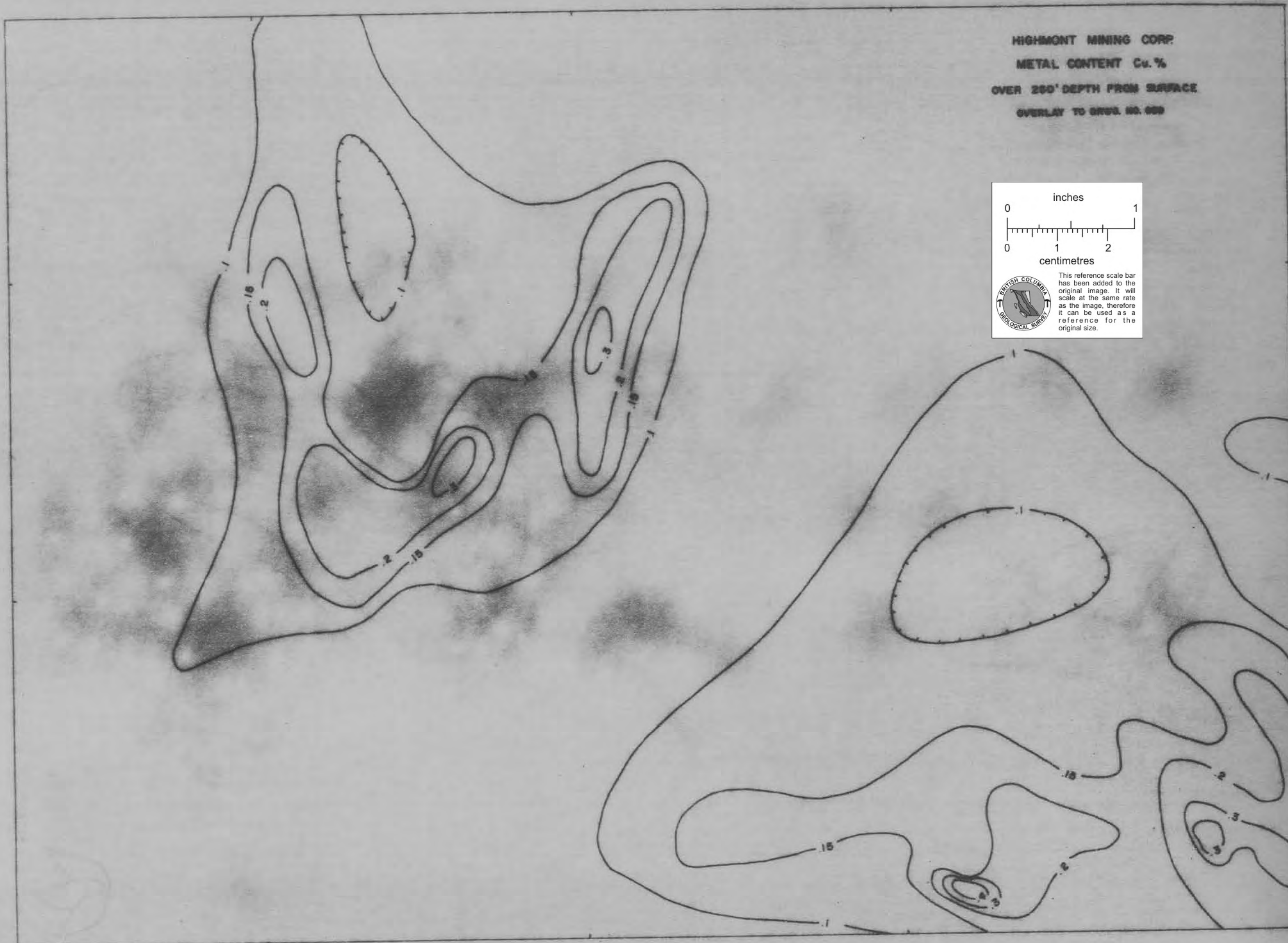
In recent years the results of exploitation of large low grade mineral deposits by open pit mining operations have permitted the establishment of broad, general guidelines for evaluating the factors involved in assessing the potential profitability of such deposits.

Although conditions vary widely, the following table provides rule of thumb ranges that will probably apply in a majority of cases for different production rates.

	Tons per Day		
	10,000	20,000	40,000
Ore Reserves Required Millions of tons	70	140	280
Capital Required Millions of dollars	25-28	34-50	57-73
Operating Costs per Ton (1 to 1 stripping ratio)			
Mining	30-50¢	27-45¢	27-45¢
Milling	60-90¢	55-85¢	55-80¢
Overhead	40-50¢	35-45¢	25-40¢
Total estimated range	$1.30-1.90	$1.17-1.75	$1.07-1.65
Net return from sales per ton to provide return of capital plus 10%	$2.20-2.90	$1.87-2.55	$1.67-2.30

In the Highmont deposit the drill indicated plus inferred reserves at 45.4 million tons are equivalent to about 65% of the postulated minimum for a 10,000 ton per day operation. However, chances of increasing reserves to the desired level appear good.


HIGHMONT MINING CORP.
METAL CONTENT MoS_2%
OVER 250' DEPTH FROM SURFACE
OVERLAY TO DRWG. NO.
inches
0
1
0
1
2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
BRITISH COLUMBIA
GEOLOGICAL SURVEY
.025
.05
.1
.025
.05
.1



HIGHMONT MINING CORP.
METAL CONTENT Cu. %
OVER 200' DEPTH FROM SURFACE
OVERLAY TO DRWG. NO.
.1
.15
.2
.3
inches
0
1
0
1
2
centimetres
BRITISH COLUMBIA
GEOLOGICAL SURVEY
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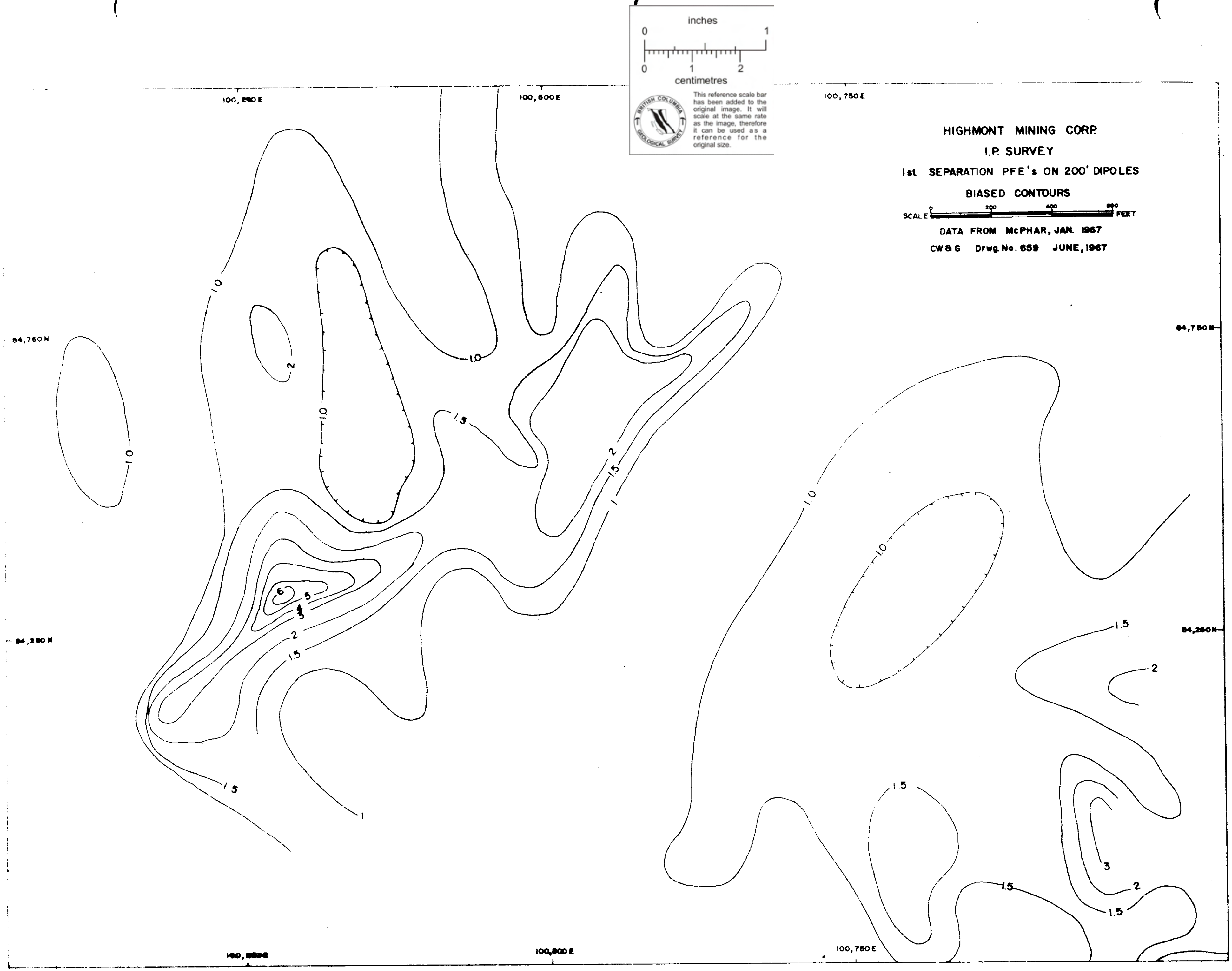
inches
0
1
0
1
2
centimetres
BRITISH COLUMBIA GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
HIGHMONT MINING CORP.
I.P. SURVEY
1st SEPARATION PFE's ON 200' DIPOLES
BIASED CONTOURS
SCALE 0 200 400 600 FEET
DATA FROM McPHAR, JAN. 1967
CW & G Drwg. No. 659 JUNE, 1967
100,250 E
100,500 E
100,750 E
84,750 N
84,250 N
1.0
2
1.5
1
1.5
6
5
4
3
2
3

Net returns from metal sales at prices of 38 cents U.S. per pound of copper and \$1.62 U.S. per pound on molybdenum contained in molybdenum concentrates with recovery of 87% of the copper and 80% of the molybdenum are calculated as follows:

Copper: \$0.38 U.S. = \$0.41 Can. per pound

Trucking	\$12.00 Can. per wet short ton
Loading	\$2.50 Can. per wet short ton
Ocean Freight	\$8.00 U.S. per wet long ton
Smelting	\$10.00 U.S. per dry metric ton
Refining	One cent U.S. per pound purchased
Less 20 pounds	Cu per dry short ton

At a grade of 25% Cu and a moisture content of 6%, these deductions and charges would amount to 9.4 cents Canadian per pound of copper.

Net realized price would thus be (41 - 9.4) or 31.6 cents Canadian per pound.

Molybdenum: \$1.62 U.S. = \$1.74 Can. per pound

Molybdenum is sold at plant site with freight and container charges for the purchaser. Marketing charges are estimated at 0.75%.

Net realized price would thus be (\$1.74 - 0.013) or \$1.727 Canadian per pound.

If the validity of drill indicated grades can be confirmed, the realized net returns from metal sales would be:

Potential ore - 0.30% Cu and 0.098% MoS_2

Copper:	(2000)(0.003)(0.87)(0.316)	=	\$1.65
Molybdenum:	(2000)(0.00098)(0.6)(0.8)(1.727)	=	\$1.63
	Mine run per ton - total		\$3.28

Potential ore plus Low Grade averages

0.27% Cu and 0.085% MoS_2.

Assuming the same metallurgical recoveries, this grade of material would produce from net metal sales $1.48 for copper and $1.41 for molybdenum or a total of $2.89 per ton.

The Highmont copper-molybdenum deposits on the basis of analysis of information presently available have the potential of supporting a large scale operation. However, a number of assumptions must be verified and many indications must be proven before a production decision can be made. In our opinion, the most important of these in order of priority are:

1. The relationship between drill indicated values and the true grade of the deposit must be established.

2. The nature of mineralization in the deposits must be clarified. Values must be sufficiently regular to permit holding mill feed grade variations within reasonable limits.

3. Inferred mineralization should be converted to drill indicated and the deposits more precisely delineated.

4. The problem of obtaining sufficient water to support a large scale operation should be thoroughly investigated.

5. Reserves should be increased by deeper drilling and by geophysics followed by additional drilling in the search for lateral extensions.

6. Preliminary favourable metallurgical indications should be confirmed and the amenability of the mineralized material to concentration into completely marketable products conclusively demonstrated by tests on a pilot plant scale.

The accomplishment of all of these objectives involves a very comprehensive programme at a cost which will probably range between one and two million dollars. Since, if validity of drill indicated values cannot be substantiated or if distribution of mineralization proves too erratic to permit rational mining, the balance of the investigation would not be justified, we propose a staged programme with stages 2 and 3 contingent upon successful accomplishment of objectives 1 and 2 above in the first stage.

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RECOMMENDED PROGRAMME

In our opinion, the best method of determining the true grade of the Highmont deposits and investigating the nature of mineral distribution is to drive an adit through the heart of the east or largest zone and to drive raises along drill holes from the adit level. This would not only permit visual inspection of actual conditions and bulk samples for grade checks but would also provide material for pilot plant testing if justified. We propose this underground work as Stage 1 of the recommended programme.

Stages 2 and 3 would both be contingent upon successful results from Stage 1, would probably be initiated as soon as evaluation of information indicated the added expenditure to be justified and would be carried out contemporaneously. While they might be considered as phases of the same stage, we have separated them because, while the pilot mill testing project - called Stage 2 - is definite in scope and nature, the drilling and other investigations lumped under Stage 3 are much more indeterminate.

STAGE 1 - BULK SAMPLING

For location of proposed work see C. W. &G. Ltd. Drwg. No. 660.

Underground work to be contracted.

Crushing plant with necessary labour to be on a lease basis.

Sampling plant to be installed and operated by Highmont.

Estimated Cost

Underground		
Mobilization	$ 5,500	
Adit 2900 ft. @ $70	203,000	
Raises 625 ft. @ $85	53,125	$261,625
Crushing		
Rental and Labour 180 days @ $742		133,560
Sampling		
Plant Installation	$ 25,000	
Labour and Supervision	10,000	
Assaying	10,000	45,000
Stockpiling		
Pad Preparation	$ 3,500	
Transportation and Maintenance	2,500	6,000
Evaluation, Geologic Mapping and Administration		10,000
Contingency		43,815
Total		$500,000

STAGE 2 - PILOT PLANT TEST PROGRAMME

In order to supply sufficient bulk sulphide concentrates to permit continuous or nearly continuous operation of the copper-molybdenum separation circuit, a pilot plant with a capacity to treat at least 100 tons per day of feed is required. Inquiries have been made to Brenda Mines Ltd. into the availability on a rental basis of that company's 100 ton per day plant which is presently situated near Peachland, B.C. This mill was used successfully to carry out a programme very similar to that proposed at Highmont.

Based on the assumption that the Brenda Plant will be available on reasonable but presently unknown terms, we estimate that the pilot plant test programme will require from three to six months and cost from a minimum of $500,000 to approximately double that amount.

STAGE 3 - FURTHER DELINEATION AND EXTENSION OF RESERVES - WATER AND POWER STUDIES - PRELIMINARY MILL DESIGN - COMPUTERIZED ORE RESERVE ANALYSIS - FINAL FEASIBILITY REPORT

The implementation of the drilling phase of this stage should take place as soon as Stage 1 results indicate it to be justified. The type of drilling attitude of holes (vertical vs. inclined) and drill pattern would be dependent on the findings from underground work. It appears probable that if justified at all, the drilling would consist of percussion drilling on targets outlined by additional I.P. work to attempt to develop lateral extensions of known mineralization coupled with diamond drilling to probe depth extensions.

The probable cost of Stage 3 is very difficult to estimate at this time. For preliminary budgeting purposes, we have allotted $350,000 for this work and recommend that more precise estimates be made if and when a decision is made to carry it out.

RECAPITULATION

Stage 1	$ 500,000
Stage 2	500,000
Stage 3	350,000
Total	$1,350,000

It is estimated that an additional $500,000 might be required to complete Stages 2 and 3.