Alfred R. Allen
GEOLOGICAL ENGINEER
Vancouver B. C.

3925 Kingsway,
April 27th 1950.

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Mr. Wm. E. Forbes and Associates,
Mission B. C.

Dear Sirs:-

Herewith please find my report on the Bird Mica property, Vernon Mining Division, British Columbia.

Large bodies of pegmatite occur on the property from which many millions of tons could be mined by cheap surface methods.

The writer is of the opinion that sheet mica cannot be produced on the property in any quantity at a profit. It is believed possible, however, that mica, feldspar and quartz can be produced profitably if suitable guaranteed markets can be found for the three products.

The writer recommends that no attempt be made to place the property into production until market sources are found which will take up all of the mica, feldspar, and quartz produced at prices which will assure a profitable operation.

Yours very truly,

THE BIRD MICA PROPERTY
VERNON MINING DIVISION
BRITISH COLUMBIA

R E P O R T

B Y

Alfred R. Allen,
Geological Engineer

April 1950

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Gold Bluff Mines Ltd.
Scale 1" = 20'

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REPORT ON
THE BIRD MICA PROPERTY

A. INTRODUCTION

The Bird Mica Property, near Armstrong B. C., in the Vernon Mining Division, was examined by the writer April 4, 5, 6, 7, 8, 1950. Mr. L. J. Bird of Armstrong guided and ably assisted the writer.

The purpose of the examination was to determine if the property warrants the expenditure of the capital necessary to bring it into production.

The writer was retained by Wm. E. Forbes and associates as an independent consulting engineer and therefor holds no shares in the company organization.

B. LOCATION

The Bird Mica Property is located about 5 miles northerly from Armstrong B. C. A wagon road about ½ mile long leads from the property to a gravel-covered road which joins the hard-surfaced highway about 3½ miles from Armstrong.

The Canadian Pacific and Canadian National Railways both pass through Armstrong. There is a loading siding on the C.P.R. about ¾ of a mile from the property, and on the C.N.R. about 5 miles distance

C. TOPOGRAPHY

The topography is typical of the interior section of British Columbia. The low rolling hills are patched with evergreens. (Photograph No. 1) The main valleys are broad and flat. The Bird Mica Property lies at the base of the rocky hills on the east side of the Schuswap valley. The main workings are about 100 to 200 feet above the valley floor. Two small intermittent streams cross the property, and a third larger stream about a mile to the south flows continually and is a source of water supply for the local farms.

D. CLAIMS AND OWNERSHIP

There are two mineral claims held by location by the Bird brothers, L. J. Bird of Armstrong and D. E. Bird of Hatsqui B. C. The claims are the Brett, No. 2978 and the Bird, No. 2979.

The 2 mineral claims have been leased to Wm. E. Forbes and Associates of Mission B. C.

E. CONCLUSIONS

The Bird Mica Property is located near Armstrong B. C., advantageously close to rail and road transportation.

Several irregular bodies of pegmatite occur on the property. The pegmatite is composed almost wholly of orthoclase feldspar, muscovite mica, and quartz. It has been intruded into mica schist and gneissic rock of the Salmon Arm formation. This formation is Pre Cambrian in age.

Sheet mica occurs chiefly in wedge shaped "books" closely intergrown to form irregular aggregates several feet across. Corrugations, striations, and twinning class much of it outside the "good grade" classification for marketing as sheet mica. It is apparent that the Bird Mica Property cannot become a successful and profitable producer of sheet mica only. There is, however, considerable medium-grained muscovite in the pegmatite, and along with orthoclase and quartz a 3-product industry might be possible.

There are many millions of tons of pegmatite on the property. The mineral constituents can no doubt be separated by selective floatation. The major problem is not the supply, the mining, nor even the separation, but most defenitely the marketing of the 3 products. A successful operation on the Bird Mica Property depends almost entirely upon reliable markets for mica, orthoclase, and silica, at prices adequate to assure a profit from the sale of each.

F. RECOMMENDATIONS

I recommend that no attempt be made to place the Bird Mica Property into production unless assured satisfactory markets for mica, feldspar, and silica are developed. The principal reasons for the above recommendation are as follows:-

(1) It is doubtful if sheet mica can be produced from the property in any quantity at a profit. Sheet mica of better quality and greater quantity may be discovered on the property, but this is not indicated since large areas of pegmatite were examined and no better mica was observed than that exposed in the open cuts.

(2) Preliminary inquiries indicate a lack of suitable markets for mica, feldspar, and silica. An arduous and probably expensive market survey may uncover markets for the 3 products, but in the writer's opinion, this is not indicated, and the additional expenditures would quite likely produce negative results.

(3) A plant suitable for the separation of the 3 products will entail a large capital outlay.

G. GEOLOGY

(a) GENERAL

The area is underlain by mica schist and gneissic granodiorite into which have been intruded dykes and irregular bodies of pegmatite. The schist and gneiss constitute the Salmon Arm formation and the pegmatite is younger.

(b) STRATIGRAPHY

The Salmon Arm, along with 7 other formations, make up the Mount Ida Group, a thick series of sedimentary, volcanic and metamorphic rocks of Pre Cambrian age.

The Salmon Arm formation consists of argillaceous rocks that have been altered to mica schist and gneiss. The formation is believed to vary from 7000 to 28000 feet thick. The thickness is dependent largely upon the amount of magmatic material which has been added.

(c) STRUCTURE

The schist and gneiss of the Salmon Arm formation near the Bird Mica property strike north to northwest and dip flat to vertical but mainly 65 to 80 degrees.

Two large faults, one 2 miles to the north and the other 2 miles south ofthe workings, strike northwesterly.

The large pegmatite bodies on the Bird Mica property assume 2 general attitudes. The dyke upon which

all the work has been done strikes about north-south and dips 20 to 30 degrees th the east. Two large irregular pegmatite bodies to the southeast appear to have a nearly similar strike but one has a steeper dip. From the north end of the dike upon which the work has been done 2 steeply diping dikes strike southeasterly up the hill. The later apperat to be separated by about 50 feet of country rock and are 20 and 100 feet thick. There are innumerable smaller dikes on the property.

The schist and gneiss are fine-grained and the pegmatite medium- to coarse-grained.

The mica in the pegmatite occurs in "books" or aggregates of books. Individual sheets have been measured up to 6 to 10 inches long and 4 to 7 inches wide. In places 80% of the rock is made up of medium- to coarse-grained mica. Similar mica is disseminated rather uniformly throughout the pegmatite. Most of the sheet mica observed occurs near the contact with the mica schist.

(d) MINERALOGY

The pegmatite is composed almost entirely of orthoclase feldspar, quartz and muscovite mica. The accessory minerals observed were in minor quantity, and only red garnet and a black mineral which appears to be hornblende. At the schist contacts some biotite mica was observed in the pegmatite.

The orthoclase feldspar is translucent to opaque, cream colored, in well formed medium sized crystals.

The pegmatite appears to be composed of about 60% orthoclase feldspar.

The quartz, light amethyst to grey in color, fine- to medium-crystalline, is closely intergrown with the orthoclase. It is glassy clear to semi transparent and shows a definite conchoidal fracture. The pegmatite appears to be composed of about 25% quartz.

Muscovite mica occurs in disseminations throughout the feldspar and quartz. The color is dark green except in thin sheets and on weathered surface when it is white. The thin sheets are very transparent. The mica occurs also in "books" from a fraction of an inch in size to 10 inches long and 7 inches wide. The books are intergrown or twinned. Many of the aggregates show a radiating form. The dielectric quality of the sheets is good. Many sheets are corrugated making splitting difficult. The largest percentage of the mica is thumb-nail size and smaller. From field estimates only the pegmatite appears to contain about 15% mica. It may be possible to recover a small percentage of the coarse material as sheets of relatively small area. A closer estimate of the mica content will be possible by bulk laboratory tests.

H. EXPOLRATORY WORKINGS

One small area on the Brett mineral claim has been explored by means of 4 open cuts and one adit tunnel.

No. 1 open cut (See Map in back envelope) shows the contact between the pegmatite and the mica schist. The cut is 28 feet long, and is directed 24 degrees south of east. No. 2 open cut, about 80 feet south of No.1, is about 80 feet long and exposes apparently the same pegmatite-schist contact. No. 3 open cut is parallel to and about 160 feet south of No. 1 open cut. It is about 60 feet long. It also exposes the contact between the pegmatite and schist. No. 4 open cut is located about 100 feet down the hill from and and 160 feet southwest of No. 1 open cut. It is 60,feet long and directed southeast. It exposes at the inner end a contact between pegmatite and schist.

The adit tunnel is about 40 feet vertically below the No. 3 open cut, and the portal is about 80 feet to the west. The tunnel penetrated 30 feet of overburden and 16 feet of schist, but did not reach the pegmatite.

I. SUGGESTED MINING

Open pit and quary methods are recommended for mining the pegmatite. If necessary several faces can be operated simultaneously. The coarse mica can be

saved during the secondary breaking by hand cobbing and sorting. Truck roads can be built to the floor levels of the pits. The broken material can be mechanically loaded into trucks and transported to the coarse ore bin at the mill. Alternatively, portable conveyors could be used to deliver the broken rock from the pits to the coarse ore bin. The pegmatite containing the coarse "book" mica could be hand sorted and placed in a separate building for trimming, grading, and packing, during slack periods of the operation.

J. SUGGESTED MILLING

Ore dressing tests should be made by at least two competent laboratories before mill design is contemplated. It is believed that the pegmatite can be separated into 3 marketable products by selective floatation, and the process would be somewhat as follows:-

(1) The rock is drawn from the coarse ore bin over a grizzly into a jaw crusher.

(2) The crushed rock is screened and crushed fine, probably in a ball mill. The finely crushed material is passed through a classifier.

(3) The finely crushed material is placed into a series of floatation cells, where by the addition of several types of solutions, the quartz is removed, then the feldspar, and lastly the mica.

(4) The 3 products are washed and dried for shipment in sacks or bulk.

K. MARKETS AND PRICES

Preliminary investigations indicate that mica, orthoclase and quartz, cannot be sold in western Canada in sufficient quantities to insure a profit from the operation of the Bird Mica property. Markets are no doubt available in the United States, but the freight rates and tariffs may be too high to leave a profit for the producer.

It would appear that a market survey is necessary before the complete picture regarding this problem is known.

If markets are not presently available there is some possibility that they may be developed, particularly if a steady supply of good grade material can be relied upon. This, however, requires time and money, and the assistance of experts in the field, and is usually undertaken only by corporations that are prepared to invest large amounts of money.

The following is an incomplete resume of the market and price picture as it appears today:-

MUSCOVITE MICA

About 500 tons of ground mica is sold in Vancouver per year.

Raw, unground, scrap mica may bring about 20.00 dollars per ton in Vancouver. Wet ground mica would undoubtedly bring a higher price if a market was established. In the United States the prices are about as follows:-

North Carolina

(1)	Wet Ground	$100.00	to	$135.00 per ton.
(2)	Dry Ground	$ 32.50	to	$ 70.00 per ton.

ORTHOCLASE FELDSPAR

The market requirements are unknown.

The U.S.A. prices are as follows:-

North Carolina, Carload Lots, add $3.00 per ton for bags.

(1)	200 mesh	$ 18.50 per ton.
(2)	325 mesh	$ 22.50 per ton.
(3)	Glass #18 Grade	$ 12.50 per ton.
(4)	Semi-granular	$ 11.75 per ton.

SILICA (QUARTZ)

There is as yet little information available regarding the quantity of silica that can be sold locally. Local price is reportedly about $ 12.00 per ton for foundary sands. The U.S.A.prices for air-floated, 92 to 99% silica, 325 mesh, is $ 18.00 to $ 30.00 per ton.

L. USES

The common uses for the three products are as follows:-

MUSCOVITE MICA

Sheet mica is used in electrical insulation, stove doors, furnace windows, lamp canopies shields and shades, eye goggles and gas masks. Ground mica is used in the roofing and insulation industries, Christmas tree snow, wallpaper, stucco, plaster, and building bricks, artificial stone and concrete.

ORTHOCLASE FELDSPAR

Orthoclase is used in the ceramic industries for the manufacture of glass, pottery, enamel ware, brick and tile. Minor uses are detergents in scouring soaps, in artificial teeth, poultry gritt, stucco dash, artificial stone and concrete.

SILICA (QUARTZ)

Silica is used chiefly in glass, artificial abrasives, foundry sand, sodium silicate manufacture, a filler in fertilizers, a filter medium, paint and building products, ceramics and cleaning products.

M. ESTIMATED PRODUCTION COSTS

Production costs will depend largely upon the size of the operation, and the efficiency of the crew and management. The following is a preliminary estimate of production costs on a 50-ton per 24 hour set-up:-

(1)	Mining, secondary breaking, sorting and transportation to mill ore bin.....	50.00
(2)	Milling-- 3 products ready to ship	350.00
(3)	Office, management, marketing, plant write-off, taxes, insurance	75.00
(4)	Royalties, property payments etc.	25.00
	Total cost for 50 tons	$500.00

N. POWER, WATER, TIMBER

Electrical power is available locally for all uses.

Water may be supplied from the river, a nearby pipe line, and some from seepage from the workings.

There is some timber on the claims, but the lumber necessary will likely best be purchased from the mill at Armstrong.

0. REFFERENCES

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FELDSPAR

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By H. S. Spence, 1932.

SILICA

(1) Silica In Canada - Dep't. Mines, Ottawa,
No. 686,
By Herbert Cole, 1928.

(2) Preliminary Investigations Into Possibilities of Producing Silica Sand From B. C. Sand Deposits.
B. C. Dep't of Mines, Victoria B. C.,
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(3) Silica In Canada - Dep't. Mines, Ottawa,
Memorandum Series No. 104,
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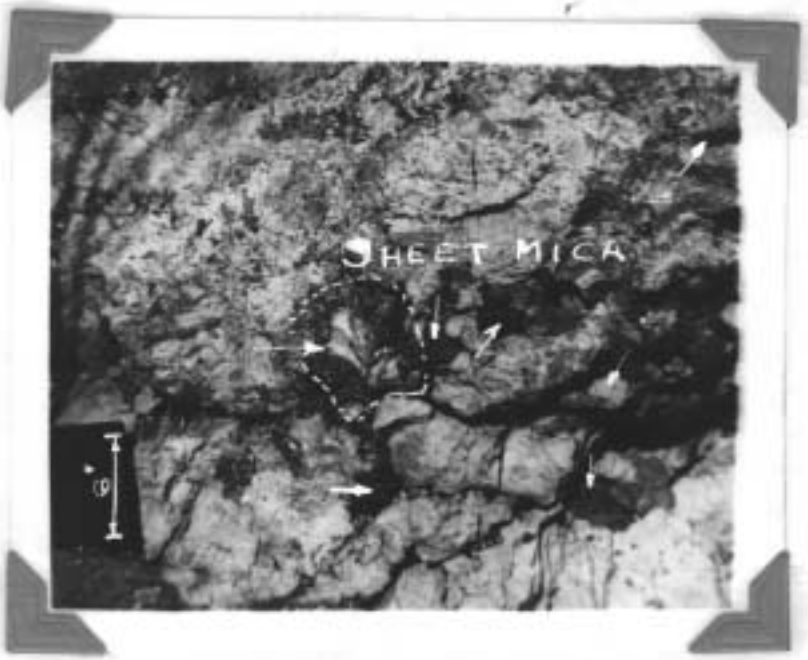
No. 1
Looking Easterly From The Valley Floor
Towards
The Bird Mica Workings

No. 2

Small Pile of Pegmatite
composed largely of mica.

No. 3
Masses of Sheet Mica

No. 4
Masses of Sheet Mica
In No.3 Open Cut.



No. 5
Sheet Mica In " Books" Near The
No. 1 Open Cut

No. 6
Band of Medium-Coarse Mica

Creek (Intermittent Flow)

Valley Floor

BRETT M. C.

Creek (Intermittent Flow)

Valley Floor

BIRD M. C.

LEGEND

- 2 Pegmatite
- 1 Mica Schist
- Rock Outcrops
- Open Pit
- Adit Tunnel
- Strike & Dip

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 49 MAP #1

Astronomic

REPORT 49
MAP 1

BIRD MICA PROPERTY

PLAN OF GENERAL GEOLOGY

BRETT & BIRD M.C.'S.

Scale 1"=200'

April 1950 Alfred Allen

Astronomic

Location Line

No 1

No 2

No 3

No 4

1020
1010
1000
990
980
970
960
950
940
930
920
910
900
890
880
870

LEGEND

- Pegmatite
- Mica Schist
- Gneisic Granodiorite
- Rock Outcrops
- Geological Contacts
- Strike & Dip
- A-9 Survey Post
- 890 Contours
- Open Pits
- Adit Tunnel

Note: Elevation Not Accurate
1000' Contour Arbitrarily Set.

Department of
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ASSESSMENT REPORT
NO. 49 MAP #2

REPORT 49
MAP 1

BIRD MICA PROPERTY

PLAN

SHOWING

GEOLOGY & TOPOGRAPHY

SCALE 1"=40'

April 1950 Alfred K. Allen