Geological Report

SILMONAC MINES LIMITED (N.P.L.)
Exploration Project

Sandon, British Columbia

April, 1966

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

April 20, 1966

President and Directors
Silmonac Mines Limited (N.P.L.)
808, 602 West Hastings Street
Vancouver 2, B. C.

Attention: Mr. A. C. Ritchie, P.Eng.

Gentlemen:

This report originates from the writer's personal field examination of surface and underground features of your Sandon, B.C. exploration project, from his personal study and discussions with the resident staff and associates of company maps and records, and from his subsequent review of the geological literature pertaining to the general geology of the Slocan camp and detailed geology of the Sandon-Silmonac mine area.

The contained recommendations, and related cost estimates, provide for a comprehensive program of general surface exploration to precede and coordinate with further underground exploration. Earlier reports, by both the writer and resident staff, have featured recommendations that were mainly directed towards extensions of the immediate 5-level exploration program. The revised objectives result from additional study and reevaluation of the available geological data.

Respectfully submitted,

W. M. Sharp, P.Eng.

WMS/hb
encl.

GEOLOGICAL REPORT

on

SILMONAC MINES LIMITED EXPLORATION PROJECT

at

SANDON, BRITISH COLUMBIA

by

W. M. Sharp, P.Eng.

April, 1966

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INTRODUCTION

The geological examination of the Silmonac 5-level exploration project was accomplished by the writer during a six-day visit during June, 1964, following the initial authorization provided by Company principals. This examination consisted of a personal inspection of principal geological features exposed by the 5-level work, of surface and underground exposures along the course of the lode over the Hope ridge and within old prospect tunnels, and of a study of geological records of this project and related developments on file at the Sandon office.

The writer repeats his particular thanks and acknowledgements to Messrs. J.C. Black and S.J. Pedley, P. Eng., project manager and geologist respectively, at the time of the writer's visit, for their kind cooperation and provision of the basic detailed information essential for the preparation of this report.

In addition to the writer's personal geological data, accruing from some seven years' geological and operating experience in the Sandon area, particular reference is made to the following:

G.S.C. Memoirs 173 and 184; C.E. Cairnes

Bull.29, B.C. Dept. of Mines, M.S. Hedley

Annual Reports to the Minister of Mines of B.C. for the years 1962, 1963 and 1964

SUMMARY

The Silmonac property extends from ½ to 3½ miles southwest of Sandon, B.C., and contains more than two miles of centrally-located ground on the trend of the 6-mile long main Slocan lode. This structure extending from the lower Silverton Creek area, and E - NE through the high Silver Ridge divide and the company's property, to the Richmond - Eureka ridge east of Sandon, includes most of the early and current major producing mines of the camp - the Standard, Mammoth, Hope, Silversmith, Slocan Star, and Richmond Eureka, and the related Ruth and Stewart workings. The current gross value of the principal constituent metals - silver, lead and zinc, from ores mined until 1960 is in excess of $72,000,000.

The main lode has been only superficially explored within the boundaries of the Silmonac property. The principal reason for this is that heavy overburden and/or severe topography provided major obstacles during the period of intensive prospecting within the district, and which occurred prior to the advent of modern exploratory methods and equipment.

The application of modern concepts of Slocan structural geology, derived from intensive geological studies of surface exposures, old underground workings and more recent developments will permit the selection of optimum intervals and horizons of the main lode for detailed exploration. The basic modern structural concept is that the rich orebodies of the district were deposited within zones of intersection of E - NE - trending shears within the axial zones and intervening panel of two major recumbent folds. This specific situation is strongly indicated on Silmonac ground within the westerly slopes of Hope ridge and farther to the west between the two forks of Tributary Creek. Major bedding sections having the optimum composition and physical properties for the development of solution channels and depositional sites are known to occur within the above specific lode intervals.

The recent underground exploration by Silmonac on the westerly extension of the 'Hope' section of the main lode was planned to search for possible depth extensions of the Hope lode and orebodies within the axial regions of the controlling Payne recumbent fold - inferred to occur at the Ruth-5 horizon within this part of the general geologic cross-section. Upon completion of the westerly drive to its present position, with attendant cross-cutting, raising, and diamond drilling, it was generally concluded that exploration had been conducted within a structurally-unfavourable region below the optimum horizon of the fold. At this unfavourable generally sub-axial horizon the characteristically well-defined Hope lode is complexly-dispersed through a multitude of flat bedding shears, with the result that individual strands of the lode could not be followed with certainty, or for more than a very limited distance.

Some success was attained during the drive, in that discontinuous segments of one appreciably-mineralized strand of the lode were traced over more than 600 feet of strike length and locally, by raising and drilling, for more than 100 feet up-dip. Although no appreciable body of commercial mineralization was located, the characteristically high-silver content of the mineralization occurring locally provided an encouraging and rather positive indication of the grade of ore that might be expected within mineable deposits within more

favourable structural situations indicated at other intervals along the main lode within Silmonac ground.

At least one-half of the plus 2-mile extent of the lode within the Company's property constitutes potential ore structure, but considerable preliminary surface exploration is required to delimit specific intervals for more intensive underground exploration. The writer believes that several sections of the property have marked ore potential. The writer also suggests that if a proportional amount of the total exploratory effort is directed towards general preliminary exploration within the new program, as was expended on relatively-localized underground exploration within the former program, the chances of locating new ore zones will be reasonably good.

RECOMMENDATIONS

It is generally recommended that a comprehensive program of surface prospecting and related sub-surface exploration within the general Hope - Jenny lode interval be completed prior to embarking upon a major underground exploration project; also that 5-level exploration be curtailed or decelerated until a more specific choice of objectives is possible.

(A) General Exploration

1. Provide access roads for general exploration of the Hope-Jenny interval of the main lode and specific sections of the footwall lodes in the Dorothy-Minniehaha sections.

2. Prospect the main lode westward of the Hope mine by bulldozer trenching and stripping.

3. Crosscut geologically-favourable sections of the main lode at, or below the general horizon of the "Queen Bess" axial plane and underlying 'west-dip' panel.

4. Further explore indicated sections (per item 3) by limited drifting and crosscutting.

5. Extend sub-surface exploration (per item 4) by cross-sectional diamond-drilling.

(B) Extended Exploration - 5-level Project

1. (a) Advance drive on present course for 500 ft. for test of inferred projection of main lode zone by cross-sectional diamond drilling; continue drive on the indicated course for an additional 800 - 1000 feet, with drill stations at 200-foot intervals.

   (b) Cross-sectional drill exploration per item 1(a).

2. Investigate bedding section, and possible lode structures, above 5-level by diamond-drilling from the "North-lateral" on 5-level.

3. (a) Crosscut NNW from 5-level within the interval of the presently-delimited mineralized section of the lode, followed by a +42° raise to base of 'west-dip' bedding panel. Prepare drill-stations within raise.

   (b) Explore lode by cross-sectional drilling from stations per 3(a).

800' total of this completed by June/67 then 500' to go on this recommn.

ESTIMATED COSTS

(A)	It.(1)	Primary & secondary access roads, estimate 5 miles @ $4,000/mi.	$20,000	
	It.(2)	D7 ripper-'dozer; estimate main lode; 25 days @ $200	5,000	
		Footwall lode 5 days @ $200	1,000	
				$26,000
	It.(3)	Estimate 500 l.f. @ $50/l.f.	$25,000	
	It.(4)	Estimate 500 l.f. @ $50/l.f.	25,000	
	It.(5)	Estimate 4000 l.f. 'AX wireline' core drill @ $6.50/l.f.	26,000	
				76,000
		Carried forward		$102,000

ESTIMATED COSTS (cont'd)

			Brought forward	$102,000
(B)	It.(1a)	Estim. 1400 l.f. @ $50/l.f.	$70,000	
	It.(1b)	" 1500 l.f. @ $6/l.f.	9,000	
	It. (2)	" 1500 l.f. @ $6/l.f.	9,000	
	It.(3a)	" 400 l.f. of crosscut and raise @ $50/l.f.	20,000	
	It.(3b)	" 1800 l.f. @ $6/l.f.	10,800	118,800
General provision for engineering and sampling charges				4,200
Provision for administration and contingencies				25,000
			Total	$250,000

Respectfully submitted,

W. M. Sharp

W. M. Sharp, P.Eng.

April, 1966

WMS/hb

PROPERTIES

Mining property held by Silmonac Mines Limited consists of 62 Crown-granted claims situated as shown on Fig. 1. In addition this plan gives the location of former and current major producing mines situated on the continuation of the main lode beyond the boundaries of the Silmonac property.

A detailed schedule of claims comprising the Silmonac group is given in the July, 1964 report, and which also provides a description of general property, buildings, development equipment and facilities.

LOCATION and ACCESSIBILITY

Figs. 1 and 3, respectively, show the general and local situation of the property and underground workings.

Ruth No. 5 Portal — the entry for the current 5-level west drive and plant site are readily accessible via 2 miles of well-graded road from the Sandon end of the New Denver — Sandon public road.

Access to the higher areas, for surface exploration of the Hope-Jenny and Dorothy-Minniehaha lodes, can be provided by the construction of a few miles of new road around lower Hope ridge and up the east fork of Tributary Creek. Supplementary jeep roads and tractor trails would depart from the upper sections of the main access route.

HISTORY

The original Ruth-Hope claim group, within and adjoining the N.E. corner of the present Silmonac block (Fig. 1) was staked in 1892. Other claims comprising the present Silmonac consolidated group were staked at this time, or shortly after.

The development of the Hope lode commenced in 1906 and shipments made nearly every year until 1919 — the bulk of the silver-rich lead ore mined being of direct shipping grade. The initially-marginal sphaleritic fractions of the orebodies were left underground, or stored in dumps for subsequent recovery of the zinc content — pending the development of adequate mill facilities for the production of an acceptable grade of zinc concentrate. During the earlier years of production every effort was made to reject the unprofitable zincy fractions.

The combined Ruth-Hope production exceeded 54,000 tons for an estimated present gross value of over $4,000,000. The recorded 26,000 tons shipped from the Hope mine alone would have a present gross value of $2,089,100 at today's metal prices (Fig. 2) — with no allowance for rejected zinc. On this basis, the average mine grade was $80.35 gross per ton, with much of it exceeding $100.00 per ton.

Mining activity was characteristically sporadic during the early history of the camp, due to rapid and extensive fluctuations of metal prices. However, within recent years lead and zinc prices have maintained stability at an attractive level, while that of silver has approximately doubled to the present level of close to $1.40 per ounce, Canadian funds. Also indicated current and future industrial requirements suggest a fair degree of price stability within the foreseeable future. This prospect alone provides a strong incentive for a large-scale resumption of mining activity in the general Slocan district.

Concurrent intensive geological investigations within the area have been carried out by mining exploration groups and government departments within recent years, thus providing a whole new concept of the nature of ore controls within the camp. With this, a number of exploration ventures have been launched — some based on valid geologic concepts, and others as rather unpredictable gambles, with the first-named types of ventures achieving more success or providing sufficient new geological information to justify the expense of further localized exploration. Both the Silmonac 5-level, and the earlier Carnation 5480-level programs fall into this latter category, in that final geological assessments indicate they were respectively below and above their optimum geologic horizons, or somewhat short of penetrating favourable combinations of lode structure and optimum assemblages of host rocks.

The main Slocan lode has produced, on the basis of the recorded production from the seven major mines along its 6-mile length, close to 1.3 million tons of relatively high-grade Ag-Pb-Zn ore. The estimated current values of this is approximately 72.65 million dollars, in Canadian funds. Also on the basis of a total recorded production of 1.8 million tons for this general section of the camp, the main Slocan lode has produced 72% of the total tonnage mined. The indicated ore potential of the Silmonac property is therefore considerable, if judged only on the basis that it contains roughly 1/3 of the total productive length of the lode, and that this increment has been only rather superficially explored.

Past experience has shown that the usual methods of evaluation, relating only large orebodies with large profits are not indicative of the actual potential of Slocan-type orebodies, as it is evident that only 20,000 tons of $50.00 per

ton ore has a gross value of $1,000,000, and that Slocan ore of this grade (Fig. 2) is of rather average value in the productive history of the camp.

GENERAL GEOLOGY

The Sandon area is centrally situated within a severely-deformed corridor of Triassic argillites, quartzites, limestones, and mixed or gradational assemblages of these rocks. The highly-folded assemblage adjoins the north contact of, and is sporadically intruded by the regional Nelson granitic batholith. The minor stock- and sill-like intrusions are of a general quartz-dioritic composition and porphyritic texture.

Within and beyond the mineralized area, the Slocan sediments have been uniquely deformed as a major complex, overturned fold. Outward of the batholithic contact the axial trend of this structure is N.N.W. Axial planes of the component major folds — in descending order, the "Silver Ridge", "Queen Bess", and "Payne Overturns" — are approximately horizontal.

The above fold complex has been transversely-sliced by a system of E - N.E.-trending, southerly-dipping multiple shear zones. These latter structures are the principal hosts to mineralization. In detail, ore deposits are localized to the axial regions of principal recumbent folds, and in particular where bedding assemblages are favourable for the development of lode-breccias, or are such as to produce favourable deflections of the lode. Abrupt deflections most generally occur at intersections of lode shears and conjugate bedding faults, and where the lode traverses lithal units of markedly differing strength or competence.

Mineralization consists of open space — filling galena and sphalerite, associated with quartz-calcite-siderite gangues.

DETAILED GEOLOGY (Fig. 3)

The "Queen Bess" and "Payne" elements of the Slocan fold occur within the Silmonac property, but are locally complex, in that bedding-dip reversals occur through a zone of closely-plicated folds.

A wide variety of contrasting rock types occur across the section. The general lithologic section, from East to West is comprised of successive 'panels' of relatively competent, thick limey to quartzitic rocks and incompetent, thinly-bedded limey to argillaceous types.

The main (Hope) lode appears as a relatively simple shear zone in more competent beds or as a wide system of sub-parallel, braiding shears in softer formations or flatly-overturned beds. While the lode appeared as a recognizable and unified structure where observed within the Hope workings, the "Mascot" and "Jenny" shears are thought to be individual strands of a locally wider, braided shear zone.

The Silmonac 5-level drive is now thought to be geologically situated within a zone of flaty-creased, sheared and broken beds - characteristic of the 'underside' of the Payne fold. Also the lode is characteristically flattened and dispersed within this confused structural setting. The principal exploratory objective is to investigate the lode within the optimum panel between recumbent folds, and within more favourable bedding assemblages. The quality of mineralization within individual strands of the dispersed lode at the No. 3 horizon provides the necessary incentive for the recommended program of exploration.

Respectfully submitted,

W.M. Sharp, P.Eng.

C E R T I F I C A T E

I, William M. Sharp, with business address in Vancouver, British Columbia 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 and construction companies until 1964, when I established by own consulting practice.

5. I have personally inspected the Silmonac Mines Limited property at Sandon, B.C., and examined all company reports, drawings, and correspondence pertaining to the property, and interviewed the resident staff. I have also examined available government reports and bulletins pertaining to the property.

6. I have no interest, direct or indirect, in the properties or securities of the above Company, nor do I expect to have any such interest.

7. The Silmonac claim group is composed entirely of surveyed Crown-granted claims; hence the ground extent of the property is as depicted on the accompanying Fig. 2, "Property Map".

Vancouver, B.C.
~~April 20, 1966~~
November, 1967

Respectfully submitted,

W M Sharp

W.M. Sharp, P.Eng.

NEW DENVER

SLOCAN LAKE

ASTRON. MAG. N.

23° 35'

SLOCAN L.

SANDON

KOOTENAY L.

NELSON

INDEX MAP

CARPENTER CREEK

TRIBUTARY CR.

SANDON

SILMONAC

HOPE

WHITE CR.

RICHMOND EUREKA

SILVERSMITH

NEW ROTH

SLOCAN STAR

SANDON CR.

W. FORK

SLOCAN LODE

JENNY

MASCOT

JENNY LIND

SILMONAC MINES LIMITED

GENERALIZED TREND OF MAIN

MAMMOTH

STANDARD ETC.

EMILY EDITH ETC.

AVISON CR.

WAKEFIELD

ADAMS

SILVERTON CREEK

FIG. 1.

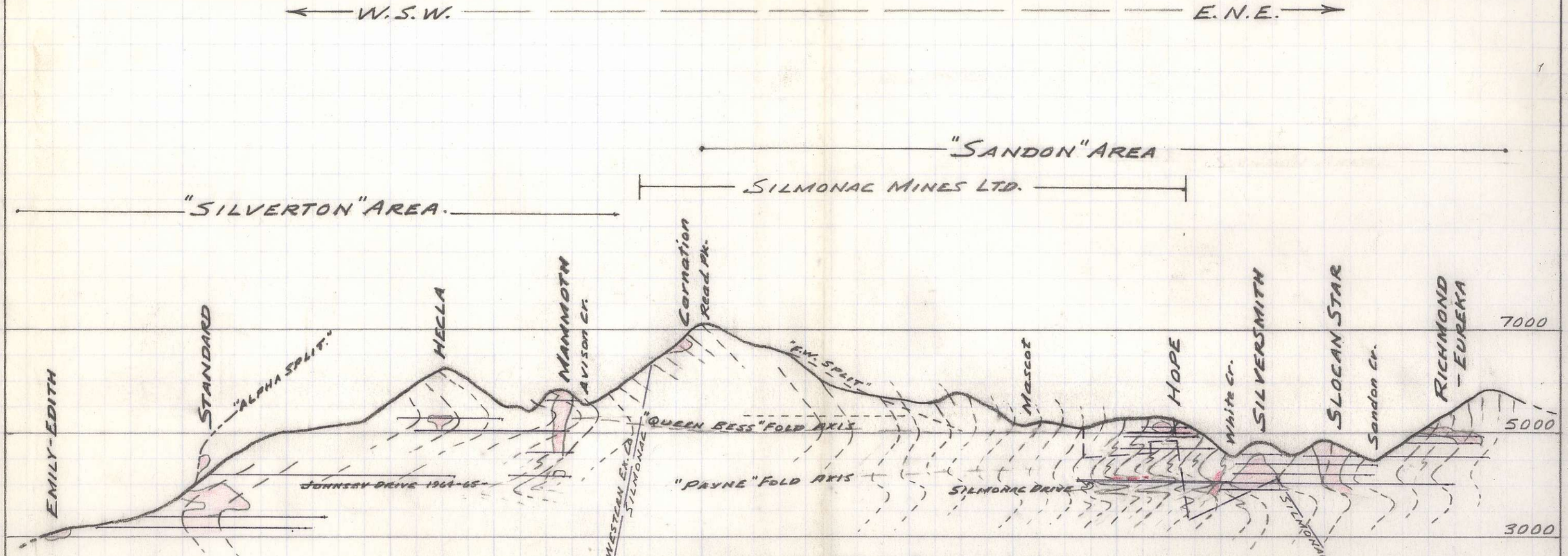
PROPERTY MAP

SILMONAC MINES LIMITED
NEW DENVER, B.C.

SCALE: 1 INCH = ½ MILE; DWN. JAN., 1966

REF.-"MINERAL REFERENCE MAP, PORTION OF SLOCAN DISTRICT," REV. BY S.J.P., NOV. 1958.

W.M.S.



779,182 TONS | 1,600 TONS | 83,349 TONS | 26,000 TONS | 221,000 TONS | 145,194 TONS | 42,535 TONS

MINE	TONS ORE PRODUCTION	AVERAGE GRADE OF ORE			GROSS VALUE IN $ CAN. @ 1966 METAL PRICES.*	
		SILVER. OZ	LEAD %	ZINC %	PER TON	TOTAL PRODUCTION
STANDARD GROUP	779,182	11.0	5.4	6.7	51.51	40,139,560
HECLA	1,600	35.0	9.0	5.0	91.22	145,952
MAMMOTH	83,349	12.0	4.0	5.2	44.22	3,685,692
HOPE (EXCL. RUTH)	26,000	29.0	11.0	(2.0)	80.35	2,089,100
SILVERSMITH	221,000	17.0	6.6	3.8	55.19	12,196,990
SLOCAN STAR	145,194	23.7	14.5	2.0	83.81	12,168,709
RICHMOND - EUREKA	42,535	19.1	6.2	2.2	52.24	2,222,028
TOTALS	1,298,860 TONS					$72,647,981

* JAN. 11. 1966:
SILVER: $1.395 PER TROY-OZ.
LEAD: $0.155 PER LB.
ZINC: $0.145 PER LB.
— CADMIUM & GOLD CONTENTS NOT INCLUDED.

FIG. 2

LONGITUDINAL VERTICAL PROJECTION of the

MAIN SLOCAN LODE with

GENERALIZED STRUCTURE & FORMER MINES

SCALE: 1"=2000'; DRAWN JANUARY, 1966

REFS.: MAIN LODE: LONG. PROJ. S.J.P. 1960
BULL. 29, B.C.D.M.; M.S.H. 1952

10,000E
11,000E
12,000E
13,000E
14,000E
15,000E
7000 N
6000 N
5000 N
4000 N
4500
5000
5500
6000
6300
Dorothy.
Minniehaha
HOPE
Mascot
SURFACE
TRACE OF MAIN LODE
SILMONAC MINES LIMITED.
N. LATERAL.
PORTAL
RUTH No.3 CROSS-CUT S.
CREEK
WHITE
SILVERSMITH
TRIBUTARY CREEK
SILMONAC DRIVE

FIG. 3.

COMPOSITE PLAN
of
SURFACE-UNDERGROUND GEOLOGY
SILVERSMITH-HOPE & W. EXTENSION
of the
MAIN SLOCAN LODE
&
PRELIM. EXPLORATION-SILMONAC PROJECT
SCALE: 1" = 400' DRAWN JAN. 1966
REFS.- PLANS SILMONAC MINES LTD.,
- BULL. 29, B.C.D.M & C.G.S. MEM. 184

W.M.S.