

Note: Red Kirkham, B.C.D.M.

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WILLIAM M. SHARP, P. ENG.
CONSULTING GEOLOGICAL ENGINEER

*plans report on H.B. mts.
this fall*

E R

STE. 808, 900 WEST HASTINGS ST.
VANCOUVER 1, B. C.

June 23, 1966.

L O NV

The President & Directors,
Buval Mines Ltd. (N.P.L.),
c/o 818 - 470 Granville Street,
Vancouver 2, B.C.

801094

3/5 cl.

Attention: Mr. D. W. Small

Dear Sirs:

**PRELIMINARY REPORT RE BUVAL MINES LTD.
PROPERTY, HUDSON BAY MT., SMITHERS
AREA, B.C.**

INTRODUCTION

Following earlier authorization by the Company's directors to examine the property on his return from a northern assignment, the writer phoned Mr. Yorke-Hardy from Prince George and arranged with him a general schedule for the examination of the Smithers area properties.

The writer reviewed details of the Buval property, current progress, and general exploration plans with Mr. Yorke-Hardy during June 11th evening, and examined the current Buval showings, with Mr. Yorke-Hardy's helpful assistance and guidance, on June 12, 1966. The resulting field examination was, by necessity, of a rather preliminary nature, and field work was limited to the mapping and check-sampling of initial exploratory work on the Seymour and Zebnie claim groups. The examination of the old Snowshoe (vein) exposures, at a considerably higher elevation, is deferred until time, snow conditions, and priorities within the general exploration schedule permit.

Much of the information embodied in this report has been derived from data supplied by officers of this Company - particularly from general research and field work accomplished thus far by Mr. Yorke-Hardy. This, along with his very helpful

Buval

field assistance, is appreciatively acknowledged.

PROPERTY (Fig. 1)

The full mineral property is made up of three contiguous, large claim groups. These, staked by Mr. Yorke-Hardy and assistants, are as follows:

④
add Till
#1, 2, 3, 4
Snowshoe A.C.

(A) Seymour group, to the south, and comprised of Seymour #1 - #84 located claims, and the contained Crown-granted Canadian/American Citizen claims - lots 7171 and 7238 respectively.

(B) Zobnic group, to the northeast, consisting of Zobnic #1 - #58 located claims.

(C) Midnight group, to the northwest, and consisting of Midnight #1 - #27 located claims.

Record data pertaining to the above claims may, if required, be obtained from the Company's Vancouver office.

access to Midnight Snowshoe
showings by new road (brown) 1500' S.
to showings

LOCATION AND ACCESS

Buval Mines' Smithers property covers a major area of the northeasterly-facing slopes of Hudson Bay Mountain. The composite group extends approximately 3 miles up-slope from the C.N. Railway line along the west side of the Bulkley River Valley, and approximately 5 1/2 miles northwestward along the mountains slope from the south end of Seymour Lake to a half mile, or so, north of Simpson Creek. Access to south and south-central parts of the property is provided by the old Sil Van (Duthie) mine road and southerly-branching roads and trails. Northerly sections of the property are most directly reached by the road and trails from Smithers to the headwaters of Simpson, and other creeks situated on this part of Hudson Bay Mountain.

General access to the Smithers area is provided by trans-Provincial Highway No. 16 extending between Prince George and Prince Rupert, B.C., and also by C.N. Railway from the principal seaport of Prince Rupert, B.C. Access by air is via daily C.P.A. flights to Prince George and thence by three-weekly connecting flights

3 - Mon - Fri

to Smithers airport. The present and prospective tempo of mining activity would seem to warrant daily connecting flights, and these may develop eventually.

HISTORY

High-grade silver-lead-zinc ore was first discovered on Hudson Bay Mountain about 1905. Several more discoveries were made in the following few years. Small-scale mining operations resulted from a number of these prospects - the general product being a high-grade (gold)-silver-lead shipping ore. The Duthie mine, being the principal operation founded on discoveries of the typical high-grade ore, commenced production in 1922 and operated during periods of adequate ore reserves and favourable metal prices until the spring of 1954.

The currently-developing major molybdenite occurrence on Hudson Bay Mountain was staked by Mr. W. D. Yorke-Hardy and associates in 1956 and 1957. The occurrence of molybdenite within rough floats fragments of granitic and altered volcanic, and dyke rocks had been known for many years prior to the above staking, but it was Mr. Yorke-Hardy who first visualized the full potential of the showings, and who organized the difficult task of staking the preliminary claim group over the precipitous Glacier Gulch area.

Through successive option agreements Climax Molybdenite (B.C.) Ltd. acquired the property, and have since very extensively surface diamond-drilled the widespread zone from restricted, difficult surface set-ups. Some of these drill holes have intersected mineralization at depths in excess of 3,000 feet. Currently the Climax company is driving a long low-level tunnel to establish deep underground drill stations. Large reserves of low-to medium-grade MoS₂ mineralization are presently indicated, and the Climax Company's apparent objective is to prove up adequate reserves of the better-grade ore for an eventual underground mining operation.

The Buval mining properties on Hudson Bay Mountain directly adjoin easterly parts of the Climax claim group. As large areas of the Buval claims have a decided structural-lithological potential for the occurrence of comparably large zones of (essentially) copper-silver type mineralization, the proposed program is largely oriented towards the detection and exploration of such possible zones. At the same time a parallel search will be made for mineable bodies of the regionally typical small high-grade gold-silver-lead-zinc deposits, some of which occur within the claim group, but which have not been extensively explored.

Note: desirability of obtaining recent geol. comp. of geol. of U.S. mts., by R.V. Kurland of B.C.D.M.
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although H.B. mts. probably significant from pt of view of currently developing MoS₂ deposit

*Don't matter
Climax
1908-59
61 - present
(Sil-Ver)*

*1922-30,
1,000,000*

Significant high grade Cu-silver-lead-zinc deposit

*Geology
Summary*

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Note: desirability of obtaining recent geol. comp. of geol. of U.S. mts., by R.V. Kurland of B.C.D.M.

GENERAL GEOLOGY

(A) LITHOLOGY

Note: Read Kirkham B.C. D.M. reports to have report on H.B.M. This fall Bell Y-H advised to attempt to secure this info as Kirkham may not be back & my name

The predominant rock types underlying the Smithers area in general, and the Hudson Bay Mountain section in particular, consist of a thick, fairly conformable assemblage of predominantly andesitic volcanics with two distinct marine and continental sedimentary sequences at a "stratigraphic" separation of about 4,000 feet. The whole assemblage comprises the Hazelton volcanic-sedimentary group ranging in age from Early Middle Jurassic to Early Cretaceous.

impale date for publication

Consolidation ref to previous report

The volcanic sequence is comprised of andesitic, dacitic, rhyolitic, and basaltic lavas, tuffs, and breccias, with minor intercalated sediments. The principal (upper and continental) sedimentary division is comprised of variably metamorphosed sections and gradations of argillite, sandstone, conglomerate, greywacke, tuff, etc.

Surface exposures of intrusive rocks are limited to a few small to medium-sized stocks (etc.) of general granodioritic composition. These and the volcanics are cut by small dykes of dioritic-to-felsic-to granitic composition. In age these are both pre- and post-ore. Three medium-sized stocks occur in the mineralized area of Hudson Bay Mountain. Several smaller stocks have been noted at widely-separate locations. The pattern and frequency of the above suggests the existence of a larger parent intrusive body within the general shell of volcanic rocks. This inference is supported by the presence of hornfelsized and/or silicified rocks, and by an apparent tendency towards mineral zoning with respect to inferred and actual cores of intrusive rock within the central mass of the mountain. Drill hole intersections confirm the presence of a major granodiorite body underlying the hornfelsized volcanics of the Glacier Gulch section of the mountain.

core idea

hornfelsized or silicified rocks a useful clue to presence of non-ore intrusives.

(B) STRUCTURE

Note R. Kirkham map pending.

Regional trends, as observed within layered Hazelton, volcanic and sedimentary rocks, are northwesterly. These give way, however, to transverse (approx. E-W) trends in the fault block to the east of the N.N.E. trending central (Silver Creek) fault. The general transverse trend of the volcanic-sedimentary rocks is, moreover, convexly arcuate to the north, with general steep north dips, suggesting that the flexure was developed by thrusting and/or over-turning forces

Consolidation ref to previous report & also into report of Harrison & Kirkham on the glacier gulch. See R. Kirkham report map

acting in a south-to-north direction. This general steeply-dipping arcuate pattern, although locally disturbed by branch faults from the Silvern Creek structure, persists over the mapped N.-S. length of the block. In addition, fractures and shears - locally mineralized - along the apparent flanks of the block conform with corresponding elements of the flexure, and suggest an origin based on "inter-bed" adjustments to folding.

The principal faults occurring within the general mass of Hudson Bay Mountain may be classified as follows:

- (a) Longitudinal and/or regional faults within the general N.N.W. to N.N.E. sector.
- (b) N.E.-trending branch faults from (a) and subordinate fractures of the general (a) set.
- (c) Transverse thrust faults, with trends approximately normal to (a).
- (d) Subordinate formational faults, trending conformably with the previously-noted arcuate "bedding" trends.

Subordinate to the above, but economically more significant, are the N.E.-trending joint and fracture sets. These appear to be closely related to the system of mineralized N.E. trending fissures and shears springing from the central Silvern Creek fault.

(C) MINERALIZATION

*Wrote by H.T. [unclear] 4/1/62
Checked by [unclear] 4/1/62*

Mineralization within Hudson Bay Mountain is principally of the fracture-filling type. Ore structures range from simple veins, to sheeted veins and shear-lobes, to joint-stockworks and general fracture-boxworks. Of the smaller, purely vein-type deposits those which have so far proved most productive are situated on N.N.E.- to N.E.- striking systems of fractures, i.e. Duthie and Glacier Gulch. The structures within this class are typically associated with relatively small, but high-grade bodies of argentiferous galena, tetrahedrite, and sphalerite, and minor proportions of other sulphosalts and sulphides - or with auriferous arsenopyrite, sphalerite and locally some chalcopyrite.

The wider mineralized shear-and-fracture structures tend to be localized along the opposite, or easterly margin of the general mineral area. Argentiferous

chalcopyrite, bornite, and tetrahedrite constitute typical ore minerals within structures of this class.

The major ore structure of the area is one involving widely distributed systems of mineralized joints, fracture boxworks, and stockworks. Molybdenite is the principal ore mineral in the single deposit of this particular structural type currently undergoing extensive exploration by the Climax company.

The bulk of the individual mineral deposits occur within the volcanic rocks of the Hazelton group. However, the bulk of the areal mineralization occurs within the assemblage of Hazelton volcanics and underlying intrusives of the Climax property, which centres about the Glacier Gulch section of the mountain.

In general, a zonal arrangement of minerals with respect to the general granitic core of the mountain is apparent. This is illustrated by the occurrence of relatively low-temperature silver-rich sulphide mineralization outward of the central core, and of higher temperature arsenopyrite, pyrrhotite, molybdenite, etc. mineralization towards the central granitic core of the mountain.

The wall rocks enclosing all mineral deposits of the locality are, to a greater or lesser extent, hydrothermally altered - the principal effect being one of bleaching and/or silicification.

DETAILED GEOLOGY, BUVAL PROPERTY (Fig. 2)

(A) SEYMOUR SHOWINGS

These are situated near the foot of the N.E.-facing slope of Hudson Bay Mountain at approximately 1,200 feet west of the north end of Seymour Lake. Specifically they are situated on the southerly Crown grant Lot 7171. A branch of the old Sit-Van road passes closely below the lower trench at a point roughly 3 miles south of Sml thers.

Three rock cuts, recently cleaned out, expose a plus-200 foot strike length of Ag-Cu mineralization along its W.N.W. course up the hill slope. Rather strongly weathered argentiferous bornite-chalcopyrite occurs as masses within shear strands and as dispersions along minor fractures over a plus - 50 foot width of the composite shear-fracture lode structure. Additional cross-trenching to explore projected extensions of the zone is being carried out.

In cross-sectional detail the exposed part of the zone shows four distinct

steeply-dipping shear strands, with intervening sections of variably fractured and mineralized rock. The host rock, consisting of the areally-typical firm red andesitic volcanics, is slightly bleached along the larger fractures.

The three samples (Fig. 1) taken by the writer consisted of local checks on more comprehensive sampling accomplished by Gunnex Ltd. in 1962. These gave the following assays - generally confirming the Gunnex results.

#19785 - Ag, 4.35 oz/ton; Cu, 2.35% across 7.0'

#19786 - Ag, 1.20 oz/ton; Cu, 1.0% across 4.6'

#19787 - Ag, 1.65 oz/ton; Cu, 1.3% across 6.0'.

The earlier sampling by Gunnex across the same and additional sections (Fig. 1) indicated the following assay sections:

	<u>Length</u>		<u>Ag, oz/t.</u>	<u>Cu, %</u>
(a) Lower Trench: <i>Gunnex</i>	3.0'		1.2	0.98
	5.0'		0.1	0.30
	8.0'		0.1	0.19
	5.0'		1.5	0.72
	(4.5')		0.2	0.11
<u>Weighted average of -</u>	21.0'	⊙	0.59 oz/t.	0.45 %
- A subsequent check sample by Mr. Yorke-Hardy assayed	16.0'		1.8 oz/t.	0.65 %
(b) Second trench: <i>Gunnex</i>	8.0'	⊙	0.30	0.42
(c) Third trench: "	5.0'		1.2	0.95
	4.6'		0.8	1.05
	6.0'		1.4	0.59
<u>Weighted average of -</u>	15.6'	⊙	1.16 oz/t.	0.88 %
(d) Top trench: "	4.3'		1.0	0.64
	5.6'		1.5	1.33
<u>Weighted average of -</u>	9.9'	⊙	1.28 oz/t.	1.03 %

The weighted average of all of the above Gunnex trench samples computes to an average width of 13.6' @ Ag, 0.84 oz/ton; Cu, 0.67 %.

In summary, the grades indicated above could be considered quite conservative, in view of the highly-weathered and leached condition of all exposures sampled, and on the basis of the slightly higher grades obtained by the writer on his spot checks.

(B) ZOBNIC SHOWINGS (Fig. 2)

*400' trenching above creek showings
400' trenching & trenching above
creek showings: soils respond to
subsonics; no chip or channel
sampling*

These are situated (Fig. 1) 1 mile due west of the C.N. Smithers station. Access by motor vehicle is via the narrow Simpson Creek road. The road distance from Smithers is only 1 1/2 miles. This includes a short section of newly-constructed road from the afore-mentioned route. The showings, at an elevation of only 1,800 feet, occur within the rock bluffs along and above the north bank of a small creek.

The recent excavation accomplished by the Company has exposed a 100'-wide zone of shearing and fracturing on a W.N.W. trend and with steep southerly dips. The red andesitic volcanic country rocks have been strongly bleached and altered hydrothermally. Bleaching and silicification have produced mixed sections of white to pale pink hard siliceous, and softer clay-mica-carbonate alteration. A little chlorite was also noted.

The structural section is a composite of shearing and sheet-fracturing on generally parallel planes. Disseminated pyrite is the principal sulphide mineral. Only trace-to-minor amounts of dark sulphides (bornite and/or grey copper) were observed within the firmer, less-weathered host rock. Minor occurrences of grey copper and galena were noted within some fractures. However, weathering and leaching have obviously so reduced the metallic content of both shears and fractures that it is difficult to estimate the nature and intensity of the original mineralization.

A few fragments of well mineralized (Cu=Zn) float of apparently quite local origin were seen within the recently-excavated material along and in the creek. Similar zones of shearing occur closely up-stream (southwest) of the above zone. All of these are to be explored by bulldozer stripping and blasting along strike projections.

In spite of the evident sparsity of the bornite-tetrahedrite, etc. mineralization, even minor amounts of these minerals carry very appreciable amounts of silver. A picked sample of vein material by the Resident Engineer of the Dept. of Mines on,

or about 1927, returned silver @ 104 oz. per ton in association with only 1.5% copper. On the basis of the indicated high Ag/Cu ratio the zone has a significant ore potential.

(C) MIDNIGHT SHOWINGS

These are situated at the 4,500-foot elevation on the northeast slope of the mountain at some 2 miles due west of Zabnic workings. A persisting snow cover at this altitude obviated an inspection of the showings during the current visit.

The following description of the showings is summarized from descriptions by Government engineers and geologists, supplemented by material provided by Mr. Yorke-Hardy:

Two or more mineralized shears striking northwesterly and dipping 35° - 45° southwest has been explored by two adits and several open cuts for 700 feet along a gently-sloping section of the otherwise steep mountain slope. The andesitic wall rocks have been strongly bleached, silicified, and variably impregnated with pyrite. Quartz-sulphide veins along the shears are generally under 6 inches in width. Mineralization consists of galena, sphalerite, arsenopyrite, and pyrite.

A 370-foot strike interval of one shear zone has been exposed, and may be continuous with another exposed some 300 feet further along the strike.

A potential for greater widths of high-grade silver-lead-zinc ore exists at possible intersections of divergent mineralized structures in the area. There is an evident tendency, as deduced from occurrences of moderate amounts of disseminated mineralization within highly-silicified wall rocks at intervals along the zone, towards the development of replacement orebodies.

A grab sample of 3 tons of sorted ore reportedly assayed gold, 0.16 oz./t.; silver, 173.7 oz./t.; lead, 21%; zinc 8.9%. A second grab sample of one ton of roughly-sorted similar material assayed gold, 0.10 oz./t.; silver, 48.5 oz./t.; lead 9.3%; zinc, 17.3%. (Sampling by resident engineer.)

(D) OTHER OCCURRENCES

These are shown on Fig. 1; they are not described in detail, but the significant feature of a number of these, which are situated to the north and northwest of the

Buval claim block, has to do with possible southerly extensions of mineralized structures into the property. These consist of both shear and vein structures, carrying gold-silver-lead-zinc mineralization.

PRELIMINARY SOIL SAMPLING

A base line, starting from the no. 1 posts of the Seymour 21 - 22 M.C.'s and following this location line (bearing N20° W) along the hill slope, has been established. Grid lines at 1200 - foot spacing, and at 90° to the base-line are also being cleared and picketed on 200 - foot stations. The reconnaissance phase of soil-sampling has commenced on this grid. To expedite a general soil-sampling survey of the property, and to supplement prepared grids, a detailed topographic map will be used as a general field map. It is proposed that sampling be conducted along appropriate contours, using a chain and altimeter for field control. The combined purpose of this control is to eliminate some grid preparation, to restrict sampling to specific "contours" - which will naturally intercept surface drainage at right angles, and to facilitate traversing by restricting it to generally level routes. Naturally, some adjustments, to avoid precipitous slopes, will be necessary.

To a recent date 12 grid lines - A to G, and O to S inclusive - have been prepared; numerous geologic and topographic features have been recorded.

Rubeanic spot tests for copper content on the current sampling indicate an 800 foot wide anomalous zone trending W.N.W. through C and D. This zone lies some 4,000 feet south of the Seymour "Canadian Citizen" showings and trends approximately parallel to it.

A strong magnetically-anomalous and altered area was noted at base-line station H. This lines up rather closely with the up-hill projection of the Canadian Citizen copper-silver zone. In addition, previously un-mapped occurrence of granitic rock within the general andesite country rock have been noted. One such granitic dyke, outcropping at approximately 400 feet south of base-line sta. A, may be traced via air photos for 3,000 feet northerly over the group.

SUMMARY AND RECOMMENDATIONS

The Buval Mines Ltd. Smithers property contains several significant, but relatively untested occurrences of copper-silver, and gold-silver-lead-zinc

mineralization. The recently-examined copper-silver showings on the Seymour and Zobnic groups occur within wide zones of shearing and fracturing. Within the generally-favourable geological setting of this section of Hudson Bay Mountain these mineralized zones may strengthen laterally or at depth with a corresponding increase in size and metal content. In themselves they constitute worthwhile targets for extended exploration within their respective localities.

The additional occurrence of extensive zones of fracturing and alteration over the northerly part of the group adjacent to the Climax property offers some potential for the occurrence of wide-spread Copper, or perhaps Cu-Mo mineralization, at depth. This particular situation would depend largely on the possible existence of significant bodies of intrusive rock buried beneath the areal volcanic cover. The presence of several small to medium-sized outcropping masses of intrusive within and adjacent to the property boundaries provides tangible support to this possibility, as does the less direct evidence provided by the "zonal" increase of higher temperature minerals in a northwesterly direction towards the assumed granitic core of the mountain.

The preliminary phases of the geochemical survey have already indicated some markedly Cu-anomalous zones. These results, locally relating to the known areas of mineralization, are sufficiently indicative to justify the extension of the reconnaissance survey to cover all but the uppermost areas of the property - the latter border section being excluded on the basis that possible anomalous zones would not necessarily relate to mineralization within the group below the west boundary.

Respectfully submitted,

W. M. Sharp, P. Eng.



ESTIMATED COSTS

1. Detailed topographic map, prepared from air photos	\$ 700.00
2. Preparation of localized exploration grids, estimate 10 miles @ \$80.00	800.00
3. Provision for soil-sampling, 1 month	1,000.00
4. Provision for 1,000 Cu-Mo analyses	2,000.00
5. Provision for follow-up magnetometer and/or I.P. Surveys; 15 mi. @ \$500./mi.	7,500.00
6. Provision for 3,000 l.f. core drilling	30,000.00
7. Provision for 'dozer trenching and bedrock excavation	3,000.00
8. Provision for supervisory expense	3,000.00
9. Miscellaneous	<u>2,000.00</u>
Total:-		<u>\$ 50,000.00</u>

Respectfully submitted,

W. M. Sharp, P. Eng.

References:

G.S.C. paper 44-23 by J. E. Armstrong
G.S.C. memoir 223 by E. D. Kindle
G.S.C. map 971A - Smithers - Ft. St. James
Minister of Mines Reports, B.C., 1927 and subsequent
Property maps and soil sample grids @ 1" = 1,500';
assay plans of Seymour showings and other data by
Mr. W. D. Yorke-Hardy.

