

REPORT ON PROPERTY EXAMINATION  
Presented by: A. J. Fennel of Barrier, B. C.  
EAST BARRIER LAKE, JOHN CREEK, B. C.  
PROPERTY SUBMITTED AS Cu:Ni  
N.T.S. 82M/5E (1:50,000)

Vancouver, B. C.  
January 31, 1977

B. Manchuk

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J. Baker, November 30, 1971
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J. A. Fennel

### LOCATION AND ACCESS

The property is located approximately 1/4 mi. from John Creek at approximately 3400' A.S.L. and is some 20 mi. from the town of Barriere along a good logging road.

### CLAIM GROUP

Mr. Fennel presently holds claims Joy 1-4 and Lee 1-15.

### BRIEF HISTORY

The property has been worked in the past, the most recent work being by Canadian Superior on the Bex Group in 1971 on an option from Barriere Exploration. The Canadian Superior work was quite thorough, involving I.P., mapping and geochemistry over the present Fennel showing. Canadian Superior drilled the most favourable I.P. (corresponding geochem) anomaly which is somewhat removed ~1/2 mi. from the Fennel showing. Drill results were discouraging, the best intersection being 170' of 0.05% Cu. (See enclosed Canadian Superior Reports).

### GENERAL GEOLOGY

The Fennel showing is within late Paleozoic meta-sediments, chlorite schists and argillites which flank the Harper Creek Batholith. Noranda's deposit along Harper Creek is supposedly in a similar environment.

Mr. Fennel's trench (which I believe is a freshened up older trench), is some 40x4x2 ft., and exposes chlorite and argillite schists which trend  $110^{\circ}/65N$ .



ENGINEERS AND MAPPING BRANCH,  
 AND TECHNICAL SURVEYS  
 1962. Field Surveys and Culture  
 1962.

NTS 82m/SE  
 1:50,000

# BARRIER LAKE

The schists carry significant pyrrhotite (up to 40% across 2') and lesser chalcopyrite. Mineralization is roughly concordant to bedding. The small sketch shown on the enclosed assay sheet shows the location of 8 chip samples taken across the trench and the location of an old packsack hole (drilled by Barriere?) which probably only weakly crosscuts the bedding. The property was presented as a Cu-Ni show, but probably has more affinities with a Cu-Zn deposit.

#### RESULTS

In view of the rather discouraging assays returned, the property was turned down but suggestions were made to Mr. Fennel for further exploration work (see enclosed letter).

Canadian Superior was undoubtedly aware of the showing as a 'pit' appears on their maps which Mr. Fennel so kindly made available to me. The showing lies within their 'skarn zone' and they state:

"A narrow well defined anomaly coincident with exposed skarn mineralization." "I.P. profiles indicate anomalous conditions are not persistent with depth."

Enclosed: 1. Location map 2. Copy of Canadian Superior Bex and Souvenir report 3. Copy of letter and assays sent to Mr. Fennel.

Vancouver, B.C.

B. Manchuk

February 15, 1977

CANADIAN SUPERIOR EXPLORATION LIMITED

Kamloops            British Columbia

BEX PROJECT

Kamloops M.D.        NTS 82 M/5

SUMMARY REPORT

J. Baker

November 30, 1971

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INTRODUCTION

The Bex property is situated along the S.E. contact of the Harper Creek batholith, approximately a half mile S.E. of East Barriere Lake, and is owned by Barriere Explorations Ltd. On August 5, 1971 Canadian Superior Exploration Limited and Barriere Explorations Ltd. entered into an option agreement whereby the former could earn a majority interest in the property.

This report summarises work done on the Bex property to date.

SUMMARY

The claims are underlain by late Paleozoic metasediments and metavolcanics adjacent to the Southeast contact of the Harper Creek batholith. Several major showings, notably the Noranda deposit, occur in similar host rocks elsewhere along the margins of the batholith, particularly thin chloritic metavolcanic units. These deposits are all susceptible to geochemistry and I.P.

Work done by Canadian Superior on the Bex property consisted of geological mapping, approximately 50 line miles of soil and silt geochemical surveys, 14 line miles of I.P. and 1360 feet of diamond drilling incurring a total cost of approximately \$33,000 over a period of four months.

Three anomalous areas, the East, West and skarn zones respectively were outlined by geochemical and I.P. surveys.

East Zone

A strong soil geochemical anomaly (>100 ppm <1400 ppm Cu.) 1000' wide x 4000' long trends approximately 290° from L.52S 60W to L.20S 80W and is apparently conformable with the trend of the underlying quartz biotite gneiss which dips 45° S.W. Coincident with the soil anomaly is a well defined I.P. conductor as indicated by a N=2 PFE contour plot exhibiting values three to four times background, and a resistivity low.

Three BQ diamond drill holes totalling 1360' were drilled trending N20° E@ - 45° at two sections 1600' apart to intersect downdip extensions of the anomaly. A total strike length of 3200' was thus effectively covered.

Mineralization intersected consisted of pyrrhotite, pyrite with only minor chalcopyrite, the best intersection, DDH 71-3 10'-180' assaying 0.15% Cu.

#### West Zone

A broad area of strong but erratic I.P. response occurs from L.68S 140W-160W to L.20 135W-160W. Silt and soil geochemical response over the area was very poor. This anomaly is open to the N.W. and S.E. Trenching was attempted over the central part of the anomaly, but bedrock was not reached. A small trench at L.52S 138W at the Southeastern end of the anomaly exposed graphitic metasediments in contact with a biotite quartz diorite dike.

#### Skarn Zone

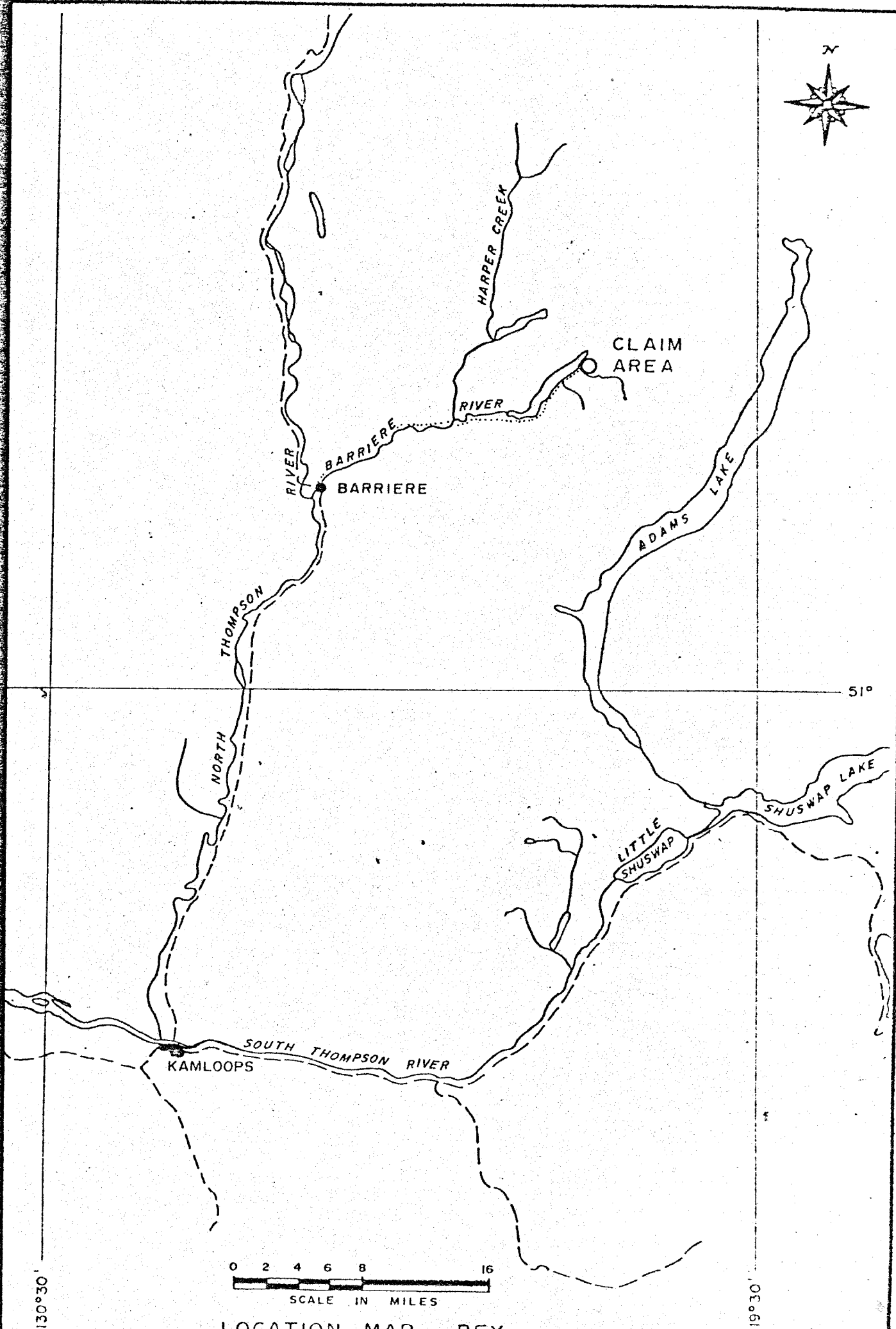
A mineralized skarn zone approximately 25' wide is exposed in trenches at L.48S 110W and 40S 114W. Chalcopyrite mineralization, where observed, is discontinuous along strike and as indicated by I.P. and X-ray drilling by Barriere Explorations, down dip.

#### CONCLUSION

Drilling results on the East zone were not encouraging. Anomalous I.P. response is attributed to a broad zone of conformable disseminated pyrrhotite pyrite and very minor chalcopyrite mineralization. Total sulfide content approaches 2%. Geochemical anomalies appear to be residual corresponding semi-quantitatively with the copper content of the underlying metavolcanic units (400-1500 ppm Cu.) It is therefore concluded that the East anomaly has been adequately tested, returning negative results.

In view of exposed graphitic metasediments on L.52S 138W, poor soil and silt geochemical response and the broad erratic nature of the I.P. response, the West anomaly is not considered to be economically significant.

The skarn zone appears to be discontinuous with erratic copper distributions.



LOCATION MAP - BEY

RECOMMENDATIONS

Diamond drilling of geochemical and geophysical targets produced little encouragement. It is therefore recommended that the option agreement be terminated November 30, 1971.

LOCATION & ACCESS

The property is located approximately 15 miles East of Barriere and 1/2 mile East of the Northeast end of East Barriere Lake.

Access to the property is via 13 miles of improved gravel road from Barriere, thence 9 miles by unimproved gravel road from the West end of East Barriere Lake to the central claim area.

For the purpose of mining operations, the property is strategically located with regard to transportation links, source of electric power and water supply.

PHYSICAL FEATURES.

The area has been glaciated by ice movement from the Northeast resulting in extensive drift cover. Bedrock is poorly exposed.

The property is situated on a Northwesterly facing slope to East Barriere Lake exhibiting a relief of close to 3000'. Gradients are of order of 20% with a distinct topographic bench trending Northeasterly across the central part of the claims.

Cedar and hemlock rain forests with moderately heavy windfall undergrowth characterize most of the area, however, old skid roads provide relatively easy access.

CLAIM STATUS

Prior to July, 1971 the property consisted of 63 claims held by Barriere Explorations Ltd. since 1966 and 1967. A further 91 claims owned by Canadian Superior in 1971 by the terms of the option agreement now constitute a part of the Bex property. A description of the claims is appended.

PREVIOUS WORK

In 1967 W.S. Read, P. Eng. was retained to conduct a magnetic and soil sampling survey on Bex #1 and Bex #2 claims to outline skarn mineralization exposed in early trenches (L.48S 110W). A subsequent EM16 survey over the same area indicated two conductors, one of which coincided with a magnetic high.

In 1968 five X-ray holes were drilled, in conjunction with additional trenching, on EM16 and magnetic targets. No significant copper mineralization was encountered.

In 1969 two additional X-ray holes totalling approximately 60' were drilled in the vicinity of L.92S 98W to fulfill assessment requirements. Very minor chalcopyrite mineralization ( $\leq 0.15\%$  Cu.) was encountered over widths in excess of 40' in foliated locally chloritic rhyolitic rocks.

Previous work on the Bex property indicated the presence of disseminated chalcopyrite mineralization occurring in a metavolcanic sequence traceable across the Barriere Lakes area. Several copper showings, notably the BL property occur within this group of predominantly rhyolitic rocks.

REGIONAL GEOLOGY

The Harper Creek batholith (Cret.) intruded a folded sequence of Cache Creek Permian metavolcanics, schists, phyllites and limestones. Related to this intrusion were the development of gneissic zone peripheral to the batholith and an open syncline parallel to the South contact.

Within Cache Creek rocks a favorable metavolcanic unit characterized by quartz-eye rhyolites trends northwesterly across the Barriere Lakes area. The Bex property covers the gneissic Southeastern part of this unit adjacent to the contact.

GEOLOGY

Poor outcrop exposure inhibited the mapping of detail structural and stratigraphic relationships. It is evident however, that a sequence of metavolcanic rocks is overlain by a predominantly metasedimentary unit. The inferred contact between the two units trends northwesterly across the central part of the claims. Metavolcanic rocks are in contact with the batholith in the vicinity of T.L. 40+00W. Numerous conformable quartz diorite dikes occur for the most part within the metavolcanic sequence, and parallel the Northwesterly trending batholithic contact.

Lithology

## (a) Metamorphic -

Metasedimentary rocks observed are predominantly argillite/shale derivatives consisting of grey pelitic schists, graphitic schists, minor quartzite and quartz sericite schists. Local stratigraphy is unknown.

The metavolcanic unit consists largely of rhyolite derivatives which become more gneissic towards the batholithic contact. Medium grained biotite quartz-eye rhyolites occur near the Sedimentary contact. Underlying rhyolite is a narrow skarn zone developed in a limy horizon. Near Harper Creek medium graded quartz feldspar biotite hornblende gneiss grades into fine grained quartz biotite gneiss and then back again. The area of the chem/I.P. anomaly is underlain by a quartz biotite gneiss horizon locally enriched in brown biotite and chlorite, which grades into medium to coarse grained quartz feldspar biotite hornblende augen gneiss towards the granite contact.

Two intrusive phases are present:

(1) The Harper Creek batholith consists largely of coarse grained biotite granite with what appears to be a medium grained chill margin.

(2) Medium grained locally porphyritic biotite quartz diorite dikes occur at several localities in the East Central map area. These dikes are apparently conformable and may be related to a late stage of batholith emplacement.

6.

### Structure

#### (a) Folding -

Country rocks trend Northwesterly and dip gently to the southwest becoming steeper to a maximum of 50° S.W. at the intrusive contact. Minor folding along axes trending Northerly is indicated but accurate tracing of these folds is inhibited by lack of outcrop. In the vicinity of Deadfall Creek there is evidence of recumbent folding in metasedimentary exposures.

#### (b) Faulting -

No major faults have been observed on the property. The topographic lineament represented by the upper part of John Creek may be tectonic. The predominant direction of widely spaced fractures where observed on the property is Northeasterly, paralleling the trend of regional lineaments in the Barriere Lakes area.

### Metamorphism

Low grade regional metamorphism of sediments and volcanics probably accompanied an early period of isoclinal folding. Contact metamorphism during batholith emplacement formed a gneissic zone 0-1 mile wide peripheral to the granite. No economic significance is attached to metamorphism.

### Alteration

Disseminated mineralization on the property appear to be related in a broad sense to chloritic and biotite rich zones within metavolcanic units. Additional alteration other than skarn (L.48S 110W) adjacent to a quartz porphyry dike is not evident.

### Mineralization

Chalcopyrite is the only economic mineral noted on the property. Pyrrhotite and minor pyrite are common to both the East anomaly and the skarn zone, but are not proportionately related to copper content. Disseminated magnetite is associated with skarn mineralization particularly where exposed in trenches Northwest of L.48S 110W.

ECONOMIC GEOLOGY

Three mineralized areas are known: the skarn zone, the East zone and mineralization encountered in an X-ray hole near L.92S 98W. Geologic and geochemical surveys indicate the East zone to be the most important. Within the latter two, sparse chalcopyrite occurs primarily as disseminations in fine to medium grained quartz biotite gneiss, a rhyotite derivative. Water intersections from the East zone appear to be related to increases in iron, manganese, and iron biotite and chlorite. No useful structural controls other than the generally conformable nature of the mineralization are evident.

The absence of strong secondary structure and well developed schistosity occurring in rhyotitic rocks as observed on nearby properties, may bear a direct relationship to low copper values. Mineralized fractures normal to schistosity indicative of more than one stage of mineralization do occur on the property, but are very widely spaced.

CHEMISTRYSurvey Method

Soil sampling of the "B" horizon at chained 200' intervals along grid and flagged lines 400' apart was utilized to locate anomalous areas. A soil drainage survey was made in conjunction with the soil survey to elicit response from areas of deep or otherwise unfavorable overburden. Control was provided by a base line (100W) and five tie lines (40W, 70W, 130W, 160W).

Sample Analysis

All samples were dried and sieved to remove the minus 80 mesh fraction which was then analysed for total copper content using hot  $\text{HNO}_3$  digestion. Sample preparation and analysis were performed by Falconbridge Metal Mines Laboratories in Vancouver.

Results

Values in excess of 100 ppm copper are considered anomalous. On this basis two geochemical anomalies are indicated:

## (a) East Anomaly -

A strong soil geochemical anomaly (100-1400 ppm Cu.) 800'



de x 4000' long trends approximately 290° from L.52S 60W to L.20S 80W apparently conformable with the trend of the underlying quartz-biotite gneiss. The zone is open to the Northwest at the Bex/Souvenir Mines property boundary. Examination of sample sites in this area indicates that in many cases the " horizon had been sampled because of minimal overburden.

(b) West Anomaly -

Scattered geochemical highs, mostly of the order of 100-150 ppm, occur over a broad area from L. 100S 112W to L.56S 130W. Although overburden deep in many places, this anomaly is considered to have only secondary importance largely on the basis of the drainage survey which returned low values except where stream gradients decreased rapidly.

PHYSICS

Survey Method

Fourteen line miles of I.P. were run to locate possible drill targets in anomalous areas as indicated by geochemistry. Alternate geochemical survey lines (800' apart) were used for the I.P. Survey.

Instrumentation

Instrumentation for the survey consisted of McPhar P660 (frequency domain) I.P. unit with operating frequencies of 0.3Hz and 5Hz. Electrode spacing was maintained at 300'. Multiple electrode separations were kept to n=3.

Results

Three anomalous areas were indicated by the I.P. survey.

(a) East Zone (L.52S 60W to L.20S 80W)

A moderately strong well defined anomaly as indicated by a resistivity low and an n=2 PFE contour plot exhibiting values three to four times background. I.P. response shows a tendency to increase towards the Bex/Souvenir property boundary. This anomaly is attributed to sulfide mineralization.

## (b) West Zone

A broad area of strong but erratic I.P. response occurs from L.68S 140W-160W to L.20S 135W-160W and is open to the Northwest and Southeast and Southwest. This anomaly is attributed to graphite and micaceous meta-sedimentary units.

## (c) Skarn Zone (L.48S 110W to L.40S 114W)

A narrow, well defined anomaly coincident with exposed skarn mineralization. I.P. profile indicate anomalous conditions are not persistent with depth.

DIAMOND DRILLING

A diamond drilling program was initiated to test the East anomaly at two sections 1600' apart. Three BQ diamond drill holes located to intersect downdip projections of I.P. and geochemical anomalies were completed by Connors Drilling. A cost of approximately \$14,000 was incurred in drilling a total of 1360'.

Drilling results were not encouraging. Sulphide mineralization consisted primarily of pyrrhotite, pyrite with only minor amounts of chalcopyrite. The best section, DDH 71-3, 280'-330' averaged only 0.15% Cu. Total sulphide content of the anomalous zone ranged from 0.5% to >3%, offering a plausible explanation of I.P. response. In view of the residual nature of much of the overburden the amount of chalcopyrite present is considered sufficient to account for the soil geochemical anomaly.

## DDH 71-1 (Section 40 s)

Location: T/L 70W 37+00s

Bearing : 20°

Dip : -45°

Depth : 500' overburden 9'

Purpose : To intersect the highest part of the I.P. anomaly (8PFE)

Results : Mineralization intersected consisted of pyrrhotite, pyrite and very minor chalcopyrite disseminated in locally chloritic quartz biotite gneiss. Total sulphide content was of the order of 1-2%. Assays returned for the most part 0.05-0.10% Cu. Sulphide content of the core adequately explained the I.P. anomaly.

## 71-2 (Section 40 s)

ation: 300' S-20°-W from 71-1

ring : N-20°-E

: -45°

th : 360'

pose : To intersect the Western part of the I.P. anomaly thus completing an 800' true width intersection of metavolcanics underlying the anomaly.

ults : Rock type closely resembled that in 71-1. Two narrow bands of foliated quartz-eye rhyolite were encountered in the lower part of the hole. Pyrrhotite, pyrite and minor chalcopryite usually amounted to less than 1%. The best intersection 280'-330' corresponding with an overall increase in sulphides assayed 0.15% Cu. which in view of the shallow overburden adequately explains the local geochemical high.

## 71-3 (Section 24 s)

ation: 80W 26S Approx. 1600' @ 290° from 71-1

ring : N-20°-E

: -45°

th : 495' 11' overburden

pose : To test coincident geochemical and I.P. anomalies

ults : Mineralization consisted of pyrrhotite, pyrite and minor chalcopryite disseminated in quartz-biotite gneiss occurring predominantly in the upper 240'. An increase in brown biotite and chlorite corresponds roughly to a general increase in sulphide content which approximated 2% from 0-240' decreasing to 0.5% towards the bottom of the hole. Two sections assayed 0.3% Cu., 20 - 30' and 100 - 110' but the better section 10 - 130' averaged only slightly more than 0.1% Cu. As in previous holes, sufficient sulphides were encountered to offer a plausible explanation of I.P. and geochemical anomalies.

CANADIAN SUPERIOR EXPLORATION LIMITED

Kamloops

British Columbia

SOUVENIR PROJECT

Kamloops M.D.

NTS 82 M/5

SUMMARY REPORT

J. Baker

November 30, 1971

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## INTRODUCTION

The Souvenir Mines property is situated along the southeast contact of the Harper Creek batholith, on the southeast side of the north end of East Barriere Lake. In October, 1971 Souvenir Mines Ltd. and Canadian Superior Exploration Limited entered into an option agreement whereby the latter could earn a majority interest in the property.

This report summarises work done on the Souvenir property to date.

## SUMMARY

The claims are underlain by late Paleozoic metasediments and metavolcanics adjacent to the southeast contact of the Harper Creek batholith. Several major showings, notably the Noranda deposit, occur in similar host rocks elsewhere along the margins of the batholith and particularly within chloritic metavolcanic units. These deposits are well susceptible to geochemistry and I.P.

Work done by Canadian Superior on the Souvenir property consisted of approximately 8 line miles of soil and silt geochemical surveys, 1/2 line miles of I.P. and 1,500 feet of diamond drilling. The purpose of this work was to test the northwesterly extension of an I.P. and copper geochemical anomaly on the adjoining Bex property, between the Bex/Souvenir boundary and East Barriere Lake. Previous trenching by Souvenir Mines adjacent to the East Barriere Lake road indicated a sparsely mineralized chloritic zone approximately 200 feet wide lying on strike with the projected trend of the geochemical and I.P. anomalies.

I.P. surveys established sulphide continuity between the Bex boundary and the Souvenir trench. Soil sampling of the zone southwest of the trenched exposures indicated a strong geochemical anomaly lying within the road I.P. anomaly. Three 500 foot BQ diamond drill holes at sections

1,600 feet apart were completed by Connors Drilling at a cost of approximately \$15,000.

Results were not encouraging: pyrrhotite, pyrite and very minor chalcopyrite locally amounting to 2% total sulphide content, occur as fine disseminations in locally chloritic quartz biotite gneiss. The best intersection DDH 71-4, 20' - 180' assayed 0.13% Cu. Trenching along the drill road indicated that much of the overburden was residual, thus accounting for enriched soil values. Sufficient disseminated sulphides were intersected to account for the anomalous I.P. response.

#### CONCLUSIONS

Ore potential of the anomalous zone appears to be very limited. Trenching by Souvenir at Section 10 N and drilling by Canadian Superior at Section 4 N and 12 S intersected narrow widths of sub-oregrade mineralization.

#### RECOMMENDATIONS

Diamond drilling of geochemical and geophysical anomalies provided little encouragement. It is therefore recommended that the option agreement be terminated.

#### LOCATION AND ACCESS

The property is located approximately 15 miles east of Barriere, on the southeast shore of the northeast end of East Barriere Lake. Access to the claims is via 13 miles of improved gravel road from Barriere. Thence via 9 miles of unimproved gravel road from the southwest end of East Barriere Lake.

For the purposes of mining operations the property is strategically located with regard to transportation links, source of electric power and water supply.

### PHYSICAL FEATURES

The property is situated on a Northwesterly facing slope to East Barriere Lake exhibiting a relief of approximately 1,400 ft. with gradients of the order of 30%. Overburden is for the most part minimal particularly on the northeastern section of the property. A mantle of up to 10' of glacial drift deposited by ice movement from the northeast covers the southwestern sector.

Cedar and hemlock rainforest with patches of pine trees characterise most of the area.

### CLAIM STATUS

The property consists of 33 apparently contiguous claims held by Souvenir Mine Limited. The location of some, namely, the Sou 1-8 claims are uncertain. A description of the claims is appended.

### PREVIOUS WORK

Previous work on the property has been summarised by Angus MacKenzie, P. Eng, in reports prepared for Souvenir Mines Ltd., dated June 1969 and July 1970. Prior to 1968 trenching exposed a mineralized quartz vein near Fison Creek and sparse chalcopyrite mineralization disseminated in chloritic and sericitic quartz biotite gneiss 1,400' northeast of John Creek. A 150' vertical diamond drill hole subsequently collared over a mineralized section of the Grizzley trench adjacent to the East Barriere Lake road returned low values ( $<0.15\%$  cu) in copper. An EM 16 survey in 1968 was inconclusive. A reconnaissance magnetic survey in 1970 indicated an area of increased but erratic magnetic response over the Grizzley trench.

### REGIONAL GEOLOGY

The Harper Creek batholith (Cret.) intruded a folded sequence of Cache Creek (Permian) metavolcanics and metasediments. Related to this intrusion were the development of a gneissic zone peripheral to the



batholith and an open syncline parallel to the South contact.

Within the country rock a favorable metavolcanic unit characterised by quartz-eye rhyolite trends northwesterly across the Carriere Lake area. The Souvenir property covers part of the gneissic southeastern section of this unit adjacent to the contact.

#### GEOLOGY

Little geologic mapping was performed on the property. It appears however that the northeastern part of the property is underlain by predominantly metavolcanic rocks and the southwestern part by metasedimentary rocks. Several conformable biotite granodiorite dikes intrude the metamorphic sequence. The unexposed contact with the main batholith lies approximately 1000' northeast of the property.

#### Lithology

?  
Metamorphic - The metavolcanic unit consists largely of volcanic derivatives which become more gneissic towards the batholithic contact. In the Grizzley trench, shear zones paralleling the foliation of medium-grained quartz biotite gneisses gives rise to quartz sericite schists. Within the broad area of sulphide mineralization, there appears to be a marked increase in the amount of chlorite, brown biotite and locally sericite, imparting a reddish tinge to much of the quartz-biotite gneiss.

Metasedimentary rocks consisting of quartzite and grey biotite schist are poorly exposed on the property and their occurrence is inferred largely from work on the adjoining ground.

#### Intrusive

A conformable biotite granodiorite dike exposed in the Grizzley trench is the only intrusive rock type noted on the claims.

Structure

## (a) Folding:

In the vicinity of the IP anomaly the quartz biotite gneiss trends  $290^\circ$  dipping approximately  $50^\circ$  southwest. Anomalously steep dips noted in the Grizzley trench appear to be a local phenomenon related to a high angle fault trending  $300^\circ$ . Flatter dips of the order of  $26^\circ$  occur near Fison Creek.

## (b) Faulting:

The predominant fracture direction parallels the North-Easterly trend of regional faults in the Barriere Lakes Area. Fracture density on the property is nowhere intense.

Two fault zones occur in the Grizzley trench; moderately strong shearing parallel to foliation of the gneisses and a high angle fault trending  $300^\circ$  dipping  $75^\circ$  to the south. Of the two, the former appears to be related to mineralization.

Metamorphism

Low grade regional metamorphism probably accompanied an early period of folding. A gneissic zone peripheral to the batholith may be contact metamorphic in origin. No economic significance is attached to metamorphism.

Alteration

No widespread alteration occurs on the property.

Mineralization

Chalcopyrite is the only economic mineral noted. Pyrrhotite and pyrite occur disseminated within the area of the IP anomaly but are not proportionately related to copper content.

ECONOMIC GEOLOGY

Two mineralized areas are known; the east zone and the quartz vein, with the former being the most significant.

East Zone: (L.20 S 80 W to L.0 S 100 W) Sparse chalcopyrite occurs conformably as disseminations in locally sheared fine to medium grained quartz biotite gneiss, a rhyolite derivative. An increase in brown biotite, the development of chlorite and to a lesser extent epidote, characterise mineralized zones. No major structural controls other than the possible relationship of mineralization to gently dipping shear zones, are evident.

The absence of strong secondary structures and widespread shearing in rhyolite units as observed on nearby properties, may bear a direct relationship to low copper values.

Quartz Vein: (L. 4 S 100 W) Chalcopyrite is sparsely and unevenly distributed within a 1' - 2' wide conformable quartz vein trending N.55 W near Fison Creek. Wall rocks are unmineralized.

## GEOCHEMISTRY

### Survey Method

A soil geochemical survey was conducted over unexposed sections of the property hitherto untested by trenching, particularly northwest of the Grizzley trenches.

Soil sampling of the "B" horizon at chained 200' intervals along blazed and flagged lines 400' apart was utilised to locate anomalous areas. Control was provided by a base line (100 W) and five tie lines (50 W, 70 W, 130 W & 160 W).

### Sample analysis

All samples were dried and sieved to remove the minus 20 mesh fraction which was then analysed for total Copper content using HNO<sub>3</sub> extraction. Sample preparation and analysis was performed by Conbridge Nickel Mines laboratory in Vancouver.

### Results

Values in excess of 100 ppm copper were considered anomalous. On this basis two geochemical anomalies are indicated.

(a) East Anomaly: A strong soil anomaly 2,500' long x 800' wide (100 - 2,300 ppm Cu) from L.20 S to L.0 S indicated a mineralized zone extending from the Souvenir/Bex boundary to the Grizzley trench with a trend paralleling that of the underlying gneisses. Overburden in this area is very shallow and may be largely residual in origin.

(b) West Anomaly: Anomalous values coincided with the area of the mineralized quartz vein.

### PHYSICS

#### Survey Method:

2 1/2 line miles of IP were run to locate possible drill targets in the eastern geochemical anomaly. Alternate geochemical survey lines (800' apart) were used for the IP survey.

#### Instrumentation:

Instrumentation for the survey consisted of a McPhar 60 (frequency domain) IP unit with operating frequencies of  $0.3H_z$  to  $5H_z$ . Electrode spacing was maintained at 300'. Multiple electrode measurements were taken to  $N=3$ .

#### Results:

A strong well defined conductor 1,000' wide was coincident with the area of high geochemical values. IP response as indicated by an IPFE contour plot exhibiting values of up to 10% reached a maximum of five times background. Accompanying this increase in frequency effect was a pronounced resistivity low.

### DIAMOND DRILLING

Three 500' BQ wireline diamond drill holes located to intersect IP and geochemical anomalies at sections 1,600' apart were completed by Bors Drilling Ltd. at a cost of \$15,000.

Drilling results were not encouraging. Sulphide mineralization consisted primarily of pyrrhotite, pyrite with only minor amounts

of chalcopyrite. The best section, DDH-71-4, 20' - 180' assayed 0.13% Cu. Total sulphide content of the anomalous zone ranged from 0.5% to >2%, offering a plausible explanation of IP response. In view of the residual nature of much of the overburden, the amount of chalcopyrite is considered sufficient to account for the soil anomaly.

DDH 71-4 (Section 12 s)

Location: 2,060' west from T/c 70W. 250's from L 12 s  
 Bearing: N-20-E  
 Dip: -45°  
 Depth: 500' (16' overburden)  
 Purpose: To test coincident geochem and IP anomalies  
 Results: Quartz biotite gneiss was encountered throughout. Mineralization encountered consisted of pyrrhotite, pyrite and minor chalcopyrite. The best intersection 20' - 180' averaging 0.13% Cu corresponded to a noticeable increase in chlorite and "brown biotite" which imparted a purplish tinge to the rock. Total sulphide content ranged from 1% - 2% decreasing rapidly below 300'.  
 The drill hole intersection corresponded closely with the IP and geochemical anomalies indicating some form of geochemical enrichment had occurred such that soil values correspond semi-quantitatively with the copper content of the underlying rock.

DDH 71-5 (Section 12 s)

Location: 120' S-35'E from L 16 s 96 W  
 Bearing: N-20°-E  
 Dip: -45  
 Depth: 500' (16' overburden)  
 Purpose: To test the western part of the IP conductor.

Results: Rock type consisted primarily of quartz biotite gneiss becoming more chloritic from 250' - 400'. Three narrow bands of quartz-eye rhyolite were noted near the top of the hole. Total sulphide content averaged less than 1% and no appreciable amount of copper occurred anywhere in the 480' of sample length. It was concluded that the cause of the major part of the IP anomaly is further to the northeast.

DDH 71-6 (Section 4N)

Location: 250' west from B/L 100 W. 60'S from L. 4N. in old trench.

Bearing: N-20°-E

Dip: -45°. (16' overburden)

Depth: 500'

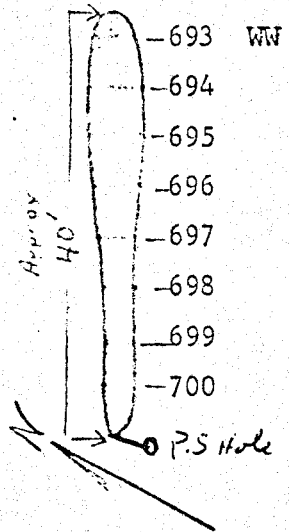
Purpose: To test the projected extension of the IP and geochemical anomalies.

Results: Lithology closely resembled that in DDH 71-4 but with less chlorite evident. Pyrrhotite pyrite and minor chalcopyrite were encountered in the upper 100'. The best intersection 20'-90' averaged 0.13% Cu.

It is concluded that IP and geochemical response is due to narrow widths of very low grade copper mineralization.

I hereby certify that the following are the results of assays made by us upon the herein described ore samples.

MARKED	GOLD		SILVER	Cu	Ni	Zn					TOTAL VALUE PER TON (2000 LBS.)
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent		
-693 WW				0.13	< 0.01	-					
-694				0.10	0.01	-					
-695				0.20	0.01	< 0.05					
-696				0.01	< 0.01	-					
-697				0.40	0.01	< 0.05					
-698				0.30	0.01	-					
-699				0.53	0.01	-					
-700				0.21	0.01	-					



Original - Assay Bk.  
 1 - JJM-DIB-FILE  
 1 - Geologist  
 1 - R. Esson  
 1 - Accounting

*[Signature]*  
 Registered Assayer Province of British Columbia

700 - 1112 West Pender Street  
 Vancouver, B.C. V6E 2S1

CERTIFICATE OF ASSAY

*Sandy Fennel Bames*

Results completed: Dec. 8/76

DEC 13 1976

I hereby certify that the following are the results of assays made by us upon the herein described pulp samples.

MARKED	GOLD		SILVER								TOTAL VALUE PER TON (2000 LBS.)
	Ounces per Ton	Value per Ton	Ounces per Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
693 WW	<0.002										
694	<0.002										
695	0.004										
696	<0.002										
697	0.033										
698	0.028										
699	0.033										
700	0.020										

Original - Assay Bk.  
 1 copy - JJM-DHM-FILE  
 1 copy - Assay Bk.  
 1 copy - Geologist ✓  
 1 copy - R.F.

*[Signature]*  
 Registered Assayer, Province of British Columbia



December 21, 1976

Mr. J.A. Fennel,  
Box 189,  
Barriere, B.C.

Dear Sandy,

Thank you very much for bringing your most interesting property to our attention, and for allowing us to review the data you had on hand.

The included assays represent chip-grab samples across the mineralization exposed in your trench; 693 NW being the most easterly end of the trench. Individual assay widths are generally of the order 3-4'. The small sketch on the assay sheet shows the relative positions of the assays.

As the assays are a little low and considering that Canadian Superior has broadly accounted for the existing anomalies, we cannot express interest in your property at this time. Nevertheless, I consider your property quite intriguing, and would urge you to carefully examine the I.P. anomalies associated with the 'skarn zone' in which your trench is located, and the I.P. anomalies associated with the graphitic sediments. Considering the geologic environment in which your property is situated I would suggest the possibility of a copper-lead-zinc deposit rather than a copper-nickel deposit. If such a deposit exists, it is likely to be sheetlike and small, say, 400-1000' long, 3-100' thick and say, around 300-600' down dip. (These are just rough guidelines). Mineralization would likely be massive consisting of mostly pyrite or pyrrhotite with significant chalcopyrite and sphalerite and less galena. Should you encounter any such indications I would be most pleased to hear from you again. As I understand, your prospecting programme at the time of my investigation was preliminary.

Enclosed please find your two Canadian Superior reports.

Yours truly,  
FALCONBRIDGE NICKEL MINES LTD.,

B. Mancinuk  
Geologist

Encl.  
BM:pb