

936001-05 PROPERTY FILE

014298

A Prospectus of

EMERALD



GLACIER

MINES LTD. (N.P.L.)



HEAD OFFICE: 4635 LAZELLE AVENUE, TERRACE, B.C., P. O. BOX 824

PROPERTY FILE

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
History	1
Property	2
SUMMARY	3
Recommendations	4
GEOLOGY AND ORE OCCURRENCES	5
Geological Setting	5
Ore Structures	5
Ore Grade	6
Exploration Potential	7
Reserves	8
Indicated Reserves	8
CONCLUSIONS & RECOMMENDATIONS	10
<u>ILLUSTRATIONS</u>	<u>following page</u>
Fig. 1 - Plan of Veins (1"-100')	4
Fig. 2 - Main Vein Ore Shoot (1"-100')	9

DOLMAGE, CAMPBELL & ASSOCIATES
CONSULTING GEOLOGISTS
808 BANK OF CANADA BUILDING
VANCOUVER 1, B.C.

INTRODUCTION

On August 1, 1965, the writer, in company with Messrs. Murdoch Robertson and Daryl Foote, of Terrace, B.C., examined the surface exposures and accessible underground workings of the Emerald Glacier mine located near the crest of Sweeney Mountain ridge at elevation 6000-6500 feet, 20 miles from the west end of Tahtsa Lake, B.C. The location, lat. $53^{\circ} 45'$ N and long. $127^{\circ} 15'$ W, is reached by the Alcan road from Houston, B.C., on Highway 16, and is connected to the Alcan road by six miles of switchback road up to the mine. The distance from Houston is about 60 miles.

The mine workings consist of three adit levels, designated by their elevations as the 6400, the 6000 and the 5400. The 5400 Level has 2000 feet of crosscut but is now caved at the portal. The 6000 Level has 1500 feet of drifts and crosscuts from which several thousand feet of diamond drilling have been done. The 6400 Level consists of about 800 feet of drifts with minor crosscuts and about 1000 feet of diamond drill holes. A length of 200 feet of drift has been stoped up approximately 100 feet from the 6400 Level, the surface, (top of the ridge), is about 40 feet further up. In 1966 a length of 60 feet of new stope was started south of the old stope, backs are down and it is now ready to mine.

HISTORY:

The property was staked as seven claims by W. J. Sweeney, D.J. Bensen and F. Madigan in 1915. Some opencuts exposed the main vein for a distance of 400 feet across the top of the ridge and down the south side, which is comprised of precipitous cliffs and talus slopes. The property was leased by James Cronin in 1917 and the vein traced for a length of 1500 feet with silver-lead values in it throughout. A drift adit was driven into the vein at elevation 6400 feet for a length of 124 feet in 1919, no values were encountered and the property option was dropped. The property was dormant until 1927 when Consolidated Mining and Smelting Co. Ltd. optioned it. (The property was accessible by trail from Houston or by boats down Ootsa Lake.)

From 1928 until 1931 Consolidated Mining and Smelting advanced the top adit (6400) several hundred feet and collared two others, the 6000 and the 5400 adits. Most of the lower level crosscuts were driven at that time. Consolidated Mining and Smelting dropped their option in 1931 and the property was dormant until 1950 when the Alcan road was constructed from Burns Lake to the east end of Tahtsa Lake.

In 1951 Emerald Glacier Mines Ltd. reopened the 6400 Level and did 400 feet of drifting and crosscutting, 150 feet of raising and 1100 feet of diamond drilling on that level. In addition, 1700 tons of ore were stoped and trucked 104 miles to Burns Lake to be shipped to Nelson, B.C. for milling. In 1952 the mine produced 2908 tons of ore from the 6400 Level stope and 300 feet of drift and 46 feet of crosscut were driven on that level. In addition, 656 feet of drifting, 470 feet of crosscutting and 3266 feet of diamond drilling were done on the 6000 Level. In 1953 twelve tons of "zinc ore" were shipped before the mine shut down because of ownership difficulties. This twelve tons ran 0.08 oz/t. Au, 15 oz/t. Ag, 55% Zn and 12% Pb.

In 1965 the present owners, represented by Mr. Murdoch Robertson, of Terrace, B.C., acquired and expanded the property, and in 1966 installed a 75 t./day mill and a new camp. In addition, the new owners took down backs on the main vein on the 6400 Level for a length of 60 feet and milled about 400 tons of ore, the concentrate for which was shipped to Trail in December, 1966, to give a net smelter return of \$9,097.

PROPERTY:

The mine property, termed the Emerald Glacier Group, is presently covered by nine mineral leases and eleven staked claims and fractions, designated as follows:

Leases

Glacier
Glacier 1-3 incl.
Emerald
Emerald 1-4 incl.

Staked Claims

M and M
M and M 1-3 incl.
Glacier Extension
Glacier Extension 1-3 incl.
David Fraction
Robertson
Robertson #1

SUMMARY

The Main (discovery) Vein on the Emerald Glacier property is exposed for 1500 feet on the surface across the crest of Sweeney Mountain near the east end of Tahtsa Lake, B.C. The vein is steeply dipping, strikes north, ranges in widths from 2 to 15 feet and contains local concentrations of zinc, lead and silver mineralization. The property is reached by 60 miles of good road from Houston, B.C.

The Main Vein is exposed for a length of 500 feet in an adit drift at 6400 feet elev. and for 200 feet in a drift at 6000 feet elev., although it is not certain if the vein on the lower level is the Main Vein. A bottom level, at 5400 feet elev., is beyond the area of the veins and is caved. An ore shoot on the Main Vein 200 feet in length and 10-12 feet in width was stoped above the 6400 Level in 1951-53, and 4566 tons of sorted ore were shipped to a mill in Nelson, B.C. This ore assayed 12.2 oz. Ag, 12.2% Pb and 11.5% Zn per ton, for a present gross value of \$90/ton. The stope run ore from this orebody probably averages about \$35/ton. Ore from adjacent, narrow veins and extensions of the Main Vein, probably averages about \$25/ton.

In 1966 the new owners of the company installed a 75 t./day mill on the property and constructed a mine camp. In preparing a new stope beside the old stope on the 6400 Level the new operators recovered 400 tons of ore which produced 132 tons of concentrate. The total net smelter return of the concentrate when shipped to Trail was \$9,097., for an equivalent value of \$22.75 per ton (development ore).

Geological features suggest that the veins become narrow and lean with depth at the south end of the property but may be very productive with depth to the north. No significant exploration has been done to the north of the 6400 Level stope below the surface.

Approximately 25,000 tons of \$35/ton ore are indicated by existing workings on the property, as well as 12-15,000 tons of \$25/ton ore, but sample records are sparse and should be better established.

The property has a possible potential, at depth to the north, of containing sufficient reserve tonnage of good grade ore to support a 200-250 tpd mill but this potential has not been investigated.

RECOMMENDATIONS: To better assess the property the underground workings should be mapped and sampled and the surface exposures freshened and sampled. The cost of such a program would be approximately \$5,000.

The Main Vein should be explored from the surface by drilling to the north. The cost of a minimum program would be \$15,000.


To develop the known ore below the 6400 Level a new level (6275) should be collared and 200 feet of new drift be driven on the Main Vein. Subsequently a raise should be driven to the 6275 drift from the existing 6000 ft. level to explore for ore below the 6275 Level. The total cost of this development would be approximately \$43,750.

To properly investigate the ore potential of the deposit headings should be advanced about 700 feet to the north on both the 6400 and 6275 Levels. Approximate cost of drifting and accompanying drilling would be \$125,000, but it should be deferred until such time as stopes are established on the 6275 Level.

Total expenditure for all immediate (Phase 1) recommendations = \$ 63,750.00

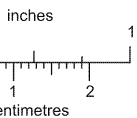
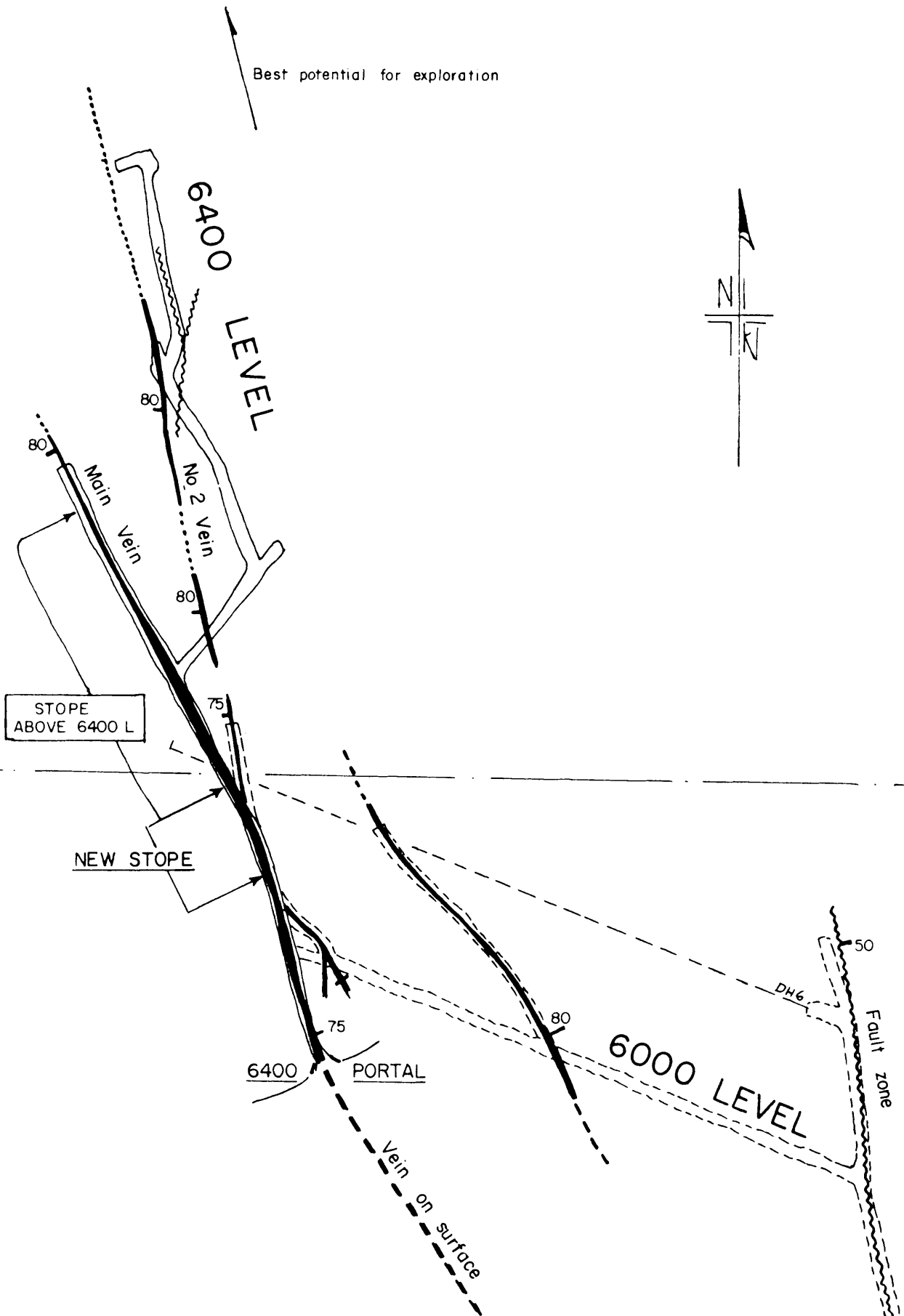
Expenditure for future underground exploration and development = \$ 125,000.00

Respectfully submitted,



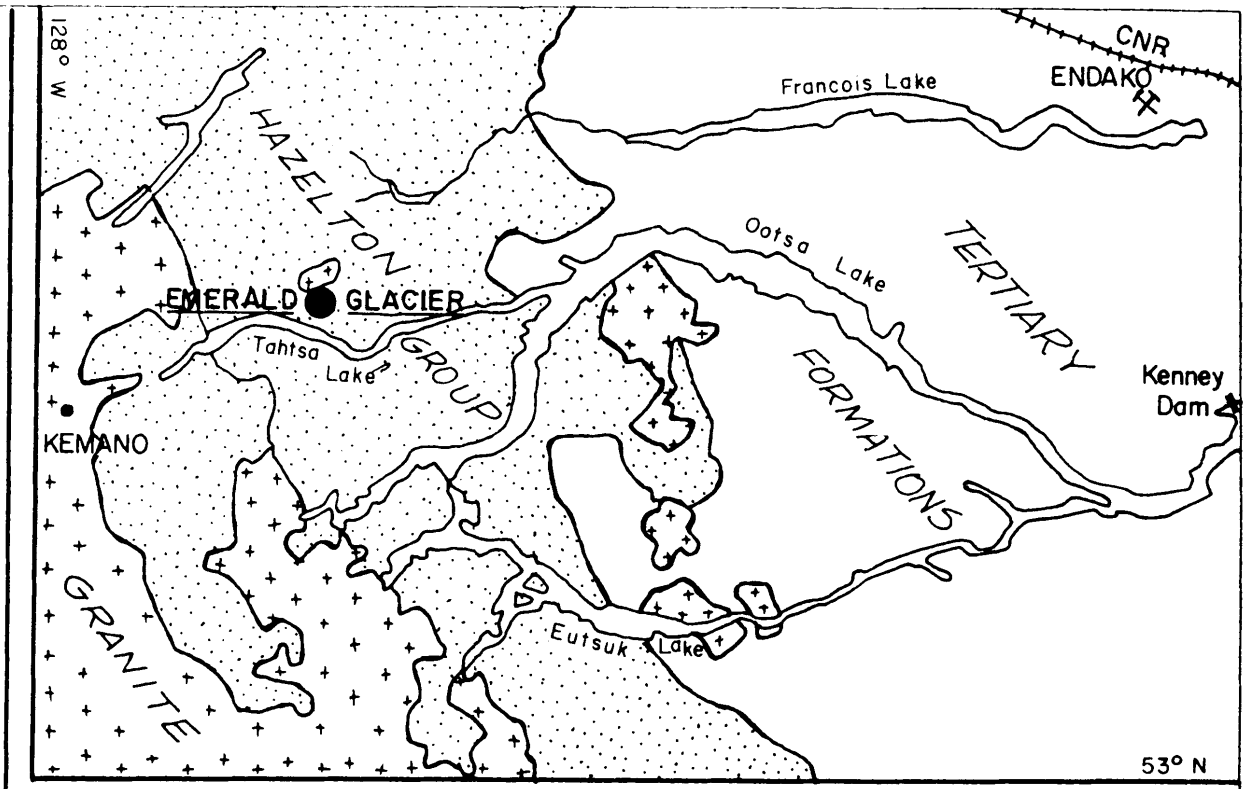
Douglas D. Campbell, P.Eng., Ph.D.

Best potential for exploration



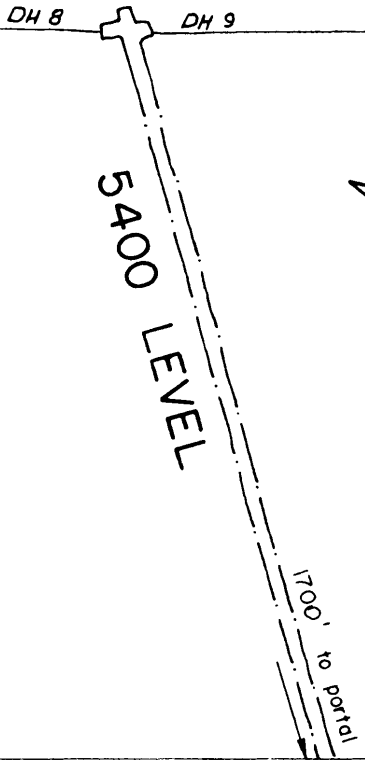
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.





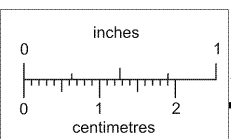
LOCATION and GENERAL GEOLOGY

1" = 20 mi.



Donald Campbell

DOLMAGE-CAMPBELL & ASSOCIATES		CONSULTANTS
VANCOUVER, CANADA		
EMERALD GLACIER MINES LTD.		
TERRACE, B. C.		
PLAN OF VEINS - UNDERGROUND		
<u>EMERALD GLACIER MINE</u>		
TAHTSA LAKE, B. C.		
SCALE: 1" = 100'	Feb. 8 1967	FIG. 1



This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



GEOLOGY AND ORE OCCURRENCES

GEOLOGICAL SETTING:

The mine area is underlain by Hazelton Group rocks of mid-Jurassic Age. These rocks are largely comprised of andesitic flows, bedded tuffs, agglomerates and intercalated sedimentary rocks. On Sweeney Mountain, at the mine, these formations are generally gently dipping and are locally flat-lying; however, in the surrounding ridges and peaks the same formations are more warped and locally tightly folded. The predominant rock types in the immediate mine vicinity are bedded tuffs, with some argillites, which have been irregularly and locally intruded by aplitic to granitic dikes.

Immediately to the north and east of the mine area two stocks of granodiorite, the largest about one mile in diameter, are intrusive into the Hazelton Group rocks. The main eastern flank of the Coast Range Batholith crops out about fifteen miles due west of the mine. (Insert, Fig. 1)

The most obvious structures in the area are north-trending, steeply-dipping regional fault zones. The rock formations are generally highly disturbed in the immediate vicinity of these fault zones although actual displacement on them does not appear to be very great. The Emerald Glacier Mine is situated entirely within one such fault zone which cuts directly across the Sweeney Mountain ridge. This zone appears to be encompassed by two major parallel steeply dipping faults which are about 1000 feet apart. The two boundary faults dip 70° - 80° to the east. The bedded tuffs, etc. through which this sheared zone cuts are gently east-dipping on both sides of the zone but within the zone they strike slightly west of north, parallel to the sheared zone, and dip 45° - 60° to the east, across the zone.

The ore structures at Emerald Glacier Mine are mineralized shear or fault zones which strike approximately parallel to the bedding of the tuffs and sediments within the regional faulted zone but dip both 60° to 80° eastward and 80° westward, thus slanting across the bedding. At least four such vein-fault zones are exposed in the middle (6000) adit level but only two are mineralized with ore-vein material. At least two vein-fault zones are exposed in the top (6400) Level. (Fig. 1)

ORE STRUCTURES:

The discovery and main vein structure at the Emerald Mine strikes $N10^{\circ}W$ and dips vertically to 80° east and west. It is exposed intermittently for a length of 700 feet to the north across the flat-top mountain ridge and, in that interval, ranges in width from 4 to 12 feet. To the south the vein is exposed down the rock bluffs from the portal of the 6400 Level down to 100 feet west of the 6000 Level portal, a plan length of 700 feet. In the exposure between these two portals the vein narrows down to a

shear one foot in width by elevation 6200 feet. On the 6400 Level this main vein has been drifted for a length of 450 feet from the portal on the south side of the ridge. At the portal the vein is six feet in width, by 150 feet in from the portal it widens to 7-12 feet, by 400 feet it narrows and at the face, 500 feet from the portal it is two feet in width. In this interval it changes dip from 70° east at the portal to 80° west at the face. The vein zone is comprised of gouge planes, chloritized and brecciated wallrock, massive and comb quartz, bands of marmotitic sphalerite and local lenses, up to several feet in width, of galena. At the face the vein zone is a quartz shear along which sphalerite has been deposited in a band about six inches in width.

East of the Main Vein, on both the 6400 Level and the 6000 Level, workings and drill holes have disclosed three or four parallel mineralized shear zones which pinch and swell but are only locally much wider than two feet and which are mineralized predominantly with quartz, sphalerite and carbonates. The 6000 Level main drift exposes a length of 600 feet of barren shear zone from two to six feet in width, dipping 60° to the east, and comprised principally of gouge, graphite and argillic wallrock with very minor carbonate and sphalerite vein filling.

Although any one of the vein zone structures may be wider along strike to the north the only one of commercial interest in the present exposures is the Main Vein on the 6400 Level.

ORE GRADE: The widest and most mineralized portion of the Main Vein on the 6400 Level extends from 200 feet to 400 feet in from the portal. The zone pinches to a sparsely mineralized shear zone at either end of this interval. This productive section of the vein zone has been stoped up approximately 70 feet at a 45° rake to the south (See Fig. 2). There is about 40 feet of pillar remaining between the stope back and surface. The vein in this pillar is about ten feet in width and is predominantly quartz with persistent lenses locally several feet in width, of sphalerite and galena. It is apparent that about 12,000 tons were excavated from this stope of which 4566 tons was sorted and shipped during 1951-53 and the remainder remains as backfill in the stope.

The grade of the 4566 tons of sorted ore that was shipped was:

12.2 oz. Ag, 12.2% Pb and 11.5% Zn per ton.

At present metal prices (\$1.40 Ag, 12¢ Pb-Zn) this represents a gross value of approximately \$74. per ton. This, of course, is sorted ore, the grade of the run of stope ore, judging from drill intersections and a few available samples, would probably be about 4 oz. Ag, 2% Pb and 7% Zn for a gross value of about \$25. per ton. What appears to be the Main Vein on the 6000 Level assays about 3 oz. Ag, 1.3% Pb and 10% Zn across a width of 1.5-2 feet. Taken to a three feet mining width the gross value

of this ore would be approximately \$20 per ton. The grade of the new backs taken down on the Main Vein south of the old stope, was \$22.75/ton, net smelter return. Since this material is more diluted than stope ore would be, it is evident that the ore will probably have a net smelter value of at least \$25/ton.

It is evident that most of the silver values are found with the galena and that therefore the very narrow veins of sphalerite are probably not ore under any circumstances. The sorted ore from the Main Vein could possibly be shipped, but because of shipping and smelter charges the profit would be modest. Since a small mill has been installed on the property it should be possible to operate the mine at a profit and generate enough working capital to fully investigate the full potential of the property.

EXPLORATION POTENTIAL: There are good exposures showing that the Main Vein narrows down to a one or two foot width proceeding downhill to the south from the 6400 Level portal. Also, on the 6000 Level none of the exposed vein zones are as wide or as well mineralized as those exposed on the 6400 Level, although there is not enough information available to be certain they are the same structures. On the 6000 Level the writer identified a number of aplitic and granitic sills or dikes throughout the workings. Drill logs from the Consolidated Mining and Smelting drilling identify most of the rock on 6000 Level as "light coloured fine grained altered andesite" or "porphyritic andesite", and all of the rock on the 5400 Level as "altered andesite with some granodiorite". In the two long holes drilled on the 5400 Level, spanning 2000 feet in an east-west direction, only three vein zones were intersected and they were tight, narrow and weakly mineralized.

From the foregoing evidence it appears that there is a radical change in country rock type from the bedded tuffs at and above the 6000 Level, to a more competent massive, possibly intrusive rock below that level, at least in the southern portion of the property. It is also suggested that this deeper rock is inhospitable for ore occurrences. This is further suggested by the fact that in 1951-52 at least ten diamond drill holes were drilled on the 6000 Level to the west toward the Main Vein and apparently did not return sufficiently encouraging results to warrant more work in that area.

However; the rake of the Main Vein ore shoot down to the north from the 6400 Level suggests that exploration on the 6000 Level should be extended at least 700 feet further north from the present face on that level. Also, the surface exposures reveal that the Main Vein continues as a wide mineralized structure for nearly 1000 feet north from the 6400 Portal, yet underground exploration extends only 500 feet along this structure. It is clear that exploration of this property should be taken further north and be concentrated above the 6000 Level.

RESERVES:

No sample records of the Emerald Glacier mine workings were available for this report, nor is there any record of the 3366 feet of diamond drilling done underground in 1951-52 although the collars of all the holes were located by the writer during his examination. From available information it is evident that the stoping in 1951-53 was done on an ore shoot on the Main Vein about 200 feet in length and averaging ten feet in width. This ore shoot rakes down the vein to the north, therefore the workings directly below it on the 6000 Level have not yet reached the downward extension of the ore shoot. The Main Vein has not been explored at depth below the 6400 Level, nor further north of the known ore shoot.

On the 6400 Level a strong, mineralized shear zone, No. 2 Vein, lies 40-100 feet east of the Main Vein but has only been exposed in a crosscut and in 30 feet of drift. It is up to three feet in width and is locally well mineralized with quartz and sphalerite.

Two vein zones, 2-3 feet in width, mineralized with quartz, sphalerite and some galena, are exposed by 200 feet of drift each on the 6000 Level. These may be the downward extensions of the Main Vein and the No. 2 Vein but if they are then these vein zones have changed direction of dip between the 6400 and 6000 Levels, which is not unexpected in steep shears such as these.

In 1966 the new owners took down the backs of the Main Vein drift for a length of 60 feet toward the portal from the south end of the old stope. (Fig. 2). This material proved to be mill grade ore and indicates improved potential for the lower grade types of vein material.

INDICATED RESERVES: The backs of the drifts on vein on the 6400 and 6000 Levels should be sampled at five feet intervals to determine the exact grade available in the exposed veins. This should also be done along the stope back. Without grades for guidance tonnages only can be estimated for those veins carrying visual, appreciable quantities of sulphides.

1. Presumably the remaining ore between the stope and the surface is of good grade:

Surface pillar = 5000 tons (@ \$30-\$40/ton?)

2. The new stope ore is mill grade of about \$20. (net)/ton and suggests the existence of similar ore above and below the level:

New ore = 6000 tons

3. Presumably the stoped ore continues at least 100 feet below the 6400 Level on the north rake:

Below 6400, Main Orebody = 20,000 tons

4. It is possible that the No. 2 Vein and the two veins on the 6000 Level will have sufficient grade to constitute ore, in which case, if such ore extends 50 feet above and below the drifts, there may be in these sources:

Subsidiary veins = 12,500 tons

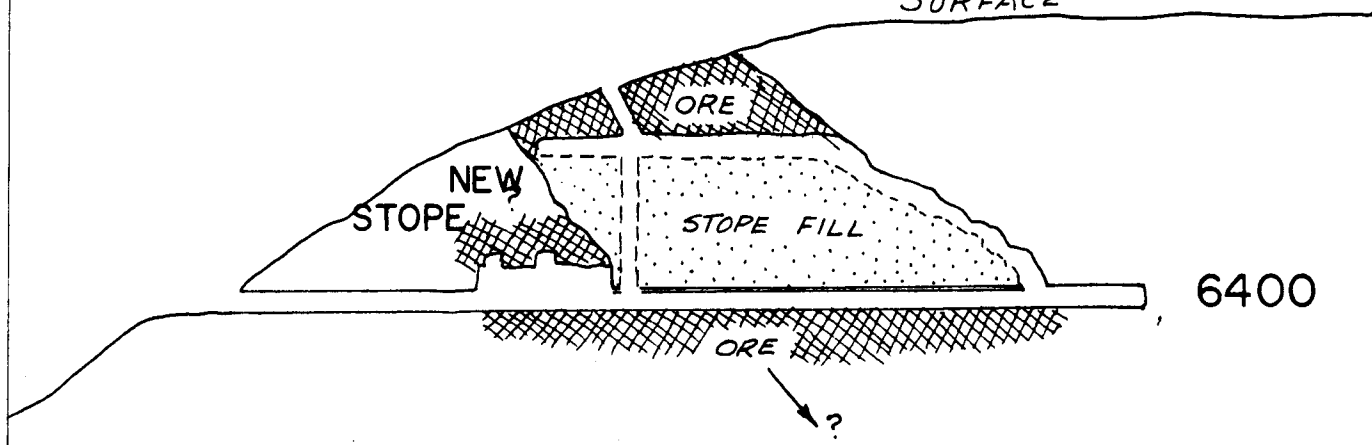
The foregoing figures are intended to be merely a guide to indicate the general range of tonnages that may be available in the present workings. Thus, the total proven and indicated tonnage is about 45,000 tons, with possible potential to the north and at depth for 10-20 times that tonnage.

If a reasonable grade can be determined for these veins and if further development provides more tonnages, then the property may have sufficient profitable reserves to warrant a larger mill. It is doubtful if enough high grade ore can be obtained to return any appreciable profit by shipping ore to a smelter from this remote location.

SOUTH

NORTH

SURFACE



6400

6275

ADIT
X-CUT
125'

DRIFT 200'

RAISE 270'

PROPOSED
NEW
DEVELOPMENT

6000 Level

DOLMAGE - CAMPBELL & ASSOCIATES CONSULTANTS
VANCOUVER, CANADA

EMERALD GLACIER MINES LTD.
TERRACE, B.C.

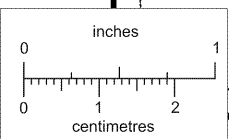
LONGITUDINAL SECTION
MAIN VEIN ORE SHOOT

EMERALD GLACIER MINE

SCALE: 1" = 100'

Feb. 8, 1967

FIG. 2



This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

CONCLUSIONS & RECOMMENDATIONS

Underground development and stoping on the Emerald Glacier Mine to date have indicated the presence of good, continuous ore structures within which occur profitably minable amounts and grades of zinc-lead-silver ore. Not enough exploration has been done in the best places on the property, to the north of the present workings, particularly on the 6000 Level, to properly assess the potential of the deposit. The geology suggests that the ore potential to the south at depth is poor but that the potential to the north and possibly at depth in that direction, is good. The favourable geological setting, the good size and grade of the known orebody, as well as the complete lack of exploration to the north at depth, all strongly indicate that further exploration of the property is warranted and that the potential to support at least a 200-250 tpd mill may well exist on this property but has not yet been sufficiently investigated.

RECOMMENDATIONS: A program of progressive projects can be set up to gather information in stages which will indicate the wisdom of proceeding with successively more costly stages. Such a program is recommended as follows:

PHASE 1:

1.	Sample the drift and stope backs on the 6400 and 6000 Levels at five foot intervals. (Or obtain sample records from the 1951-53 operators, presumably in Nelson, B.C.)	\$ 2,500.00
2.	Remap geology of 6400 and 6000 Levels and relog the 1951-53 drill core in the workings. (Or obtain old logs)	\$ 500.00
3.	Sample all fresh surface exposures, preferably bulldozer cuts to the north of the Main Vein raise.	\$ 2,000.00
4.	Drill the Main Vein from the surface at 100 feet spacing north of the stope to intersect the vein 100 feet below surface.	\$ <u>15,000.00</u>
	TOTAL:-	\$ <u>20,000.00</u>

PHASE 2: (Production and development)

1.	Stope up on old and new stopes. Pull and mill old stope fill.	(Profit generated) " "
2.	Collar a new adit on the 6275 Level, drive 125 ft. to vein drift 200 feet or more on ore (325 ft. @ \$50./ft.)	\$ 16,250.00
3.	Drive raise from 6000 Level to the 6275 Level (275 ft. @ \$100/ft.)	\$ 27,500.00
	TOTAL:-	\$ <u>43,750.00</u>
	<u>TOTAL OF PHASES 1 and 2:-</u>	<u>\$ <u>63,750.00</u></u>

PHASE 3: (To be done only if the foregoing work is successful)

- | | | |
|----|--|-------------------|
| 1. | Drive 700 feet from face of west drift on 6000 Level.
Drive 800 feet from face of No. 2 Vein drift on 6400 Level. Crosscuts to veins and stub drifts. 500 feet. | \$100,000. |
| 2. | Drill off Main Vein and No. 2 Vein above drives. | <u>\$ 25,000.</u> |
| | TOTAL:- | <u>\$125,000.</u> |

Respectfully submitted,



Douglas D. Campbell, P.Eng., Ph.D.

February 8, 1967

DOLMAGE, CAMPBELL & ASSOCIATES
CONSULTING GEOLOGISTS
808 BANK OF CANADA BUILDING
VANCOUVER 1, B.C.

February 8, 1967

CERTIFICATE

I, Douglas D. Campbell with business and residential addresses in 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, (B.A. Sc., Geological Engineering, 1946), and of the California Institute of Technology, (PhD., Economic Geology and Geophysics, 1955).
3. I am a registered Professional Engineer of the Province of British Columbia.
4. From 1946 until 1957 I was engaged in mining and mining exploration in Canada and the United States as geologist for a number of companies. I was chief geologist for Eldorado Mining and Refining Co. Ltd. when I retired in 1957 to begin private practice as a consulting geologist.
5. I personally have visited the Emerald Glacier mine and reviewed all the available reports, maps and drill results.
6. I have not received, nor do I expect to receive, any interest directly or indirectly in the properties or securities of Emerald Glacier Mines Ltd.

Respectfully submitted,



Douglas D. Campbell, B.A.Sc., Ph.D., P.Eng.
Vancouver, Canada.