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Geological Report

HUDSON BAY MTN. PROPERTY  
BUVAL MINES LTD. (N.P.L.)

W M. Sharp, P.Eng.

February, 1967

WILLIAM M. SHARP, P. ENG.  
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STE. 808, 900 WEST HASTINGS ST.  
VANCOUVER 1, B. C.

February 28th, 1967

The President and Directors,  
Buval Mines Ltd. (N.P.L.),  
c/o #201 - 535 Thurlow Street,  
Vancouver 5, B.C.

Gentlemen:

The accompanying geological report "HUDSON BAY MTN. PROPERTY,  
BUVAL MINES LTD., (N.P.L.)" has been prepared as requested and authorized.

The writer expresses his thanks and acknowledgements to the principals of  
both Buval Mines Ltd. and Anco Explorations Ltd. for the provision of maps and reports  
resulting from the latter's 1966 field work. These have been essential to the preparation  
of this report.

Respectfully submitted,

*W.M. Sharp*  
W.M. Sharp, P.Eng.

Encl.

*W.M.S.*

**Geological Report**  
**and**  
**Exploration Proposals**  
**regarding the**  
**HUDSON BAY MTN. PROPERTY**  
**of**  
**BUVAL MINES LTD. (N.P.L.)**  
**In the**  
**Smithers Area**  
**of the**  
**OMINECA MINING DIVISION, BRITISH COLUMBIA**

**by**  
**W.M. Sharp, P.Eng., Geological Consultant**

**Vancouver, B.C.**

**February, 1967.**

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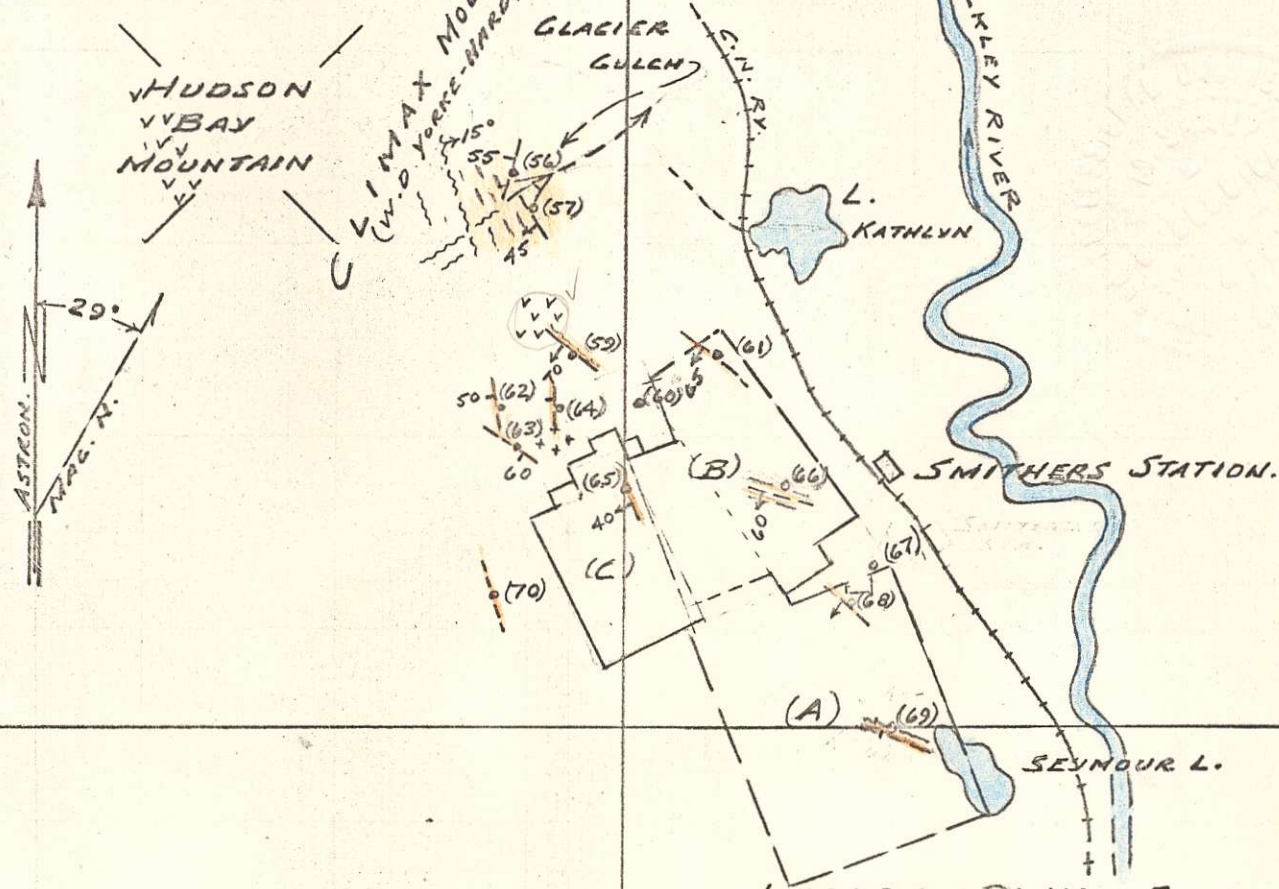
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PROPERTY INDEX.

* (A) - SEYMOUR GROUP OF 86 CLAIMS	----	
* (B) - ZOBNIC " " 58 "	----	
* (C) - MIDNIGHT " " 27 "	----	
(56) - OLD GLACIER GULCH, N. SIDE.	----	GOLD-SILVER; ZINC-LEAD.
(57) - " " " 5. "	----	GOLD-BISMUTH-SILVER-LEAD-ZINC.
(59) - YUKON SHEAR & VEINS.	----	GOLD-ZINC-CU.
(60) - CASCADE " " "	----	GOLD-SILVER-LEAD.
(61) - VANCOUVER SHEAR-LODE.	----	SILVER-LEAD-ZINC.
(62) - HEATHER SHEAR-VEIN.	----	GOLD-SILVER-ZINC.
(63) - EMPIRE SHEARS & VEINS.	----	SILVER-LEAD-ZINC.
(64) - JESSIE VEINS	----	GOLD-SILVER-LEAD-ZINC.
* (65) - SNOWSHOE SHEAR-VEIN.	----	GOLD-SILVER-LEAD-ZINC.
* (66) - ZOBNIC SHEAR-ZONES.	----	SILVER-(COPPER & TETRAN.)
(67) - ZEOLOTIC SHEAR.	----	(COPPER).
* (68) - SMITHERS COPPER SH-VEINS-	----	COPPER-SILVER.
* (69) - CAN. CITIZEN SHEAR-LODE PROP.	----	COPPER-SILVER.

6/25/15



54°-45'

LEGEND

- VEINS (LODES) & SHEARS.
- GRANITIC ROCKS.
- DIORITIC ROCKS.
- HAZELTON VOLCANICS.

127°-15'

LOCATION PLAN - FIG. 1

PROPERTY & SHOWINGS.  
BUVAL MINES LTD. & VICINITY,  
HUDSON BAY MT., SMITHERS AREA,  
OMINECA M.D., B.C.  
 SCALE: 1" = 2 MI. PRELIM. REPT. JUNE/66  
 SUMM. REPT. FEB. 1967  
 REF. G.S.C. MEM. 223-REV. ED.  
 APPROX. OUTLINES & LOCATIONS -  
 PENDING SURVEY TIES.  
 W.M. SHARP, P. ENG.

## SUMMARY

Buval Mines Ltd. (N.P.L.) Smithers, B.C. property occupies a 16 square mile area along the easterly-facing slope of Hudson Bay Mtn. The northerly part of the general group lies approximately 2 miles southeast of the Glacier Gulch area and the extensive molybdenite deposit currently being explored by Climax Molybdenum (B.C.) Ltd. The southeasterly projection of the regional formational trend, and of one general set of structures and intrusives associated with the above mineralized zone is inferred to extend into more northerly sections of the Buval claim group.

Preliminary exploration of the 176-claim area shows the group to be generally underlain by volcanics of the Hazelton group. Outcrops of plutonic rocks are observed locally; however, the full extent of these, under the extensive overburden, is unknown. The same observation may be made with reference to locally-outcropping, or otherwise exposed zones of mineralization and alteration occurring at various parts of the claim group. Preliminary geochemical investigations made during 1966 were moderately successful in indicating the presence of a number of distinct zones of bedrock copper mineralization; these however, require substantiation and/or further investigation by parallel geochemical-geophysical methods and, locally, by trenching or diamond drilling.

Apart from the Snowshoe diamond-drilling program, a principal part of the 1967 field investigation will be concerned with the search for other concealed zones of possible Cu-Mo bedrock mineralization, for which the writer believes the area possesses a considerable geological potential.

Mineralization discovered to date is of widely-differing types; (a) relatively narrow, but high-grade Au-Ag-Pb-Zn veins and (b) relatively wider fracture-stockwork zones containing Cu-Ag mineralization.

Preliminary surface exploration of the Seymour showings has so far defined a 200-foot length by 50-foot width of Cu-Ag mineralization. Within this, an average 6-foot wide section returned an average assay of 2.6 oz/ton silver, and 1.64% copper. More comprehensive cross-sectional sampling was prevented by reason of the limited extent of the current pattern of trenches, and also by the weathered-leached character of exposures. The 1966 I.P. survey disclosed an extensive, moderately anomalous zone of interest over and beyond the showings.



Trenching and geological mapping within the Midnight group during 1966 disclosed a wide lode structure, well mineralized by argentiferous galena, sphalerite, and chalcopyrite. From assay returns on 15 trench samples, the writer has computed a probable ore section measuring an average 4 feet in width by 360 feet in length. The average grade through 5 trenches is Au, 0.092 oz/ton; Ag, 19.88 oz/ton; Pb, 6.3%; Zn, 1.2%. The computed gross and net smelter values of this mineralization are, respectively, \$53.92 and \$40.00 per ton, and the ore potential 130 tons per vertical-foot. Trenching to date has only fractionally exposed a part of the 100-foot wide shear-fracture system and the presently-delimited 1400-foot length.

Other Au-Ag-Cu, etc. mineralization within the Zobnic showings, Vancouver, Simpson Gulch areas is indicated by preliminary geochemical investigations; however, these zones are either unexplored or only very superficially explored by current excavations.

## RECOMMENDATIONS

### (A) GENERAL EXPLORATION

1. Perform semi-detailed corollary geochemical surveys over presently-indicated Cu-Zn-heavy metal anomalies. The routine laboratory testing of these to be preceded by preliminary determination of possible Hg, As, Ag, etc. content prior to specifying particular analyses; Kraft bags; -100° Fahr.; -80 mesh
2. Reinstigate reconnaissance geochemical investigation, with particular emphasis on silt, and soil-sampling of wet and dry drainage courses; laboratory treatment of samples as per A-1; the proposed coverage is shown on Dwg. 3.
3. Record geological data accruing from A-1, A-2.
4. Supplementary rock-chip sampling and analyses.

### (B) DETAILED EXPLORATION

1. Test Snowshoe vein surface mineralization at depth. Core-drilling, based on suggested pattern Dwg. No. 1; Wire-line specified; BX or BQ series;
2. Explore Seymour Cu-Ag zone by (a) magnetometer survey; (b) extended detail geochemical exploration; (c) cross-trenching; (d) diamond-drilling.
3. General provision for bedrock trench exploration of Simpson Gulch group geochemical anomalies, Zebnic zone northwesterly extension, and unspecified targets tentatively resulting from the proposed 1967 program of general exploration.

ESTIMATED COSTS

A-1	Wages-sampling and sample prep. Laboratory analyses, 400 @ \$3.50	800. 1,400.	\$ 2,200.
A-2	Wages-sampling and sample prep. Laboratory analyses; (1,000 @ \$3.50)	1,600. <u>3,500.</u>	\$ 5,100.
A3-4	Tentative provision		\$ 1,000.
B-1	5 holes @ 200' ea., 1000 l.f. 8 holes @ 250' ea., 2000 l.f. Sub-total = 3000 l.f. @ 12.00 Provision, camp and helicopter service Engineering, sampling & miscell. -	36,000. 5,500. <u>2,500.</u>	\$44,000.
B-2	(a)-4 days; wages and equip. rental (b)-1 week; wages and lab. charges (c) Preliminary allowance (d) Preliminary test, 1000 l.f. @ \$10. Miscellaneous supplies -	150. 600. 1,000. 10,000. <u>250.</u>	\$12,000.
B-3	General Provision		\$ 5,000.
	General Provision, omissions and contingencies -		<u>\$ 7,500.</u>
	<u>Total -</u>		<u>\$76,800.</u>

Respectfully submitted,

*W.M. Sharp*  
W.M. Sharp, P. Eng.

*W.M.S.*

## INTRODUCTION

The writer's preliminary examination of the property was made during June 11-12, 1966. This consisted of a review of preliminary field work accomplished under the direction of Mr. W. D. Yorke-Hardy - Company principal, and geological mapping by the writer of the then-accessible exposures within the "Seymour" and "Zabnic" sections of the property. Other showings at higher elevations were still blanketed by snow during this late-spring period.

A second field examination was made during September 5-6, 1966. This visit was principally directed towards the detailed mapping and sampling of the Midnight (Snowshoe) trenches - the cleaning out of old prospect trenches, and the excavation of additional rock-cuts having been recently completed by the Anco Exploration crew. Mr. R. Anderson assisted the writer on this examination. In addition, data resulting from concurrent exploration of other showings and prospect areas within the general group was reviewed with Messrs. Yorke-Hardy and Anderson.

During his November 3-4, 1966 visit the writer reviewed recent and current exploration progress via data provided by Anco field staff. This included the preliminary interpretation of an Induced Polarization survey over the Seymour Cu-Ag prospect zone. A scheduled magnetometer survey over the indicated I.P. anomalous area was precluded by unsettled, to stormy earth-field conditions - a usual circumstance during winter months at this latitude. Also, as winter weather prevented further productive field work from late November onwards, the winter period was utilized for field laboratory check-analyses of the large number of soil samples accumulated during the preceding field season.

This report is, to a considerable extent, based on various technical data compiled by Anco Explorations Ltd., and made available to the writer by permission of Molybdenum Explorations' principals. For this the writer states his formal acknowledgements and personal appreciation.

## PROPERTY

Buval Mines Ltd. 176-claim property consists of three contiguous, principal claim groups. These, shown on Fig. 2 of the text, are as follows:



L 7171 - CANADIAN CITIZEN  
L 7238 - AMERICAN CITIZEN

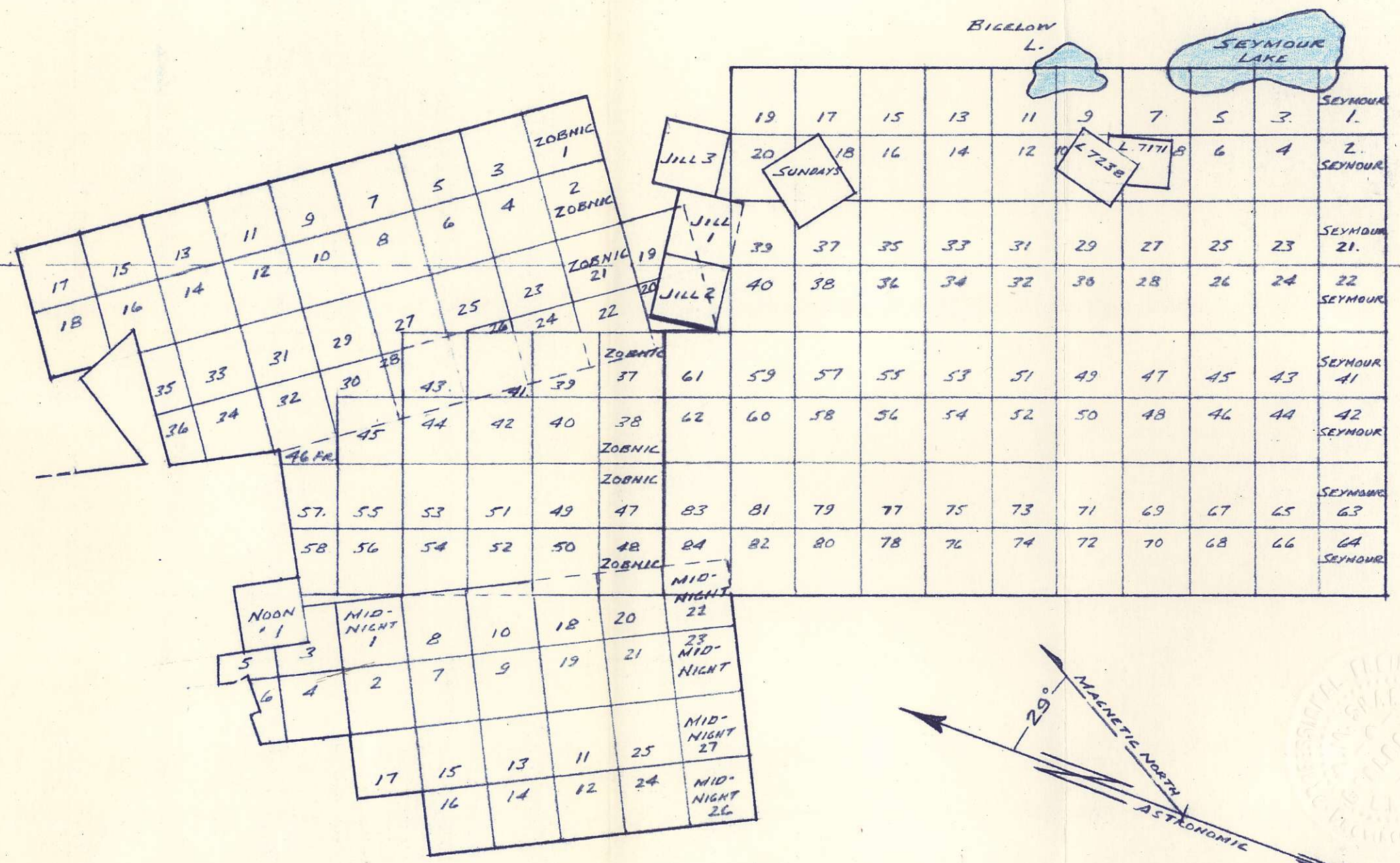


FIG. 2.

CLAIM MAP

BUVAL MINES LTD. (N.P.L.)  
 HUDSON BAY MTN., SMITHERS, B.C.  
 OMINECA MINING DIVISION  
 SCALE: 1" = 3000' FEB., 1967  
 REF. "BUVAL MINES LTD. N.P.L. CLAIM MAP."  
 SCALE 1" = 1500', ANCO EXPLORATION  
 W.M.S.

**Seymour Group:** comprised of Seymour #1-#84 located claims, the contained Crown-granted Canadian Citizen (L.7171) and American Citizen (L.7238) claims, the Sundays located claim, and the northerly-contiguous Jill #1, #2, #3 locations.

**Zobnic Group,** consisting of two overlapping blocks of located claims; (a) Zobnic #1-#36, and (b) Zobnic #37-#45, #46 Fr., #47-58.

**Midnight Group,** consisting of the Midnight #1-#27 block of located claims plus Noon #1.

Schedule A, appended, compiled from the Company's files, and containing formal descriptions of all claims comprising the Smithers, B.C. property, will supplement the above general description.

The Registered office of the company is Suite 201 - 535 Thurlow Street, Vancouver, B.C.

Possible open ground between the Buval north boundary and the south boundary of Climax Molybdenum's property should be secured by staking or via short term option arrangements.

#### LOCATION AND ACCESS

The Company's Smithers, B.C. property is situated closely west-southwest of that town, along the generally-lower northeasterly-facing slopes of Hudson Bay Mountain. In addition, northerly claims of the Buval group, in part, locally adjoin the irregular south boundary of Climax Molybdenum's Glacier Gulch property.

With a N.W. length of some 5 1/2 miles, and an E-W width of about 3 miles, the company's property covers a projected horizontal area of roughly 16 square miles over the rugged easterly slope of Hudson Bay Mtn.

As elevations range between 1700 feet at the east boundary to 5500 ft. at the N.W. corner of the Buval claim group, the relief is in the order of 3800 feet.



Access to the south and central parts of the property is provided by the old SII-Van (Duthie) mine road, and branch roads and trails. Northerly sections of the property are seasonably-accessible by steep, rough jeep-roads and trails following the general Simpson Creek drainage course.

General access to the Smithers area is provided by trans-Provincial Highway 16, connecting Prince George and Prince Rupert, and also by C.N. Railway connecting with ocean transportation at the latter point. In addition, C.P. Airlines provide daily (Mon.-Fri.) service between Prince George and Smithers.

### HISTORY

High-grade silver-lead ore was first discovered on Hudson Bay Mtn. about 1905. Several more discoveries were made within the next few years, with small-scale mining operations resulting from the successful development of a number of these - the general products being high-grade (gold), silver-lead-zinc shipping ore, or medium, to high-grade arsenical gold ore. The Duthie mine, the principal gold-silver-lead-zinc local operation, produced in excess of \$1,000,000. gross value of direct-shipping ore and concentrates (mill at 50 t.p.d.) during its preliminary 1922-30 production period. Substantially greater production resulted from intensive development, and the installation of a 150 t.p.d. concentrator during the early 1950's. Also, during this general period several shipments of high-grade arsenical-gold, and silver-lead-zinc ore were made from the Glacier Gulch operation - from what is now the general geological setting of Climax Molybdenum (B.C.) Ltd.'s potential major molybdenum prospect.

The Climax molybdenite deposit was staked by Mr. W. D. Yorke-Hardy and associates during 1956-57. The presence of molybdenite within the mineralized granitic and volcanic float closely below the glacier at the head of Glacier Gulch had been known for many years prior to 1956. However, Mr. Yorke-Hardy was the first to be sufficiently impressed by the possibly-large ore potential to assume the task of organizing and performing the difficult project of staking an adequate number of claims over this extremely rough, to precipitous area.

Since its initial acquisition of the prospect in December, 1957 the Climax organization has extensively surface diamond-drilled the deposit, and is now engaged in driving a low-level tunnel to test the zone at depths below the reach of the preliminary drilling. Work to date has indicated the probable existence of an extensive,

deeply-penetrating body of low, to medium-grade mineable molybdenite ore.

The greater part of the Buval claims area has been explored in only a rather superficial manner, and this was largely accomplished in earlier years when mining economics and objectives were largely restricted to the development of the typical high-grade, modest-tonnage underground operations. Exploration for these in recent years, in spite of the fact that some could result in profitable mining ventures, has been curtailed due to the current preference by investors and developers for the exploitation of the more predictable large tonnage, but low unit cost-profit mining situations.

The relatively minor amount of exploration so far accomplished within the group has been on small, to medium-sized high-to intermediate grade mineral occurrences. The Snowshoe Ag-Pb-Zn vein within the Midnight group is one of these. The showings were staked in 1928 and exploration, to about 1937, resulted only in the excavation of about a dozen shallow prospect trenches and two short adits.

Similar localized exploratory work has been done on the Zobic, Smithers Copper, Vancouver, and Seymour (Canadian Citizen) Vein or mineralized fracture zones. However, with respect to the latter, Gunnex Ltd. quite thoroughly sampled it in 1962. In 1963 Noranda optioned the property and carried out a limited program of geophysical and geochemical prospecting - the latter phase employing the less sophisticated procedures of only a few years ago.

Commencing from a relatively few key claims acquired earlier, Mr. Yorke-Hardy and associates staked most of the claims comprising the present group during 1966.

### GENERAL GEOLOGY

The writer's principal reference for this section is G.S.C. Memoir 223 by E.D. Kindle, and published in 1954. Mr. R.E. Anderson, P.Eng., who personally directed much of the 1966 preliminary exploration program, helpfully supplemented this with personal observations concerning Hudson Bay Mtn. geology and mineralization. The principal authority on the general geology of the whole Hudson Bay Mtn. area is R.V. Kirkham, geologist, who has spent several field seasons on this project for the Dept. of Mines. His report, if and when published, should add significantly to the current rather meagre store of non-confidential information concerning the local economic geology.

### (A) Lithology

The Smithers area is generally underlain by the predominantly volcanic rocks of the Hazelton group, ranging in age from Early Middle Jurassic to Early Cretaceous.

The Hudson Bay Mtn. section is comprised of a thick, fairly conformable assemblage of essentially-andesitic tuffs, agglomerates, and flows, containing two distinct marine and continental sequences - these having a stratigraphic separation of about 4000 feet.

The upper, and principal sedimentary division, deposited in a continental basin, is comprised of variably-metamorphosed argillite, sandstone, conglomerate, greywacke, tuff, and inter-gradational varieties of the foregoing.

Surface exposures of intrusive rock are rather sparse; these appear to be typically-associated with small stocks of a general granodioritic composition. Three such bodies occur within the principal mineralized area of Hudson Bay Mtn., while a number of minor bodies have been observed in the peripheral areas. The distribution and frequency of these suggests the possible existence of a generally continuous intrusive core within the general section of volcanics and sediments forming the outer mass of the mountain. This possibility is somewhat strengthened by the occasional appearance of zones of silicified and/or hornfelsized volcanic rocks and, with this, an apparent tendency towards mineral zoning with respect to an inferred central granitic core within the heart of the mountain. Mr. Yorke-Hardy has noted that a significantly large body of granodiorite, under the upper Glacier Gulch area, has been intersected by deep core-drilling; this tends to substantiate the above inference.

R.V. Kirkham (M.M. Rept. 1965) notes that the better (Climax) molybdenite mineralization occurs at 1100'-1600' depths (at 4000'-4500') within a large sheet-like body of granodiorite. Previous reports note that the overlying surface mineralization, exposed in the Glacier Gulch canyon, occurred within a system of steeply-dipping, N.W.-trending feldspar porphyry dykes and joint fractures cutting hornfelsized volcanics.

### (B) Structure

The regional structural trend of both primary and secondary structures appears to be northwesterly. These, however, locally give to more east-westerly fracture-bedding trends - suggesting periodic occurrences of cross-warping and/or fracturing. These

are conspicuous within the Buval claim group in the Seymour and Zobnic areas.

The upper part of Hudson Bay Mtn. is notable for the co-occurrence of both N.W., and N.E.-trending fracture systems, and also for the presence of a major westerly-overthrust fault. Early reports also note the presence of frequent (swarm?) N.W.-trending "porphyry" dykes. This general complex lithologic-structural setting was probably a principal factor in the localization of the extensive  $MoS_2$  stockworks and replacements within the Glacier Gulch locality, and also for the occurrence of the satellite vein-type mineralization within the bordering areas. The more important of the latter class of mineral (Au-Ag-Pb-Zn) deposits appear to be related to N.E.-trending systems of fractures, apparently springing from the large Silvern Creek fault.

By reason of their moderately close proximity to the upper Glacier Gulch structural focus and apparent center of mineralization, their position with respect to possible southeasterly extensions of the granodiorite host rock, structures, and mineralization, the northeasterly claims of the Buval property constitute a favourable area for exploration.

### (C) Mineralization

Within the Hudson Bay Mtn. locality, this is principally of the fracture-filling type. Gold-silver-lead-zinc mineralization typically occurs within single veins, vein-lodes, or shear-zones. The economically more-important molybdenite deposits are associated with stockwork-type quartz veinlets and/or "dry" joint-fracture systems and stockworks.

The wider mineralized shear-and-fracture structures appear to be localized along the easterly margin of the composite mineral zone. Argentiferous-chalcopyrite, bornite and, locally, tetrahedrite comprise the typical ore minerals within this latter class of deposits.

In general, a zonal arrangement of minerals, with respect to a possible granitic core within the mountain, is apparent. This is postulated on the peripheral distribution of relatively low-temperature, silver-rich sulphide mineralization with respect to an inferred deep source in the Glacier Gulch locality, and from the higher-temperature arsenopyrite-pyrrhotite-molybdenite, etc. assemblage closer to this source.



The usual form of wall-rock alteration observed consists of bleaching and silicification of the typically dark andesitic wallrocks. Textures appear uniformly fine-grained. Reportedly, alteration of the host rocks of the Climax molybdenite zone is rather slight; hence, the geological factor of wallrock alteration would be of limited use only in the search for concealed mineral occurrences of this class.

### PRINCIPAL SHOWINGS & EXPLORATION

#### (A) Seymour Lake - Dahl Creek

Report Drawings No's. 2 and 3, and Fig. 3 supplement the following descriptions.

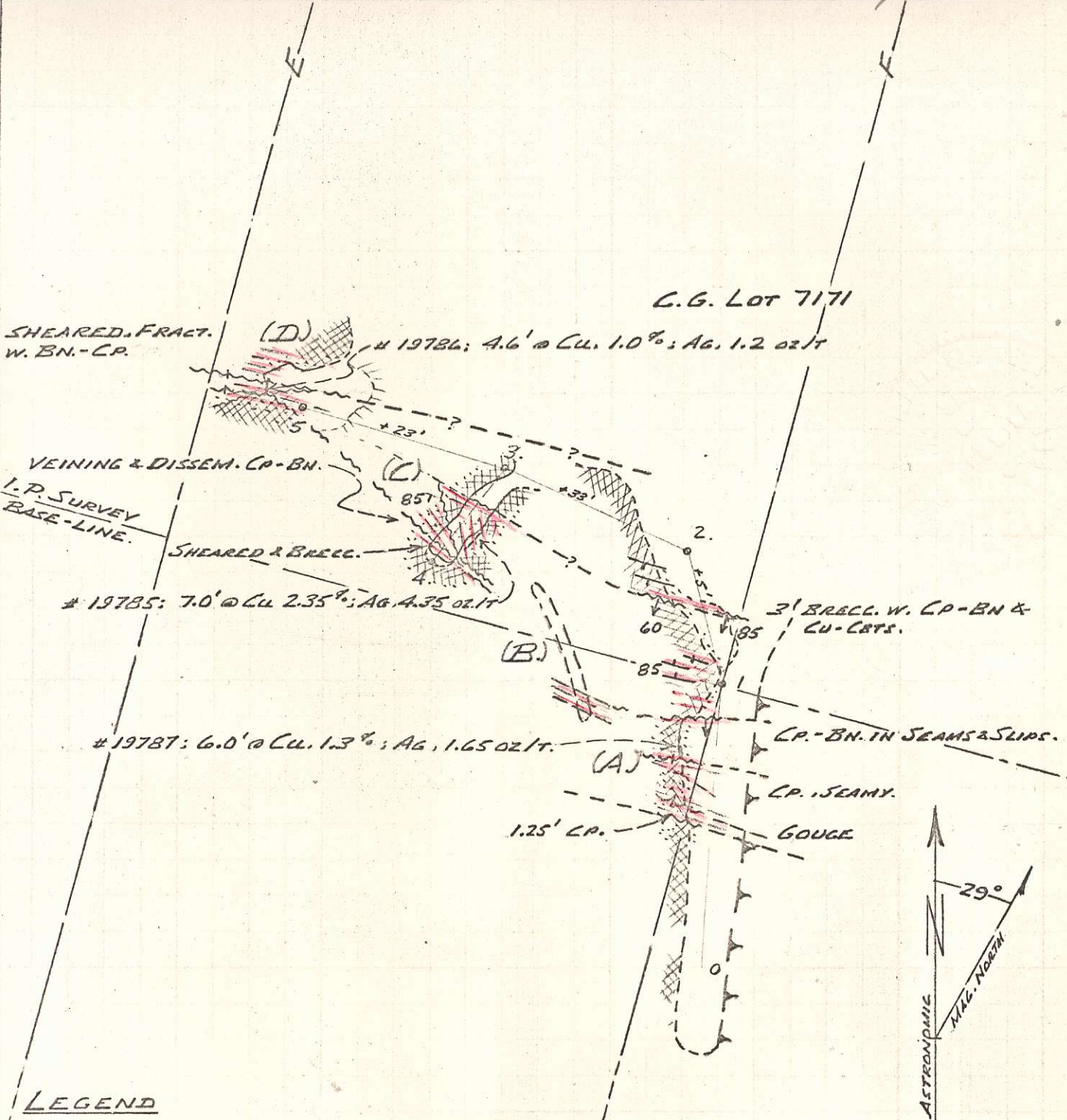
The Seymour Cu-Ag showings occur on C.G. Lot 7171. A westerly branch road from the old Sil-Van mine road passes closely below the trenches.

Three rock cuts, cleaned out and freshened during the early summer of 1966, expose a plus-200 foot strike length of mineralization trending northwesterly up the steeply-sloping hillside. The trenches also expose a W.N.W. zone of multiple fracturing and shearing within the local section of Hazelton group andesitic tuffs, agglomerates, flows, etc.





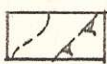
Rather strongly-weathered argentiferous bornite-chalcocopyrite occurs as discontinuous, braiding veins, lenses, seams, and disseminations over a plus-50 foot width of composite shearing and fracturing.

In detail, the cross-sectional exposures contain four distinct, steeply-dipping shear strands, with intervening sections of variably-fractured, altered, and mineralized rock. Wall rock alteration is mild; some silicification and colour-bleaching occurs along larger fractures. The secondary copper minerals- malachite and azurite - are frequently more prominent than the fresh sulphides.

Three samples (Fig. 3), taken by the writer as local checks on results of sampling by Gunnex Ltd. in 1962, returned the following assays:



LEGEND

-  HAZELTON VOLCANICS:  
RED & BROWN ANDESITIC TUFFS, ETC.
-  SHEAR-FRACTURES;  
MINOR SLIPS & SEAMS.
-  MINERALIZATION:  
CHALCOPYRITE (CP); BORNITE (BN)  
(WITH ASSOCIATED AG; CU-CBTS.)
-  ALTERATION:  
SILICIFICATION-BLEACHING
-  OUTLINE OF ROCK EXPOSURE;  
BROW-LINE OF SLOPE.

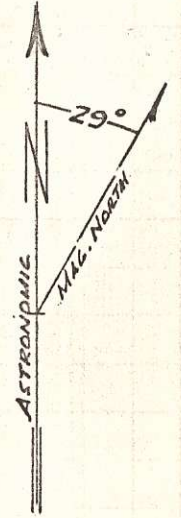


FIG. 3 - PLAN

GEOLOGY, MINERALIZATION, ASSAYS  
 SEYMOUR CU-AG SHOWINGS  
 BUVAL MINES LTD. N.P.L., SMITHERS.  
 OMINECA MINING DIVISION, B.C.  
 SCALE: 1" = 50'      FEB., 1967

W.M. SHARP, P. ENG.

SCANNED BY CLEVELAND, OHIO

<u>Description</u>	<u>Length</u>	<u>Ag, oz/ton</u>	<u>Cu, %</u>
(a) Lower Trench (A)	3.0'	1.2	0.98
	5.0'	0.1	0.30
	8.0'	0.1	0.19
	5.0'	1.5	0.72
	<u>(4.5'</u>	<u>0.2</u>	<u>0.11)</u>
<u>Weighted average,</u>	<u>21.0'</u> @	<u>0.59 oz/ton</u>	<u>0.45%</u>
A subsequent check sample by Mr. Yorke-Hardy showed:	16.0' @	1.8 oz/ton	0.65%
(b) Second Trench (B)	8.0'	0.30	0.42
(c) Third Trench (C)	5.0'	1.2	0.95
	4.6'	0.8	1.05
	<u>6.0'</u>	<u>1.4</u>	<u>0.59</u>
<u>Weighted average,</u>	<u>15.6'</u> @	<u>1.16 oz/ton</u>	<u>0.84%</u>
(d) Top Trench (D)	4.3' @	1.0	0.64
	<u>5.6'</u>	<u>1.5</u>	<u>1.33</u>
<u>Weighted average</u>	<u>9.9'</u> @	<u>1.28 oz/ton</u>	<u>1.03%</u>
The weighted average of the Gunnex samples over trenches A, B, C & D is computed at:	13.6' @	0.84 oz/ton	0.67%
The weighted average of the writer's sampling of the apparently better-mineralized sections is:	5.9' @	2.6 oz/ton	1.64%
<u>For a gross Ag-Cu value of \$17.72 per ton.</u>			



The above grades are believed to be fairly conservative, in view of the highly weathered-leached condition of all mineralization sampled, and the slightly higher values obtained via the writer's check-sampling - the latter excluding the effect of supplementary widths of mineralized material in extending his results to the Gunnex 13.6' width.

The I.P. survey, conducted by Huntco Ltd. during October 26-November 2, 1966 on a grid covering the above showings (Dwg. No. 2), indicated a weakly-anomalous "zone of interest". This, coinciding with the projected trend of the mapped showings, has an indicated length of +1000 feet and a variable width ranging from 130 feet to 330 feet.

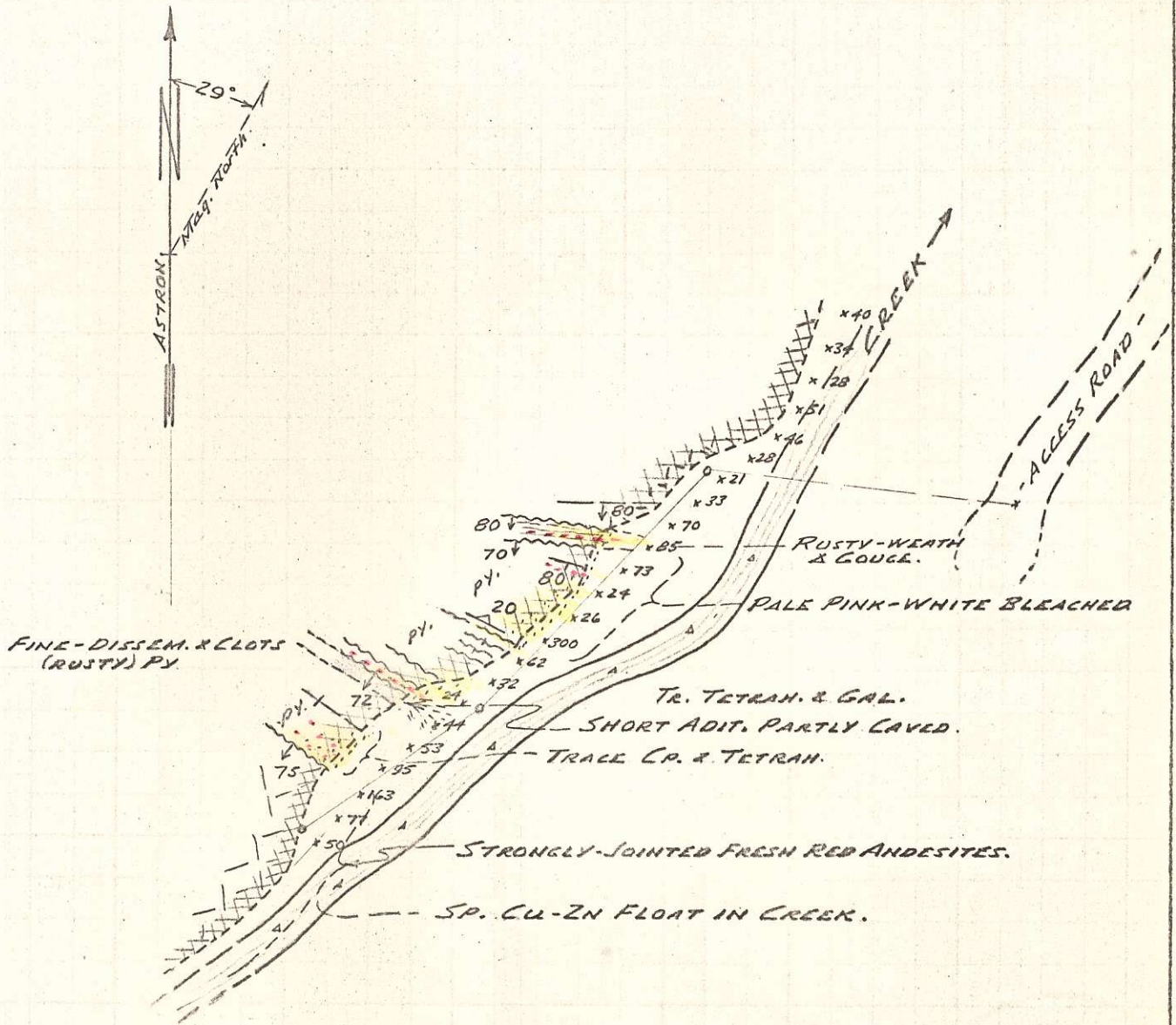
It was intended to further investigate this anomaly through a magnetometer survey of the same grid area. However, the erratic earth-field conditions prevailing during the end of the field season resulted in a cancellation of this check until conditions improved.

The geochemical survey, by the rubenic-copper method, did not provide significant anomalies corresponding to mineralization occurring within the Seymour showings. A fairly marked anomalous area, however, was disclosed closely west to Dahl Creek (Dwg. 3). Scattered occurrences of chalcopyrite-bornite mineralization in this general locality have been reported; hence the area warrants further investigation.






#### (B) Zebnic Showings

The general location of these is shown on Dwg. No. 3. Fig. 4 is a detailed plan showing geology, mineralization, and soil-sampling. The creek-side wall-rock exposures and short adit are directly accessible by road.

Rock-slashing, dozer, and hand-trenching accomplished during 1966 have exposed a wide (100' approx.) zone of shearing and fracturing on a W.N.W. trend, and steep southerly dips. The purplish-red andesitic volcanic country rocks have been hydrothermally-bleached and silicified, resulting in mixed, or intermittent sections of white to pale-pink, hard-cherty, and soft clay-mica-carbonate-altered rocks. Minor chloritic-altered sections, within stronger shears, were also noted.



**LEGEND**

-  HAZELTON VOLCANICS  
LOC. RED ANDESITES  
(FLOWS & TUFFS)
-  ALTERATION:  
BLEACHING (KAOLIN) & SILICIFICATION.
-  JOINTS & SEAMS.  
SHEAR-FRACTURE (ZONES).
-  MINERALIZATION: MAINLY  
DISSEMIN. PY, TETRAH., BN(P), CP,  
& ASSOC. CU-CBTS.
-  SOIL SAMPLES:  
TOTAL CU, PARTS PER MILLION (P.P.M.)

**FIG. 4 - PLAN**  
**GEOLOGY & SOIL SAMPLING**  
**ZOBNIC SHOWINGS; CREEK EXPOSURES**  
**BUVAL MINES LTD. (N.P.L.) SMITHERS, B.C.**  
 SCALE: 1" = 50'      FEB., 1967  
 W.M. SHARP, P. ENG.

Mineralization consists of predominant very finely-disseminated pyrite, with sparsely-disseminated minute grains of dark mineral- presumably bornite and/or grey copper. Small amounts of grey copper and galena occur within some fractures. In general, the nature and identity of the metallic minerals is uncertain, due to post-mineral weathering and leaching.

A few fragments of good Cu-Zn float were seen within recently excavated rock in, and along the banks of the creek. These obviously originated from similarly mineralized zones up-stream.

Subsequent bulldozer excavations in the heavy overburden up-slope, and to the west of the creek showings do not appear to have exposed significant amounts of mineralization.

Although locally weak, the Ag content of the mineralization is impressive; a sample taken by a former B.C. Dept. of Mines Engineer assayed 104 oz/ton silver - associated with only 1.5% copper. On the basis of this favourable Ag/Cu ratio this, and like zones have considerable potential for the occurrence of ore-grade material.

The very limited amount of soil-sampling accomplished indicated a significant degree of copper mineralization in the vicinity of the showings; however, the soil-sampling carried out over the restricted grid did not indicate any significant concentrations of total copper to the south of the creek.

#### (C) Simpson Gulch Grid

This area, shown on Dwg. No. 3, lies about 1/2 mile southeast of the Midnight grid and Snowshoe Au-Ag-Pb-Zn showings.

Exploration during 1966 consisted of a fairly detailed geochemical survey of a grid located south of Simpson Creek, and designed to intercept possible southerly extensions of the Cascade Group showings.



As no significant exposures of bedrock mineralization appear to have been encountered during the recent geochemical traverse of the Simpson Gulch grid, some features of the neighbouring Cascade showings are noted below. The description is provided by G.S.C. Memoir 223:

"The main showing is a shear zone 18 to 20 feet wide in andesitic volcanic rocks of the Hazelton group. The zone contains numerous bands of vein quartz sparingly mineralized with pyrite, arsenopyrite, and sphalerite. A crosscut 350 feet long is driven towards this zone 93 feet vertically below the surface showings. A vein----above the main showings contains galena, pyrite, and sphalerite. An 18 inch sample across this vein assayed: gold, 0.26 oz/ton; silver 1.5 oz/ton; and lead, 25 per cent."

Two extensive geochemical anomalies derive from plots of the rubeanic tests for copper on the soil-samples taken during 1966. In spite of the fact that the probable southerly projections of the Cascade mineralization would be expected to yield significant "heavy-metals" geochemical indications, all samples run for this group of metals returned less positive results than the rubeanic coppers.

The two copper anomalies cover extensive areas and appear to register significant contents of "soluble" copper over the heavily-overburdened surface; hence follow-up exploration is warranted.

#### (D) Vancouver Grid

The detailed soil-sampling program yielded only one relatively small rubeanic-copper anomaly. The results of parallel heavy-metals determinations were uniformly weak. However, the possibility of other forms of mineralization occurring locally has not been completely eliminated by the foregoing copper-heavy metals geochemical procedures.

#### (E) Midnight Group

##### 1. General

This occupies the highest part of the Buval property, with elevations ranging

from approximately 4000 ft. to 5500 ft., and is situated within an area of steep hill slopes and strong bluffs. Topographically, it lies on a broad spur of the mountain where the drainage is to the northeast at lower elevations, and southerly within the uppermost areas. At this general altitude the snowfall is heavy - normally permitting surface exploration between mid-June and mid-November.

During 1966 weather and the general limitations of the larger program permitted only relatively-localized geochemical survey coverage - this being restricted to the area of the Snowshoe trenches. Exploration was mainly directed towards detailed physical exploration of the Snowshoe vein system, and involved the cleaning out of several old sluffed trenches, and the excavation of a number of new cuts across various parts of the zone. This was accompanied and followed by detailed geological mapping and sampling of trench exposures - compiled on Dwg. 1.

## 2. Geology & Mineralization

The Snowshoe lode consists of a general zone of shearing and open fracturing on a general strike of North 30-35 degrees west, with dips of individual fractures, ranging from 30 to 85 degrees southwesterly. The zone has been explored by frequent surface cuts and two adits for a length of 1400 feet; however, these workings only partly expose the full width of the structure at all cross-sections.

Mineralization, accompanying quartz veining, consists of galena, sphalerite, chalcopyrite, pyrite and arsenopyrite. Gold, silver, lead, zinc, (and cadmium?) comprise the marketable metallic content.

The andesitic wall rocks have been strongly bleached, generally silicified, and variably-impregnated with finely dispersed pyrite. Individual sulphide veins vary in width from a few inches to a foot or more; between these, the altered rock is somewhat fractured and additionally mineralized. Sampling was done to include this marginal mineralization for a determination of metal content across practicable mining widths.

Because of the composite nature of the zone, there is a potential for the occurrence of considerably greater widths of mineable ore than is exposed to date - particularly where cross, or acute-fracturing between parallel strike shears is abundantly developed.

### 3. Sampling

The writer's sampling covered all exposures of mineralization contained in the expanded system of trenches, and included several lightly, or doubtfully-mineralized subordinate fractures and/or fracture zones. As lode strands are dispersed over cross-sectional widths in excess of 100 feet, within the northerly trenches at least, it is obvious that further trench exploration would be impractical. Consequently, further exploration and sampling of both the currently delimited central mineralized section, and of possible northwesterly and southeasterly extensions, will be most effectively accomplished by diamond drilling.

The writer's sampling is detailed on Dwg. 1.

### 4. Mineral Estimates

The following are assays on samples representing true widths - local copper assays not included;

<u>Place</u>	<u>Width, ft.</u>	<u>Au, oz/t.</u>	<u>Ag, oz/t.</u>	<u>Pb, %</u>	<u>Zn, %</u>
3N Trench	4.0	0.035	21.35	10.7	tr.
2N Trench	5.0	0.10	3.70	0.95	tr.
1N Trench	4.0	0.06	2.50	0.60	tr.
1S Trench	3.0	0.24	95.75	17.47	7.75
2S Trench	4.0	0.06	24.10	5.85	0.27

The sampled length, average width, and indicated weighted-average assay of the above lode section is;

360' x 4.0' @ Au, 0.092 oz/ton; Ag, 19.88 oz/ton; Pb, 6.3%; Zn, 1.2%

The above ore shoot would also have a depth potential of 130 tons per vertical foot on the basis of 11 cu. ft. per ton of average mineralized material. The computed gross value of the above is \$53.92 per ton; the computed net-smelter value is approx. \$40.00 per ton.

With gross mining costs estimated at \$25. to \$30. per ton, there is a potential indicated profit of \$10. to \$15. per ton on the medium-grade of ore presently indicated.

Hence, an appropriation for diamond drilling, both to confirm the above indicated grades of material and to search for additional higher-grade ore appears quite justifiable.

*W. M. Sharp*  

---

W.M. Sharp, P. Eng.

*W.M.S.*

## Report References

### (A) General

1. G.S.C. Memoir 223, Mineral Resources, Hazelton and Smithers Areas, by E.D. Kindle, 1954.
2. G.S.C. Map 971A, Smithers - Fort St. James; scale 1 inch = 8 miles.

### (B) Detailed

1. Annual Report, Minister of Mines B.C., 1925, A137
2. Annual Report, Minister of Mines B.C., 1929, C137
3. Annual Report, Minister of Mines B.C., 1937, C 19
4. Annual Reports, Minister of Mines B.C., 1958-1965
5. R.E. Anderson, P.Eng., manager Anco Explorations Ltd. re: maps, general data, etc. pertaining to property and detailed exploration, 1966 season.
6. W.M. Sharp, P.Eng., Preliminary Report re Buval Mines Ltd. Property, Hudson Bay Mt., Smithers Area, B.C., June 23, 1966.


\*\*\*

## CERTIFICATE

I, William M. Sharp, with business address in Vancouver, and residential address in North Vancouver, British Columbia, do hereby certify that:

1. I am a consulting geological engineer.
2. I am a graduate of the University of British Columbia with B.A.Sc., (1945), and M.A.Sc., (1950) degrees in Geological Engineering.
3. I am a registered Professional Engineer in the Province of British Columbia.
4. I have practiced my profession since 1946, in both geological and managerial capacities with Canadian mining companies until 1964, when I established my own consulting practice.
5. I have personally investigated the principal mineral occurrences, geological features, and all available Government reports pertaining to the Buval Mines Ltd. Smithers, B.C. claim group and individual prospects. In addition, I have discussed and incorporated data compiled by the Company and Anco Exploration Ltd. principals.
6. I have no interest, direct or indirect, in the properties or securities of the above company, nor do I expect to acquire any such interest.

Respectfully submitted,

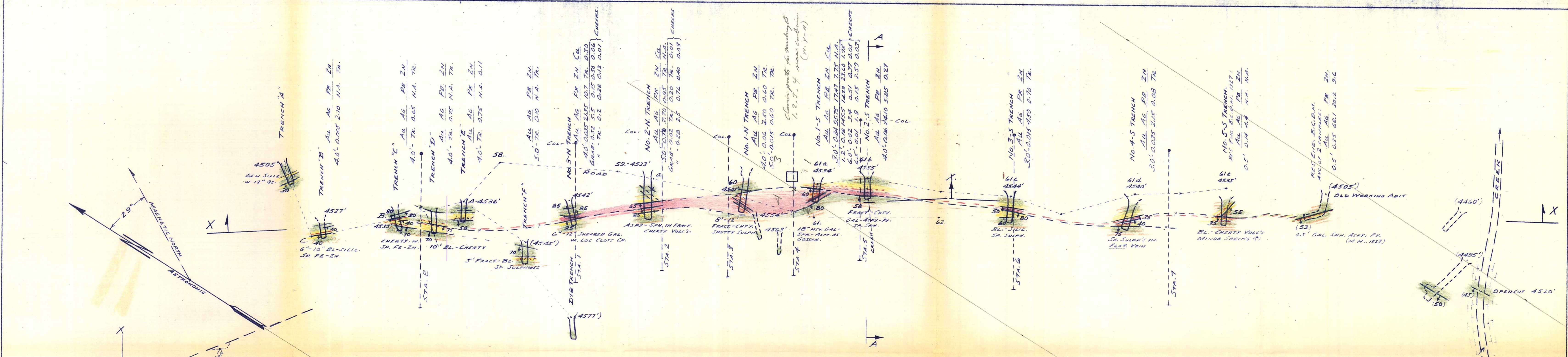
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W.M. Sharp, P.Eng.

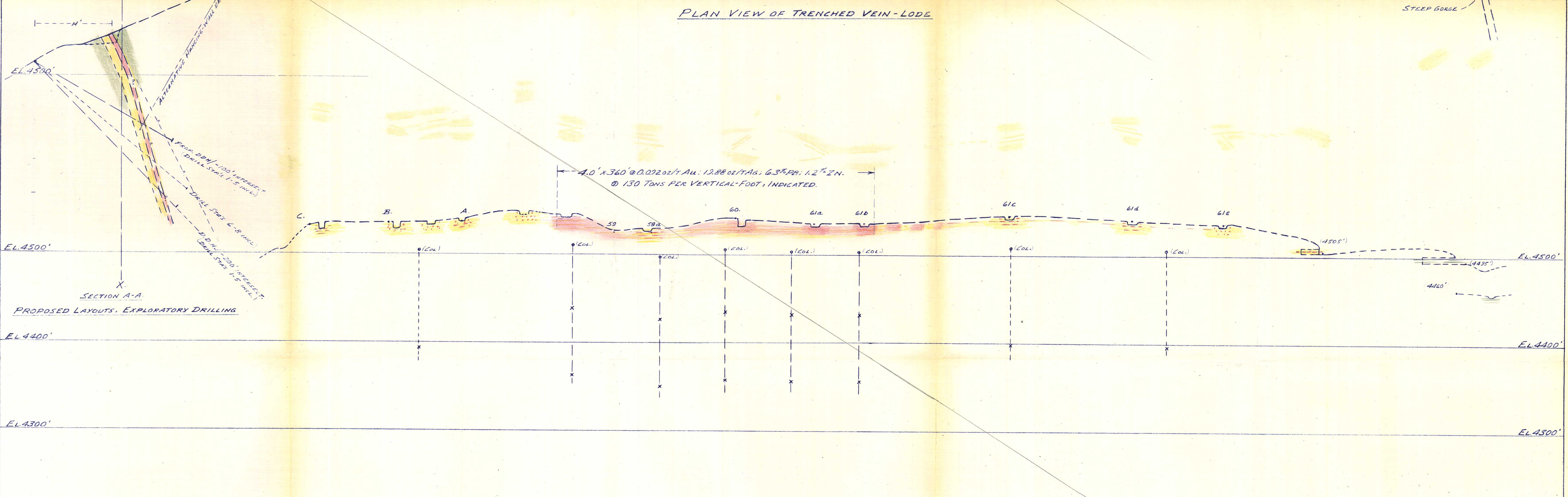
Vancouver, B.C.  
February 1967

*W.M.S.*





PLAN VIEW OF TRENCHED VEIN-LODE



LONGITUDINAL VERTICAL PROJECTION X-X

NOTE:  
WALL-ROCK ALTH. BY BLEACH (KALIN)-  
SILIC. W. DISPERSED AT 4 loc. MIN. CARBON.

**W. M. SHARP, P.Eng.** CONSULTING GEOLOGICAL ENGINEER  
808-900 W. HASTINGS ST., VANCOUVER 1, B.C.

**BUVAL MINES LTD. (N.P.L.)**

PROPERTY:  
MIDNIGHT CLAIM GROUP, HUDSON BAY MOUNTAIN,  
QUINECA MINING DIVISION

TITLE:  
GEOLOGY, SAMPLING & PROPOSED DIAMOND DRILLING,  
ON TRENCHED SECTION, SNOWSHOE VEIN

LEGEND:  
 ANDESITIC TUFFS, ETC.  
 QUARTZ, CHERTY ALTH.  
 MASSIVE, DISPERSED  
 GALENITE, ETC.  
 ATTITUDE OF APPARENT  
 BLENDING  
 SHEAR FAULT - SANDS, SILIC.  
 PROPOSED DRILL HOLE  
 SURVEY DETAIL  
 REF. ANCO EXPLOR. 1-50

SCALE: 1 INCH = 50 FT. DATE: FEB. 1957 DWN BY: W.M.S. DWG/FIG. No. 1



AMERICAN CITIZEN  
L. 7238

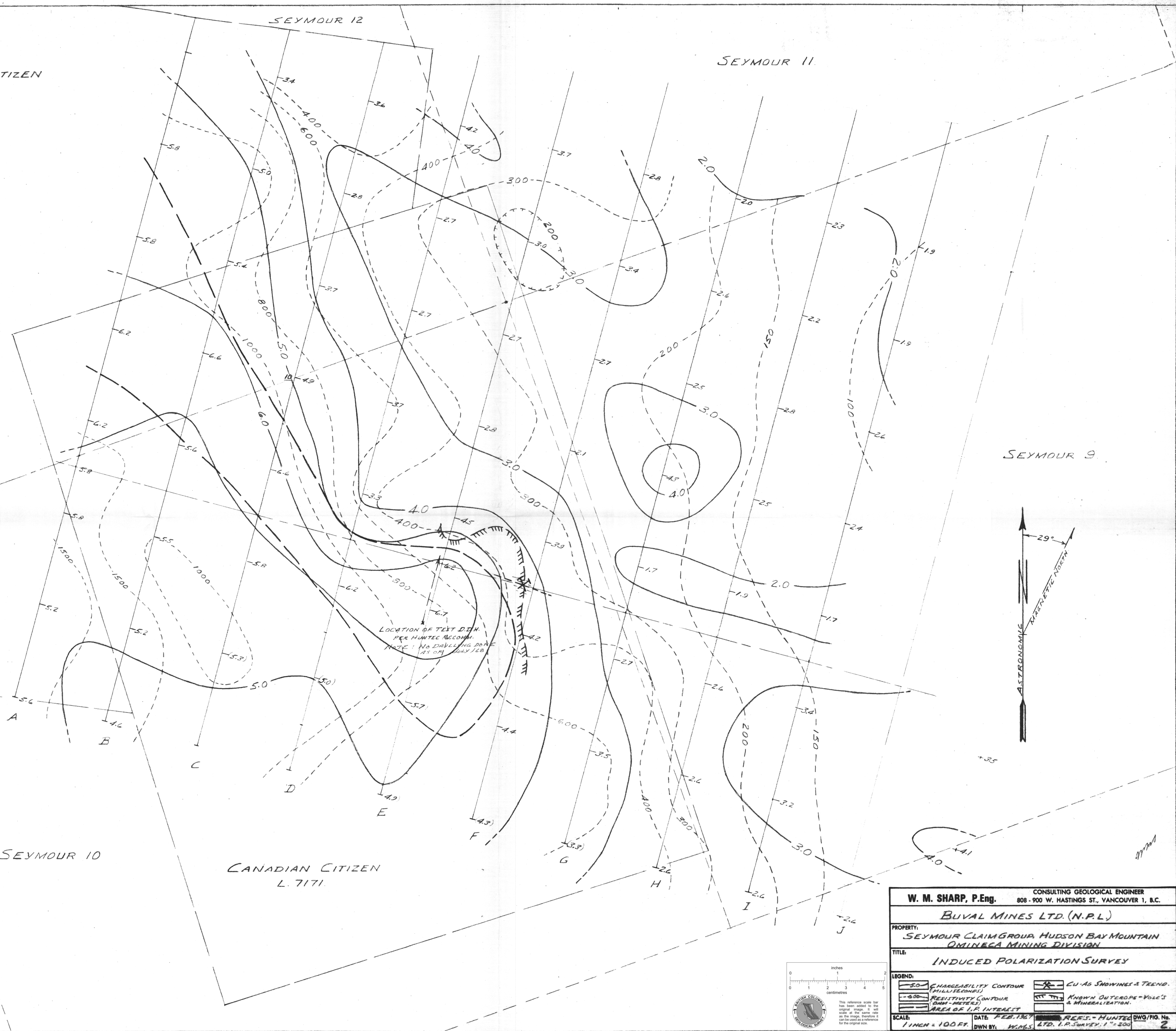
SEYMOUR 12

SEYMOUR 11

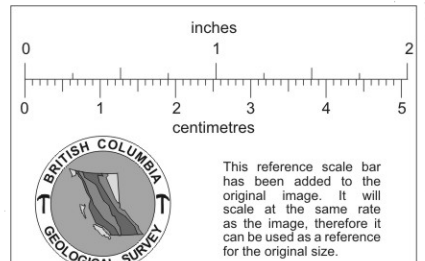
SEYMOUR 9

SEYMOUR 10

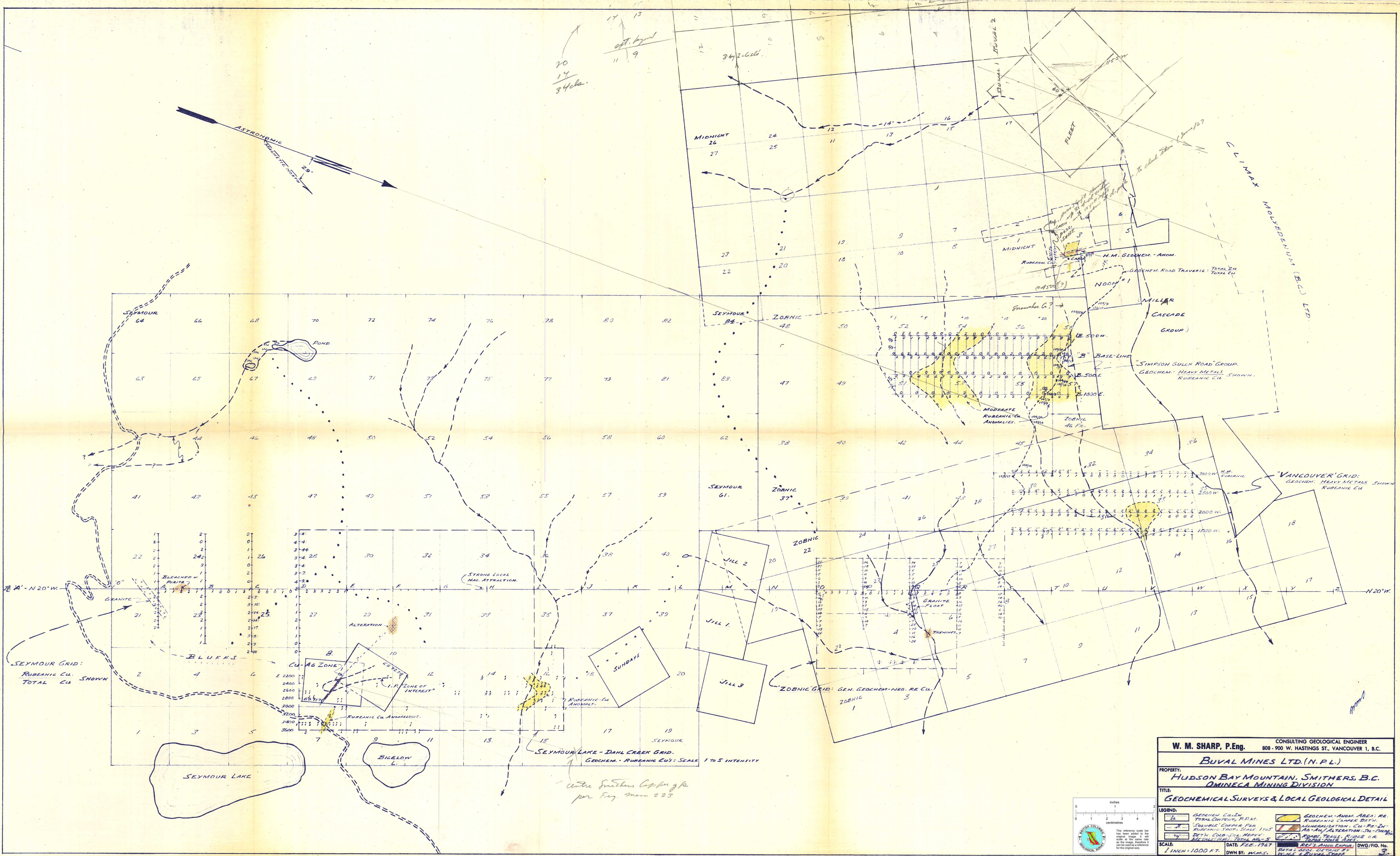
CANADIAN CITIZEN  
L. 7171



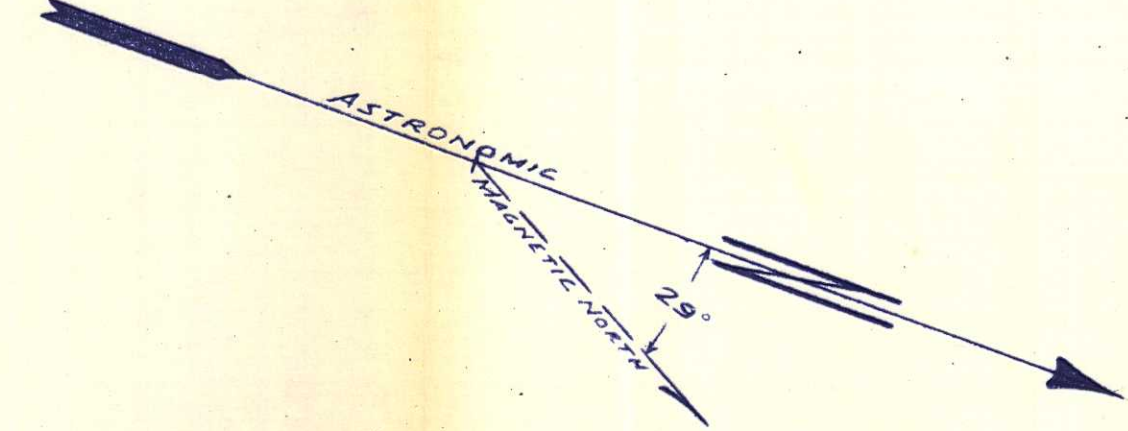
<b>W. M. SHARP, P.Eng.</b> CONSULTING GEOLOGICAL ENGINEER 808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.	
<b>BUVAL MINES LTD. (N.P.L.)</b>	
PROPERTY: <b>SEYMOUR CLAIM GROUP, HUDSON BAY MOUNTAIN          OMEGA MINING DIVISION</b>	
TITLE: <b>INDUCED POLARIZATION SURVEY</b>	
<b>LEGEND:</b> - 5.0 CHARGEABILITY CONTOUR (MILLISECONDS) - 600 RESISTIVITY CONTOUR (OHM-METERS) - AREA OF I.P. INTEREST	- CU-AG SHOWINGS & TRENDS - KNOWN OUTCROPS - VOLCS & MINERALIZATION
SCALE: 1 INCH = 100 FT. DWN BY: W.M.S.	DATE: FEB. 1967 RES. - HUNTEC LTD. I.P. SURVEY. 1" = 200'







20  
14  
34 kts.  
opt. beyond



17 13  
11 9

MIDNIGHT  
26  
27

STANDARD TIME

C. L. MAX. INDUSTRY (B.C.) LTD.

MIDNIGHT  
RUBENIC CU

H.M. GEORHEN - ANOM.

GEORHEN ROAD TRAVERSE: TOTAL ZN  
TOTAL CU

NOON

MILLAR

CASCADE  
GROUP

"SIMPSON GULCH ROAD" GROUP.  
GEORHEN: HEAVY METALS SHOWN.  
RUBENIC CU

"VANCOUVER" GRID:  
GEORHEN: HEAVY METALS SHOWN  
RUBENIC CU

STRONG LOCAL  
MAG. ATTRACTION

JILL 2

ZOBNIC  
37

JILL 1

ZOBNIC  
22

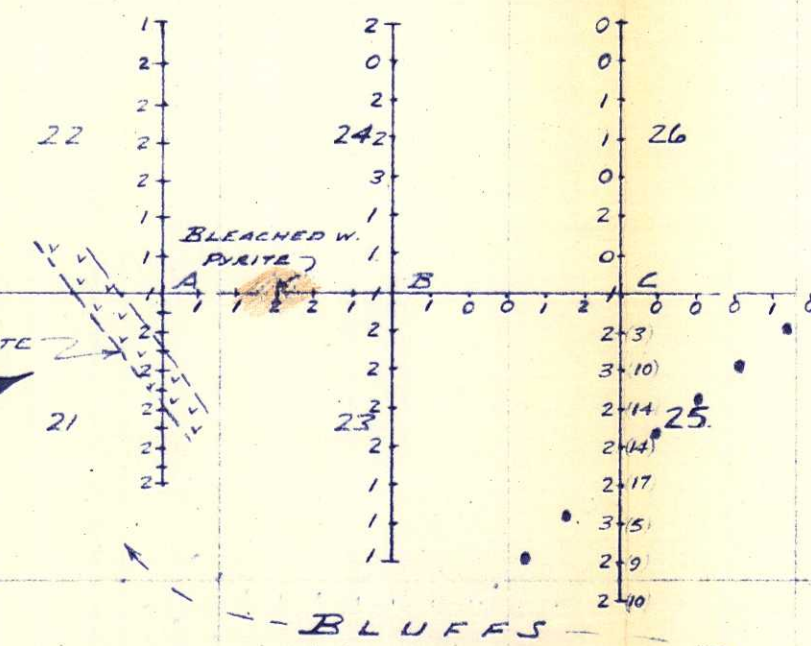
JILL 3

ZOBNIC  
1

SUNDAYS

ZOBNIC GRID: GEN. GEORHEN - NEG. RE. CU.

SEYMOUR GRID:  
RUBENIC CU.  
TOTAL CU SHOWN



BLUFFS

ALTERATION

CU-Ag ZONE

COVEX

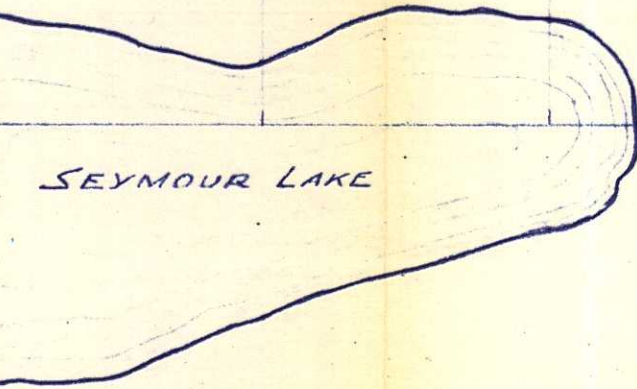
"I.P. ZONE OF INTEREST"

RUBENIC CU ANOMALY

RUBENIC CU ANOMALY

SEYMOUR LAKE - DAHL CREEK GRID.  
GEORHEN - RUBENIC CUS: SCALE 1 TO 5 INTENSITY

Center Sections Copper g.p.  
per Eng. mem 223



**W. M. SHARP, P.Eng.** CONSULTING GEOLOGICAL ENGINEER  
808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.

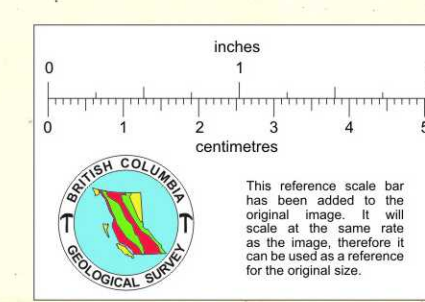
**BUVAL MINES LTD. (N.P.L.)**

PROPERTY: HUDSON BAY MOUNTAIN, SMITHERS, B.C.  
OMINECA MINING DIVISION

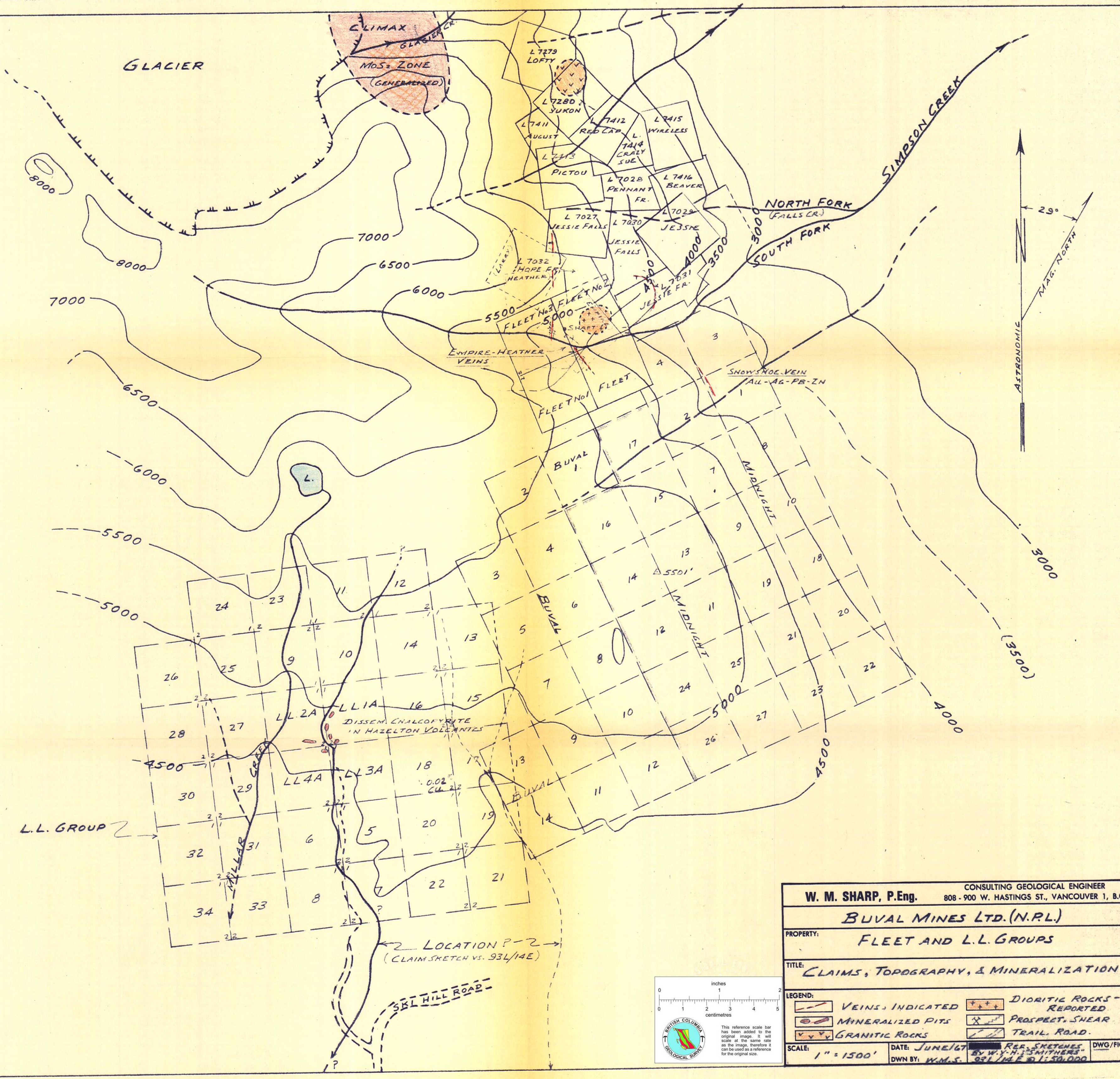
TITLE: **GEOCHEMICAL SURVEYS & LOCAL GEOLOGICAL DETAIL**

LEGEND:  
 [Symbol] GEORHEN CU IN TOTAL CONTENT, P.P.M.  
 [Symbol] GEORHEN COPPER PER RUBENIC CU, SCALE 1 TO 5  
 [Symbol] DET. COP. - SOL. MEASUREMENTS  
 [Symbol] RUBENIC CU ANOMALY  
 [Symbol] GEORHEN - ANOM. AREA, RE. RUBENIC COPPER DET.  
 [Symbol] ALTERATION, CU-Pb-Zn NO. 545  
 [Symbol] ROAD, TRAIL, RIDGE OR RAILROAD ROUTE  
 [Symbol] DATA: GEO. DETAILS BY W.M.S. & BUVAL STAFF

SCALE: 1 INCH = 1000 FT. DATE: FEB. 1967 DWN BY: W.M.S. DWG/FIG. No. 3



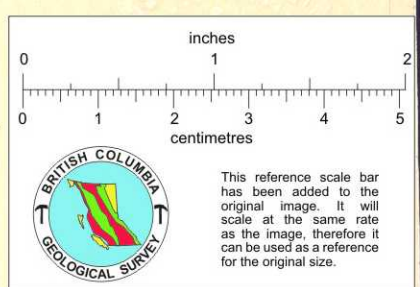




L.L. GROUP

LOCATION P-2  
(CLAIM SKETCH VS. 93L/14E)

SBL HILL ROAD



<b>W. M. SHARP, P.Eng.</b> CONSULTING GEOLOGICAL ENGINEER 808 - 900 W. HASTINGS ST., VANCOUVER 1, B.C.	
<b>BUVAL MINES LTD. (N.P.L.)</b>	
PROPERTY: <b>FLEET AND L.L. GROUPS</b>	
TITLE: <b>CLAIMS, TOPOGRAPHY, &amp; MINERALIZATION</b>	
<b>LEGEND:</b> VEINS INDICATED MINERALIZED PITS GRANITIC ROCKS	DIORITIC ROCKS - REPORTED PROSPECT SHEAR TRAIL ROAD
SCALE: 1" = 1500'	DATE: JUNE/67 DWN BY: W.M.S.
REE SKETCHES BY W.Y.H. SMITHERS 93L/14E D.L. 50,000	
DWG/FIG. No. 4	