

*File: Salmonac-Kam-
Kotia Burkam J.V.*

KAM-KOTIA BURKAM JOINT VENTURE
New Denver, B.C.
March 15, 1970.

801109

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

171 WEST ESPLANADE
NORTH VANCOUVER, B.C.

May 21/70

Dear Bill:

my genuine apologies for not getting this to you much sooner. However, on starting this effort, I found my background knowledge a bit rustier than I would have thought it would be while on-site. Hence, the time spent on checking and up-dating earlier maps, reviewing the account data, and in preparations of - what I considered mandatory at this stage of development - an adequate set of maps (some a little redundant!) generally conspired to delay effective progress.

Thanks for your patience - optimistically assuming that you have not already 'blown your top' - and I hope the enclosed meets the company's present requirements, and is of some use to you personally.

Best regards to yourself and Kay,
Sincerely,
Bill.

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

171 WEST ESPLANADE
NORTH VANCOUVER, B.C.

MARCH 21, 1970

DEAR MR. WALKER :

PLEASE ACCEPT MY GENUINE APOLOGIES FOR NOT GETTING THIS TO YOU SOONER - THE DELAY BEING MAINLY DUE TO PRELIMINARY TIME SPENT ON REFRESHING AND UP-DATING MY BACKGROUND INFORMATION, AND ALSO ON COMPILING, WHAT I HOPE WILL SERVE AS AN ADEQUATE, BASIC SET OF EXPLORATION-DEVELOPMENT MAPS.

IN VIEW OF THE SOMEWHAT GENERAL TERMS OF REFERENCE RE. THE SCOPE OF THIS REPORT, I HOPE THAT IT WILL MEET YOUR MORE ESSENTIAL CURRENT REQUIREMENTS. IN THIS REGARD, I HAVE ATTEMPTED TO KEEP MY RECOMMENDATIONS ON A REASONABLY BROAD BASIS - KNOWING THAT BILL HOGG IS QUITE ABREAST OF LOCAL DEVELOPMENTS, AND BEST ABLE TO DETAIL THE ACTUAL EXPLORATION PROCEDURES WITHIN IN ANY GIVEN TARGET AREA.

MY INCIDENTAL CALCULATIONS INDICATE THAT "TO A LARGE PART AT LEAST, THE CURRENTLY-BLOCKED-OUT 'ORE' CAN BE MINED PROFITABLY; HOWEVER I HAVE, FOR PRESENT PURPOSES, OMITTED CONSIDERATIONS OF THE VARIOUS ECONOMIC FACTORS - ON THE BASIS THAT MANAGEMENT IS BETTER EQUIPPED TO CARRY THIS OUT, AND THAT ANYTHING MORE THAN A 'PRELIMINARY FEASIBILITY' REPORT IS UNWARRANTED AT THE PRESENT (MARCH 1970) STAGE OF DEVELOPMENT.

MR. DOUGLASS REQUESTED, VIA A PHONE CONVERSATION TODAY, THAT I SEND ONE COPY OF THE REPORT DIRECTLY TO HIM; ALSO I AM SENDING ONE COPY DIRECTLY TO BILL HOGG. THIS LEAVES FOUR FOR YOU OUT OF THE FIVE ORIGINALLY SUGGESTED BY BILL.

YOURS VERY TRULY,

W. M. Sharp.

ENCL.

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

171 WEST ESPLANADE
NORTH VANCOUVER, B.C.

March 15, 1970

Mr. G. W. Walkey,
Vice-President & General Manager,
Kam-Kotia Mines Limited,
Suite 416-25 Adelaide Street West,
Toronto 1, Ontario.

Dear Sir:

PROGRESS REPORT
KAM-KOTIA - BURKAM JOINT VENTURE
SILMONAC MINES EXPLORATION & DEVELOPMENT
NEW DENVER, B.C., SLOCAN MINING DIVISION

INTRODUCTION:

With this the writer submits his report and general recommendations on current progress and future exploration and development of the Silmonac Mines interval of the Main Slocan Lode.

Authorization relating to the writer's field and office studies and preparation of this report was provided by Mr. J.C. Block and subsequently confirmed by Mr. W. Hogg, Mine Manager. During February 12-13, 1970 the writer made the necessary office compilations at the New Denver mine office, carried out a personal inspection of the Joint Venture workings, and generally discussed the project with Mr. Hogg.

The writer's report is essentially based on geological compilations by J. Lamb during 1968-69, the December 24, 1969 report by Mr. Block, and relevant maps, sections, technical records, and verbal information provided by Mr. Hogg. The writer freely acknowledges that the aforementioned data provide the main extent of his information concerning the Joint Venture operations. With this, the writer expresses his appreciation of the helpful cooperation and assistance received from Mr. Hogg.

Because of his general lack of contact with the 'Silmonac' project since November, 1967 the writer has found it necessary to devote a somewhat disproportionate amount of his gross office time on the preparation of this report to refreshing his background information, assimilating the cur- ^{2 1/2 years}

rent data, up-dating former report maps, and to the (concurrent) preparation of a set of maps which might adequately describe the various features of the local geology and mineralization. The resulting map set comprises:

- K70-1, Composite Plan: Underground Exploration - Geology
- K70-2, Apparent Contours - Footwall Vein
- K70-3, Assay Plan - Tunnel & Diamond Drill Sampling
- K70-4, West 3996 - 4625 Exploration & Development
- K70-5, Geology, etc. - Central Interval, Main Slocan Lode
- K70-6, Current Assay Data - Ore Blocks

Substantially more geological information is required to prepare broadly informative sets of cross-sections and long-sections; hence, no attempt has been made to furnish them with this report.

The presently-contemplated procedures for systematic exploration-development via footwall-laterals, cross-cuts, and drill-hole fans should facilitate compilation of the requisite plans and sections.

SUMMARY & RECOMMENDATIONS:

The present Joint Venture objectives comprise the continued development of the orebody discovered by underground and surface drilling during 1967 and continued exploration of the two-mile interval of the lode situated in the geologically-favourable west-dip panel underlying the axial plane of the Queen Bee reversal.

The inner part of 4625 crosscut and adjoining workings up to 4690 sub-level are largely situated within the apparent roof zone of a slightly domed block, or flatly south-dipping complex of related intrusive porphyries. The lode occurs as a broad zone of shearing and fracturing within the closely overlying, more-or-less altered quartzitic-to-argillaceous wall rocks; its curved flatly-warped attitude ~~xxxx~~ ~~xxxx~~ appears to result from a coincidence of deflections caused by the Douglass fault and underlying porphyries.

The visible mineralization comprises fine-grained (sheared) mixed galena and sphalerite; this veins and impregnates the fractured to brecciated rock fillings, and is normally accompanied by a rather sparse gangue consisting of quartz, calcite, and siderite. 'Vain' widths range from a few inches to, locally, 14 feet; the computed average width of the 'footwall' vein, currently the prior development target, is 4.2 feet. From evidence supplied by several drill-

High Ag values due to presence of Ag-rich terranite -

*Ag. As. S. sulphurates
like tetrah.*

hole intersections and occasional tunnel exposures, the 'hangingwall' vein appears to have less general continuity.

To date a gross strike length of about 700 feet of fairly continuous footwall vein mineralization has been delineated; dip lengths over various sections range from 70 to 200 feet-plus. Currently, indicated ore reserves amount to:

26,780 tons @ Ag, 16.7 oz/ton; Pb, 7.6%;
Zn, 10.4% (Cd not assayed)

The above grade corresponds rather closely to that of a 200-lb. test sample, comprising a composite of the 4690 mineralization, i.e., Ag, Pb, and Zn @ 16.9, 6.1, and 10.8, respectively.

The writer regards the current results from the continuing exploration-development program to be highly encouraging. On the basis of the results obtained through exploration of a relatively minor part of the potentially-mineralized extent of the lode within the Company's property, and the fact that exploration is being pursued at a geologically-optimum 'horizon' of the Slocan fold, the writer generally recommends that exploration be continued to test a significantly longer lode interval. More specifically, this would comprise its respective 'westerly' and easterly extensions to, and below the easterly Carnation and westerly Hope workings - involving some 4,500 - 5,000 feet of lateral exploration. Corollary vertical exploration would specifically include; the up-dip extensions of the 'crosscut' orebody, and tentatively include up-dip extensions of mineralization encountered via the extended lateral exploration program. ← current

In regard to exploration currently being undertaken, the writer offers the following suggestions:

1. Continue 'horizontal' exploration via footwall laterals - maintaining the optimum lode-lateral separation for short, and intermediate drill-hole evaluation; more distant up-dip sections may be tested from appropriate footwall cross-cuts - as is being done at present.
2. Establish basic drill-fans on 'north-south' sections and systematic spacing, where appropriate - this to permit more direct correlations of drill-hole data (rel. to vein 'contouring').
3. Continue main 'westerly' exploration via the 4690 lateral.

4. Continue 'easterly' exploration via the 4625 lateral for an additional 300 - 400 feet in order to investigate the probable frequency of porphyry at this horizon; if ^{the potential} porphyry ^{proves} to be preponderant, ~~transfer the drive to the 4755 horizon.~~ *continue*
5. Explore for possible up-pitch extensions of mineralization within the 'Douglass flexure' above 4720 horizon via drill holes from 4690 No. 1 cross-cut and the main crosscut.

Respectfully submitted,

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

Encl.

PRELIMINARY:

Descriptions of property, location, accessibility, history, district geology, etc. are not repeated in this report. However, for purposes of completeness and continuity, an abbreviated summary of the preliminary phase of the general exploration program is included.

Compilations of geological information which accrued from the 1963-67 exploratory work indicated that most of the 3996 workings situate within a uniquely and complexly deformed assemblage of sediments and porphyries - comprising a general section with a vertical extent of at least 400 feet above the level and, probably, an equivalent distance below it. Bedding within this section is frequently closely plicated, broken, and sheared along near-horizontal axial, and slip-planes. This general vertical section is inferred to lie within a composite, or multiple zone of recumbent folding comprising the 'Payne Overturn' - as earlier designated by Paul Billingsley - within this locality. Approximately one-half of this section comprises porphyry. Of the three major bodies penetrated, at least the easterly and central masses appear to be laterally-attenuated 'axial injections' which top flatly against the footwall of the lode; the smaller westerly body, encountered within the final 500 feet of the drive, has sill-like relationships with respect to its host-panel of uniformly west-dipping beds - but, possibly, also 'tops out' against the lode some few hundreds of feet above the level. The current inference is, that within the general West Silver-Smith-Jennie interval at least, the lode is largely controlled by such flatly-domed or sloping porphyry bodies. This relationship is also evident within lower levels of the current workings.

Subst. aerostatic are to a large extent the result of deflection caused by flow of muds

Within the geologically-complex ('3996') section' the lode appears typically as a series of separate, dislocated short segments within the broken heavy ground - generally constituting a difficult exploration-development situation. Following the receipt of favourable results from the series of up-holes from the west end of 3996 level the decision was made to continue exploration of the indicated ore body via surface diamond drilling from the site on East Fork Tributary Creek. Drilling from this site, at approximately 5,350' el., effectively tested the lode within the optimum panel of westerly-dipping beds above the 3996 complex and below the 'Queen Bess reversal' - the latter tentatively placed at about 5,200' el. in this locality; surface drilling has also had the advantage of lower costs and better directional control and core recovery than were possible from underground drilling.

5-West

All five holes drilled from the surface intersected mineralized vein material; three of these intersected ore -

grade mineralization across mineable widths. Further, the result of calculations combining all six intersections indicated a potentially-mineable orebody containing 28,000 tons grading Ag, 15.2 oz/ton; Pb, 3.6%; Zn, 5.6%. The inferred dimensions of this assay block were in the order of 225' x 600' x 2.5' - for strike-length, dip-length, and thickness consecutively.

The current underground exploration-development program was initiated to carry out detailed exploration of the drill-indicated ore shoot and of its easterly and westerly extensions. The Joint Venture organization established a small mining plant a few hundred feet east of the Minnichaha adit (el. 4950') at 4625' elevation. The 4625 crosscut, driven almost due south, intersected the main lode - but not the Minnichaha structure - at some 3,000 feet from the portal. In this connection the writer suggests that the absence of clearly recognizable elements of the Minnichaha lode within the initial part of this drive might be expected if, as is suggested by certain surface exposures, this complex vein system roots on a flatly ESE-dipping lode-strend or fault which could be well into the back of the 4625 crosscut.

CURRENT EXPLORATION-DEVELOPMENT PROGRESS:

Near the end of February, 1970 approximate total advances on the various headings were as follows:

A-4625:

West Lateral	67'	
East Lateral	594'	
#1 B.H. or Res.	45'	
#2 " " "	55'	
#3 Res.	55'	
#4 Res.	55'	
#5 Res.	105'	
#6 Res.	<u>230'</u>	1,206 ft.

B-4690:

West Lateral	375'	
Sub-level, east	325'	
#1 X-C	90'	
West Incline and B.H.	55'	
#3 Res.	85'	
#6 B.H. - Res.	55'	
#7 Res - B.H.	<u>95'</u>	1,080 ft.

C-4720:

Sub-level	120'	
#1 Res.	<u>55'</u>	175 ft.

D-4755:

West Sub-drift	105'	
East Sub-drift	95'	
#1 X-C	90'	
#1 Res.	40'	
#2 Res.	<u>10'</u>	340 ft.

GEOLOGY:

Wall Rocks & Structures:

Dwg. K-70-1 supplements this section of the report.

Wall rocks are mainly argillites, quartzites, argillaceous quartzites, etc. Locally, particularly near porphyry contacts, these are more-or-less altered; typical alteration constituents are quartz (chert), kaolin, and biotite. In places the actual contact between the biotitic quartz feldspar porphyry and biotitized sediments is difficult to define. This chert-biotite alteration is also found within bedding sections quite remote from the main zone of porphyries. An analogous, but more intense chert-silicate alteration was noted within cores from the surface drill holes; here it occurs in quite obvious association with the lode and/or faulted zones above and below it. A similar green, brown, and white banded alteration occurs within the Carnation 5480 crosscut over a section lying some hundreds of feet in the footwall of the main lode.

Bedding strikes predominantly to the north; minor local deviations occur - particularly near porphyry contacts. Dips are essentially westward, exceptions to this are principally due to drag-folding, or to crowding by porphyry intrusives.

The inner part of 4625 crosscut, all of the 4625 lateral, and most of 4690 east sub-level lie within the upper part of a slightly domed and/or flatly south-dipping mass of porphyry; this body apparently roots within the general 3996 complex. Exposures within the workings are of relatively fine-grained biotitic quartz-feldspar porphyry - possibly representing a somewhat hybridized contact phase of the typically coarser-grained porphyries observed on 3996 level. Fragments from 4625 crosscut have a strong argillic odour - indicating the presence of kaolin presumably due to hydrothermal alteration. The 4625 body is, however, compositionally and texturally quite similar to the thin dykes and sills cored higher in the vertical section and within the lode hanging wall section; it also shows strong similarities to the sill-like body outcropping south and east of the Mascot tunnels. The various tunnel and drill-hole intersections suggest that the intrusive occurs as a domed footwall mass or thick,

flatly south-dipping footwall lens through 4625 horizon to about 4720 horizon; above the latter it would appear to pinch and split into 'sheets' paralleling the lode-with most breaking across it and into its hanging wall section.

DOUGLASS FAULT:

This strikes northwesterly and dips steeply southwestward through the 4625 crosscut and west lateral; its northwesterly extension cuts 4690 No. 1 crosscut. In broad context this fault, like most formational faults in the Sloan camp, cuts obliquely across the generally E-W trending lode; in detail, however, it intersects the lode and deflects it to the southeast over a 100' - 200' strike-interval above and east of 4625 crosscut. Between 4625 level and 4755 sub-level the fault passes from the footwall to the hanging wall of the lode. An impressive width of high-grade mineralization occurs within the 4690-4720 interval of general convergence of the fault and lode; however, the mineralization narrows appreciably, both on strike and dip, as the lode diverges from the fault.

LODE & MINERALIZATION:

All drawings of the accompanying set relate to the following text:

Where currently opened the lode is a broad zone of shearing and fracturing ranging from a few feet to as much as 40 feet wide and dipping from 15° - 35° southerly. Ore minerals are galena, sphalerite and possibly grey copper or related 'sulpho-salts'. These are usually mixed and occur as more-or-less concentrated fracture-fillings or as fine dispersions in the brecciated rock and gangue - the latter typically comprising quartz, calcite, and siderite together or alone. Pyrite and pyrrotite are frequent gangue accessories. Gangue, at least within the workings, are typically lean - imparting 'dry' appearance to the mineralization. Where the dark fine-grained (sheared) sulphides occur, with only minor amounts of gangue minerals, within a filling of sheared and broken sediments it is difficult to visually evaluate the mineralization; in such instances a more-than-usual degree of reliance is placed on systematic sampling procedures. The writer admits to some difficulty in visually checking some sections that had returned significant Pb-Zn assays.

Within the present extent of underground exploration the mineralization occurs within distinct 'footwall' and 'hanging wall' veins. Thus far the 'footwall' vein appears to comprise the principal unit; locally, at least,

the hanging wall vein tends to be discontinuous, or is only vaguely indicated in some cross-sections. The normal separation between veins ranges from a few feet to about 20 feet-plus. Single-vein intersections obtained in drill holes SS-1, -2, and -4, intersecting the lode at a few, to several hundreds of feet up-dip the 4755 horizon suggest that either one of the pair pinches out or that they converge up-dip. Intersections made by S47 and S48 (both down-dip) and that via SS-3 (vicinity of Douglass flexure ?) indicate that, at these points, the hanging wall member is better mineralized. Within the current underground area of vein development the evidence favours the footwall vein. Therefore, as underground development proceeds on the footwall vein the hanging wall vein should also be tested by an adequate pattern of drill holes.

Over its presently-delineated extent the lode has an 'average' east-west strike and 'average' 20° - 30° southerly dip. In actual fact it swings from a sinuous ~~south-~~ easterly to northeasterly strike on its eastward course through the workings, while the dip locally flattens and steepens over a range of possibly 10° - 40°.

Drawing K70-1, "Apparent Contours - Footwall Vein", was constructed from the available tunnel and drill hole data, and admittedly embodies some questionable projections and/or inferences. However the compilation indicates that the footwall vein is broadly bowed to the south; the inferred vein contours suggest a broad, flatly plunging, somewhat warped nose with its axis on about 11 + 25E. This configuration is probably due to the combined (deflective) effect of the Douglass fault and that of a domed or arched surface on the underlying (footwall) porphyry block or sheet. Its generally flat dip may be due to a general crowning effect from the combined 3996-4625 porphyry complex; however, it is noteworthy that the flat dip persists for some 1,200 - 1,500 feet up-dip of the main body of porphyry and into the preponderantly sedimentary rock section, where the influence of minor footwall and hanging wall porphyry sheets is probably negligible.

The Douglass fault-lode intersection comprises a locally important ore control in that its effect is evident to at least the 4755 sub-level. In this connection it is worth noting that similar fault-lode ore situations occur within the upper part of the Jackson lode and, less obviously, within the 'Stewart' segment of the Ruth lode.

Exploration to date indicates a 700 foot gross strike-length of fairly continuous mineralization on the footwall vein at the 4725 horizon; the currently-delineated dip-length, as measured on and N.E. of the Douglass fault, exceeds 200 feet.

Good mineralization over mineable widths evidently continues for some 200 feet northwestward of the Douglass fault-ledge intersection, hence appears to be a fundamental part of the favourable Douglass flexure. Further to the northwest recent drill hole results suggest that the ledge is 'tightening' in conjunction with a slightly southerly bend. However, further westward it should swing into the dominant southwesterly trend where the opportunity for several other favourable 'ore situations' should be encountered within the 2,500 - 3,000 foot structurally-optimum ledge interval from the present face to and under the easterly Carnation workings. In this regard the 600' - 700' dip interval from present exploration horizons to the overlying Queen Bess axial plane offers better-than-average prospects for the occurrence of other 'blind' orebodies. In the interim, at least one favourable situation could develop some 500 feet beyond the present face of 4690 west lateral where the ledge may intersect the westerly extension of the Footwall ledge (4625 X-C).

The few existing drill-hole intersections indicate more-or-less continuous mineralization within the footwall vein, on its favourable N.E. trend, for some 180 feet beyond the Douglass flexure. On the basis of ledge trends closely above 3996 level other favourable right hand-left hand deflections may be expected to occur along the general easterly continuation of the ledge. A shorter-range possibility is that its continuation may intersect projections of one or more of the several N.W.-faults cutting west 3996 level, and at which favourable fault-ledge ore situations might occur; the first such intersection could be made at some 300' - 400' beyond the current face of 4625 east lateral.

As the 'contour method' appears to best portray the more significant details of a sinuously-trending and flatly-dipping ledge, the writer suggests that this form of compilation be adopted as a standard office procedure.

The present program of driving on footwall laterals, from which cross-sectional drilling may be most expeditiously performed, should be continued. With this, short range drilling for ledge-evaluation and heading-control may be accomplished from the lateral; more extensive probes of possible ore shoots may be accomplished by drilling from special footwall cross-cuts. The writer suggests that additional fill-in drilling, on systematic cross-sections, is warranted in order to fill in existing gaps and more accurately portray (contour) the ledge.

CURRENT ORE RESERVE ESTIMATES:

These are based on sampling carried out entirely by the mine staff. Assays of all chip, drill-core, and drill-sludge samples were initially plotted on Dwg. K70-3. For purposes of 'block calculations', many of these were grouped and averaged for more representative weighting in the subsequent calculations.

Drawing K70-6 shows assays of single and grouped samples and the derived ore blocks. The latter are listed below, with assays representing Ag, oz/ton; Pb, %; and Zn, %, in that order. A volume-tonnage factor of 11 cu.ft. per ton is assumed; all calculations involve 'weighted averaging':

Block 47W - Probable Ore:

- (a) No dilution - 10,280 tons @ 14.8; 7.5; 10.9 over a 5.3' average width
- (b) With dilution - 12,200 tons @ 12.5; 6.3; 9.2 over a 6.3' average width

Block 47C - Probable Ore:

- (a) No dilution - 13,300 tons @ 17.8; 7.1; 10.5 over a 3.0' average width
- (b) With dilution - 19,950 tons @ 12.0; 4.7; 7.0 over a 4.5' average width

Block 47E-1 - Probable Ore:

- (a) No dilution - 1,950 tons @ 10.9; 7.1; 7.6 over a 4.0' average width
- (b) With dilution - 2,450 tons @ 8.7; 5.7; 6.1 over a 5.0' average width

Block 47E-2 - Probable Ore:

No effective dilution - 1,240 tons @ 29.8; 15.5; 9.2 over a 7.2' average width

Block 47-3 - Possible Ore:

- 2,130 tons @ 15.7; 9.0; 7.1 over a 5.0' average width

Totals:

- (a) No dilution - 26,780 tons @ 16.7; 7.6; 10.4 over a 4.2' average width
- (b) With dilution - 35,840 tons @ 12.5; 5.7; 7.8 over a 5.25' average width

The above estimates are for the "footwall" vein only. No deductions have been made for material which would probably be left as pillars, as the writer assumes that the potential additional tonnage of mineable ore within the "hanging wall" vein will offset, or exceed deductions for pillars or voids.

Respectfully submitted,


W. M. Sharp, P. Eng.