

REPORT on  
THE FRANKLIN CAMP  
GRAND FORKS, BRITISH COLUMBIA  
for  
GREAT PLAINS DEVELOPMENT CO. OF CANADA LTD.

by: R.W. Phendler, B.Sc., P.Eng.

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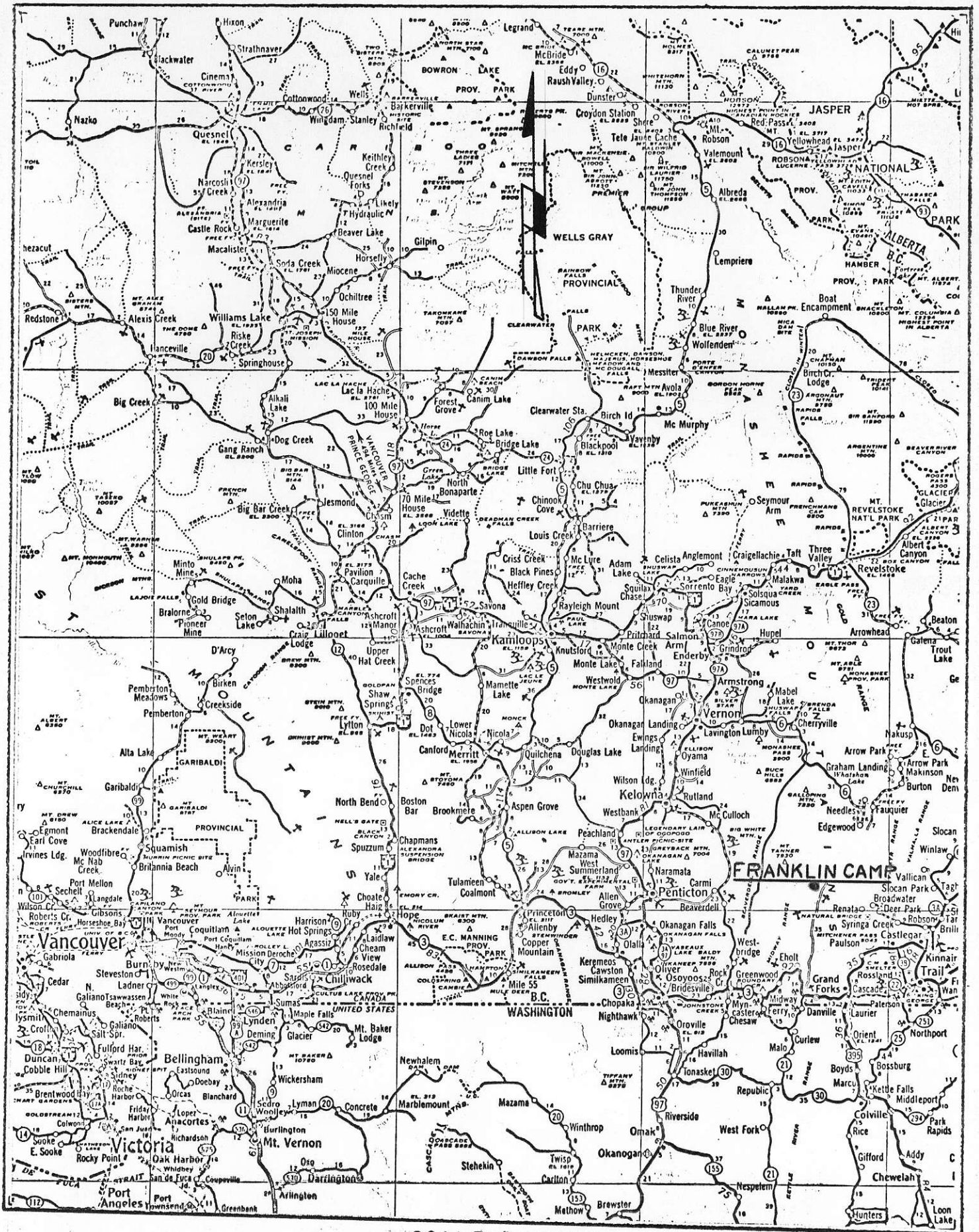
BACON & CROWHURST LTD.

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R.W. PHENDLER, B.Sc., P.Eng.

Vancouver, B.C.

June 19th, 1970.



SCALE: 1" = 39 MILES

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY AND CONCLUSIONS	1
RECOMMENDATIONS	4
INTRODUCTION	5
LOCATION AND ACCESS	5
PROPERTY AND OWNERSHIP	5
HISTORY	6
GEOLOGY AND MINERALIZATION	8
1. McKinley Prospect	8
2. I.X.L. Property	11
3. Banner Property	12
4. Riverside Showing	14
BIBLIOGRAPHY	15

LIST OF ILLUSTRATIONS

Location Map - 1" = 30 miles	Frontispiece
Fig. 2 - Geological Map of Franklin Camp 1" = 800'	In envelope at back of report
Fig. 3 - Geological Map of McKinley Prospect 1" = 100'	Back of report
Fig. 4 - Vertical Section - McKinley Mine 1" = 100'	"



SUMMARY AND CONCLUSIONS

The properties of Boundary Explorations Ltd. are in the Franklin camp, 40 miles north of Grand Forks in southeastern British Columbia. Access is by road from Highway 3 at Grand Forks.

The two square miles of claims cover four prospects, the McKinley, I.X.L., Banner and Riverside. The McKinley and I.X.L. are copper skarn deposits associated with Nelson granitic intrusions, limestone and sharpstone conglomerates; they display similarities to the Phoenix camp, 30 miles to the southwest, which has intermittently produced more than 20 million tons of approximately 1% copper since 1900.

The Riverside showing consists of widely spaced, narrow (up to  $\frac{1}{2}$ " ) quartz stringers with contained blebs of chalcopyrite and flakes of molybdenite within granodiorite. Mineralized fractures were observed by the writer over an area 800' x 200' but no concentration was noticed. Similar mineralization is reported to extend for one mile southeastward to a northeasterly striking fault that parallels Burrell Creek. Little exploration work has been done on this showing as surface exposures indicate a sub-marginal grade. Some reconnaissance exploratory work can be justified, however, in view of the scope of the deposit.

In 1968 and 1969 Newmont Mining Corporation of Canada Ltd. carried out extensive exploration work on the Banner, McKinley and the I.X.L. showings. Geochemical, geophysical and geological surveys

were conducted over these prospects with the following results:

#### I.X.L. Property

A large copper geochemical anomaly coincided with an induced polarization anomaly indicating widespread sulphide mineralization in an area underlain by skarn, limestone and silicified, pyritic feldspar porphyry. Extensive trenching showed widespread mineralization, the best results being 0.78% Cu across 70' and 0.33% Cu across 80'. Diamond drilling indicated that these zones do not continue to depth. Most of the mineralization occurred in pyritic feldspar porphyry which showed substantial areas of 0.03%-0.17% Cu. This was reflected in the geochemical pattern.

There does not appear to be much possibility that a commercial orebody exists in the area in which the exploration work was carried out.

#### McKinley Prospect

N-S striking skarn and limestone bands terminate on the south against a 300' wide, easterly striking dyke of pyritic feldspar porphyry. Selective metasomatism has occurred, forming extensive zones containing disseminated pyrite and chalcopyrite within the skarn. The band of limestone-skarn is 1000' across and about 500' is made up of potential mineralized skarn in three zones. The feldspar porphyry dips south at about 30° and, although chalcopyrite has been seen up to 500' from the contact, the best possibilities are believed to be on or near the contact (see Fig. 4). The central skarn zone may be on the axis of a fold.

Proposed diamond drilling of this prospect was not carried out by Newmont Mining Corporation. It is considered that a potential four to ten million tons of mineralized skarn could exist on the McKinley prospect. Grade can only be determined by diamond drilling.

Banner Property

The Banner vein is a silicified zone within clastic sediments that is comparable to the Union vein, one mile to the east. The latter produced 188,000 tons of ore between 1904 and 1946, grading 0.21 oz. Au and 7.2 oz. Ag per ton. Trenching, tunnelling and diamond drilling of the Banner vein show that it contains only minor irregular pods of erratic gold-silver mineralization. No further work is warranted.

The asking price for these properties was not determined although \$7000 was mentioned for a one year option.

RECOMMENDATIONS

In spite of considerable previous effort, the following work can still be justified:

1. McKinley

Diamond drilling of the skarn-feldspar porphyry contact zone.

A total of 2500' of BQ drilling is recommended.

2. Riverside


Reconnaissance geochemical work on 400 foot centres is warranted to cover an area of 5000' x 2000'. Approximately 6 line miles of line-cutting, sample collection and analysis appear to be justified.

Summary

Diamond drilling - 2500' @ \$12/ft.	\$30,000
Geochemical survey - 6 miles @ \$200/mi.	1,200
Property Option for one year	<u>7,000</u>
	\$38,200
Engineering & geology	<u>4,000</u>
	\$42,200
10% contingencies	<u>4,220</u>
Total	\$46,420

Respectfully submitted,

BACON & CROWHURST LTD.

*R. W. Phendler, P. Eng*  
 R. W. Phendler, B.Sc., P. Eng.  




### INTRODUCTION

At the request of Mr. D.M. Mann of Great Plains Development Company of Canada Ltd., the writer examined the Franklin properties of Boundary Explorations Ltd. on June 11th, 1970. Accompanied by Mr. J. Carson of Boundary Explorations Ltd., who acted as guide, the writer visited the McKinley, I.X.L. and Riverside showings, taking nine chip samples and one soil sample.

On June 15th, the various properties were discussed with Dr. G.W.H. Norman of Newmont Mining Corporation of Canada Ltd.

### LOCATION AND ACCESS

The Franklin camp is at an elevation of 3500'-4500' in southeastern British Columbia. It is 40 miles north of Grand Forks and is accessible by 45 miles of paved and gravel road from Grand Forks up the valleys of the Granby River and Burrell Creek. Branch roads lead to all prospects, as well as to the Franklin campsite.

### PROPERTY AND OWNERSHIP

Boundary Explorations Ltd. hold or hold options to the claims that cover the Riverside, McKinley, Banner and I.X.L. showings. The claims that cover the limestone band between the Banner and McKinley mineral showings are also controlled by Boundary Explorations Ltd. (see Fig. 2).

At least 79 mineral claims that surround the above-mentioned claims are held in good standing by Boundary Explorations Ltd.

The expiry date of some of the claims is August 27th, 1970. Sufficient work was done in 1969 to keep all claims in good standing but has yet to be filed.

The claims cover an area of about two square miles.

#### HISTORY

The first mining claims to be located in the Franklin camp were the Banner and the McKinley, which were both staked in the summer of 1896. In 1900, a 200' crosscut tunnel was driven on the Banner claim to intersect the Banner vein encountered in a shaft but no mining was carried out. Activity increased in 1906 when practically all the ground in the mineral belt was staked. A few hundred feet of underground development work was done on the McKinley property during the same year but no production resulted.

Between 1913 and 1946 the Union Mine, which is one mile east of the Banner property, produced 188,680 tons of ore, averaging 0.21 oz. Au, 7.2 oz. Ag, 0.14% Cu, 2.0% Pb and 3.5% Zn. The ore was produced from a steeply-dipping fissure vein that is reportedly similar to the Banner vein.

The McKinley claim was leased by W. MacArthur in 1948-49 and 145 tons was produced by open cut methods. Grade of production is reported to have averaged 6.3 oz. Ag, 0.014 oz. Au, 11.2% Pb, 17.1% Zn and 3.0% Cu. In 1964, Franklin Mines Ltd. carried out some exploration work on the McKinley and Banner showings.

In 1968 Newsont Mining Corporation of Canada Ltd. optioned the Franklin camp claim group from Boundary Explorations Ltd. During September, October and November of that year, reconnaissance geochemical and geological surveys revealed areas of interesting mineralization on the McKinley, Banner and I.X.L. claim groups. An induced polarization survey conducted over the McKinley workings indicated anomalous conditions which were thought to be related to widespread mineralization.

As a result of favourable indications in 1968, the following work was done in 1969:

1. Airborne magnetometer survey of 45 square miles surrounding the Franklin camp.
2. Ground magnetometer survey over 75 line miles.
3. Collection of 4100 soil samples over 75 line miles.
4. Geological mapping over 75 line miles.
5. Induced polarization survey over 22 line miles over selected areas.
6. Collection of 670 stream sediment samples covering 200 square miles.
7. 19,000<sup>+</sup> of bulldozer trenching.
8. 1984<sup>+</sup> of diamond drilling.

The option was dropped in late 1969.

### GEOLOGY AND MINERALIZATION

The area in which the Franklin camp is located is underlain by a complex of metamorphic rocks of both sedimentary and volcanic origin that range in age from Paleozoic to Tertiary.

The oldest rocks are known as the Anarchist group and are made up of siltstone, argillite, limestone and conglomerate. These are intruded by granitic rocks belonging to the Nelson, Valhalla and Coryell intrusions of Mesozoic and Tertiary age. These intrusives separate the sedimentary and volcanic rocks of the Franklin camp from those of the Phoenix camp 30 miles to the southwest. The geologic setting of both camps is similar.

The copper deposits in the Phoenix camp, where production has continued, with interruptions, since 1900, occur as pyrometamorphic skarn deposits interbedded with sharpstone conglomerate.

The limestones of the Anarchist group in the Franklin camp occur with associated sharpstone conglomerate as two separate belts. The eastern belt can be traced north from the workings on the McKinley showings for nearly two miles whereas the western belt is located on the I.X.L. claims, 1½ miles to the west of the McKinley claims (see Fig. 2). The two belts are separated by overlying Tertiary volcanics of McKinley Mountain. Extending north from beneath these volcanics is a tongue of Nelson granodiorite.

#### McKinley Prospect

Trenching and geological mapping by personnel of Newmont Mining Corporation of Canada Ltd. has shown that an easterly striking

silicified, pyritic feldspar porphyry, 300 feet wide, cuts across northerly striking limestone, skarn and argillite. These formations are bordered on the east by sharpstone conglomerate and on the west by siltstone. The favourable band, in which occur the limestone and mineralized skarn, is about 1000' wide. Two massive limestone beds appear to be present and may be folded limbs of the same formation. Between the limestone bands is a 250' wide zone that contains mineralized skarn and may be the axis of a fold. On the west and east limits of the skarn-limestone band are similar bands of skarn with associated sulphide mineralization. These may form the outer limbs of a fold (believed to be synclinal).

The layered rocks butt up against pyritic silicified feldspar porphyry (see Fig. 3) that is believed to dip about 30° to the south. The most intense mineralization found to date lies close to the feldspar porphyry and this may extend down the dip for a considerable distance. However, chalcopyrite mineralization has been found as much as 500' north of the feldspar porphyry.

The old (1900) McKinley adit was driven for 200' in a southerly direction in the western mineralized skarn zone. Grades were continuous but low (0.08% Cu) and selected samples were as follows: 0.17% Cu across 10'; 0.26% Cu across 10'. Three consecutive samples taken by Newmont Mining Corporation of Canada from surface on the same zone in 1969 assayed 1.05% Cu across 10.0'; 0.63% Cu across 10.0'; 0.21% Cu across 10.0'. The skarn zone on which most development was done is clearly exposed because of its location in McKinley Creek.



The central skarn zone (see Fig. 3), from which 145 tons of 3% Cu was taken, appears to be the most promising. It lies in the central part of the 1000' wide limestone-skarn band (possibly the axis of a fold and the locus of a crush zone, which may have afforded channels of ingress for mineralizing solutions).

The following samples were taken by the writer during the present examination:

<u>Sample No.</u>	<u>Width</u>	<u>% Cu</u>	<u>Oz. Ag</u>	<u>Oz. Au</u>	<u>Location</u>
38251	10'	0.31	0.32	*0.003	West skarn 0-10' N
38252	10'	0.04	0.31	*0.003	" 10-20' N
38253	10'	0.02	0.22	*0.003	" 20-30' N
38254	10'	0.04	0.43	0.012	" 30-40' N
38255	15'	1.28	0.82	*0.003	" E end
38256	10'	0.27	0.61	0.003	East skarn 0-10' N
38257	10'	0.17	0.22	*0.003	" 10-20' N
38258	10'	0.09	0.12	*0.003	" 20-30' N
38259	5'	0.03	0.06	*0.003	" 30-35' N

\* Less than

Selective pyrometasomatism of favourable bands associated with limestone appears to have formed the mineral zones in the McKinley prospect. Ore possibilities in depth or along strike have not been determined and warrant some exploration.

Induced polarization work has shown the presence of anomalous conditions on the skarn zones indicating that sulphide mineralization projects under the south-dipping feldspar porphyry for at least 200 feet. The anomalies are open to the south.

Patchy copper geochemical anomalies surrounding the McKinley workings reflect the irregular distribution of the deep glacial

overburden. Most of the chalcopyrite mineralization in the area is confined to the contact between the pyritic silicified feldspar porphyry and the limestone skarn zones.

#### I.X.L. Property

The I.X.L. property lies one mile west of the McKinley prospect and contains skarn type copper mineralization associated with limestone and granitic intrusives. The sequence of strata across the I.X.L. belt, cherty sediments, argillites, limestone, sharpstone conglomerate, andesite flows and breccia, is the same as in the McKinley belt. It has been suggested that the two were originally connected, but Tertiary volcanics obscure their relative positions.

Stream sediment sampling of Bluejoint Creek on the west side of the I.X.L. property indicated anomalous copper conditions, and trenching showed the presence of limited copper-gold mineralization in skarn. Extensive soil sampling disclosed the presence of an 800' x 400' copper geochemical anomaly surrounding some old pits. This was coincident with magnetic and IP anomalies, and follow-up trenching was carried out. The trenching showed that limestone with minor skarn zones occurred as remnants in a silicified feldspar porphyry, irregularly mineralized with pyrite and some chalcopyrite.

The highest and most continuous assays (70 feet of 0.78% Cu and 80' of .33% Cu) were found in feldspar porphyry near the centre of the anomaly. Diamond drill holes 200 feet to 300 feet below the mineral zones encountered negligible copper as did a hole beneath a skarn outcrop 600' to the west. Drilling indicated that the formations dipped 55° to the southeast.

The extensive feldspar porphyry contains widespread minor copper (0.03% - 0.17%) and this was reflected in the geochemical patterns.

It appears that the I.X.L. property has been properly explored and little possibility remains that large profitable ore-bodies exist therein.

#### Banner Property

The Banner claim is situated about 1½ miles north of the McKinley Mine (see Fig. 2) and is one of the pioneer properties in the Franklin camp.

The copper-lead-zinc mineralization is confined to a group of parallel fissure veins that are similar to the Union vein from which a substantial tonnage was produced prior to 1946 (see "History"). During the examination by Newmont Mining Corporation, the old 200 foot crosscut adit was re-opened. It was learned that a silicified zone, believed to be the principal Banner vein, was intersected in the adit and results of chip-sampling were as follows:

<u>Location</u>	<u>Width</u>	<u>Oz. Au</u>	<u>Oz. Ag</u>	<u>% Cu</u>	<u>% Pb</u>	<u>% Zn</u>
North wall	20'	.005	0.60	0.37	.04	2.91
South wall	25'	.01	0.42	0.76	.25	3.96

The adit was driven due west 100' north of the 25' deep Banner shaft. An old trench, located 25' north of the shaft, (which returned an assay of 0.59 oz. Au) gave the following assays: 0.04 oz. Au, 3.59 oz. Ag, 1.14% Cu, 6.65% Pb, 3.45% Zn/30.0'.

Three drill holes put down by Boundary Explorations Ltd., under the 30 foot mineral section exposed in the trench, verified that the silicified zone intersected in the adit is the downward extension of the Banner vein and that the dip is  $45^{\circ}$  NE. Assays and widths of mineralization in the holes were similar to that in the adit and expectations of a mineable orebody in the shaft were not realized.

The extensions of the vein in both directions were checked with discouraging results.

Geochemical sampling results showed discontinuous north-west-trending copper and zinc anomalies. This substantiates the findings of the adit and the drilling, that the Banner vein system contains minor pods of high-grade mineralization. Host rocks of the veins are altered tuffs, quartzite and brecciated, calcareous conglomerate.

To the south of the Banner property, the north-south trend of linear copper and zinc geochemical anomalies follows the strike of the pyritic sharpstone, limestone and argillite. Selected samples of argillite containing about 5% pyrite assayed 0.37% zinc. In general, the sharpstone conglomerate is mineralized with sphalerite, galena and pyrite, and is well silicified.

Part of the mineral production from the Phoenix camp came from small high-grade veins with silver and gold values. The presence of similar silver and gold bearing veins in the Franklin camp adds to the general similarity of the two camps. However, it is doubtful if the Banner vein has the potential of becoming a producer.

This property was not visited during the present examination.

### Riverside Showing

The Doe and Bear claims cover this showing and lie  $1\frac{1}{2}$  - 3 miles southeast of the McKinley Mine and close to the Franklin camp-site. They straddle Burrell Creek. Mineralization consists of speckled chalcopyrite, pyrite and molybdenite in quartz and calcite stringers up to  $\frac{1}{2}$ " wide. The quartz stringers occupy cleavage or joint planes and occur every few feet where trenching has been carried out. No sulphide disseminations were observed in the enclosing granodiorite, which appears to be weakly sheared in a northwesterly direction. Little evidence of alteration was observed.

Mineralization, as described above, was observed by the writer over an area 800' x 200' but it was reported to extend for about one mile to the southeast, across Burrell Creek.

Some bulldozer trenching was carried out in 1969 but little more than what can be observed on virgin outcrops was exposed. It is believed that no geochemical or geophysical work has been done on the showings.

Tonnage possibilities are great but the grade, where observed, is undoubtedly sub-marginal. A random soil sample taken by the writer ran 1275 ppm copper and 25 ppm Mo. It was taken from undisturbed soil, about 100' from the nearest visible quartz-chalcopyrite stringer.



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2. G.W.H. Norman - "Field Work Geological Considerations and Results" - Franklin Project, Grand Forks Area, B.C. - 1969 (Newmont Mining Corporation of Canada Ltd.)
3. L.D. Kornze - "Geochemical Soil and Stream Sediment Survey" - Franklin Project, Grand Forks Area, B.C. - 1969 (Newmont Mining Corporation of Canada Ltd.)





ROAD TO IXL PROSPECT

TRENCH No. 4

ROAD TO FRANKLIN CAMP AND GRAND FORKS 45 MILES

McKinley Creek

WEST SKARN ZONE

EAST SKARN ZONE

CENTRAL SKARN ZONE

McKINLEY MINE

Fresh skarn - produced  
 145 tons 0.014 Au.  
 6.3 Ag.  
 11.2 Pb.  
 17.1 Zn.  
 3.0 Cu. (?)

Cp. malachite magnetite

SAMPLE No.	WIDTH	%Cu.	OZ. Ag.	OZ. Au.
38254	10'	0.04	0.43	0.12
38253	10'	0.02	0.22	0.003
38252	10'	0.04	0.31	0.003
38251	10'	0.31	0.32	0.003

TRENCH No. 3A

SAMPLE No.	WIDTH	%Cu.	OZ. Ag.	OZ. Au.
38259	5'	0.03	0.06	0.003
38258	10'	0.09	0.12	0.003
38257	10'	0.17	0.22	0.003
38256	10'	0.27	0.61	0.003

Fresh skarn, py, cp.  
 Sample 38255-15'  
 1.28% Cp., 0.82 oz. Ag., 0.003 oz. Au.

Downslope 35°

**LEGEND**

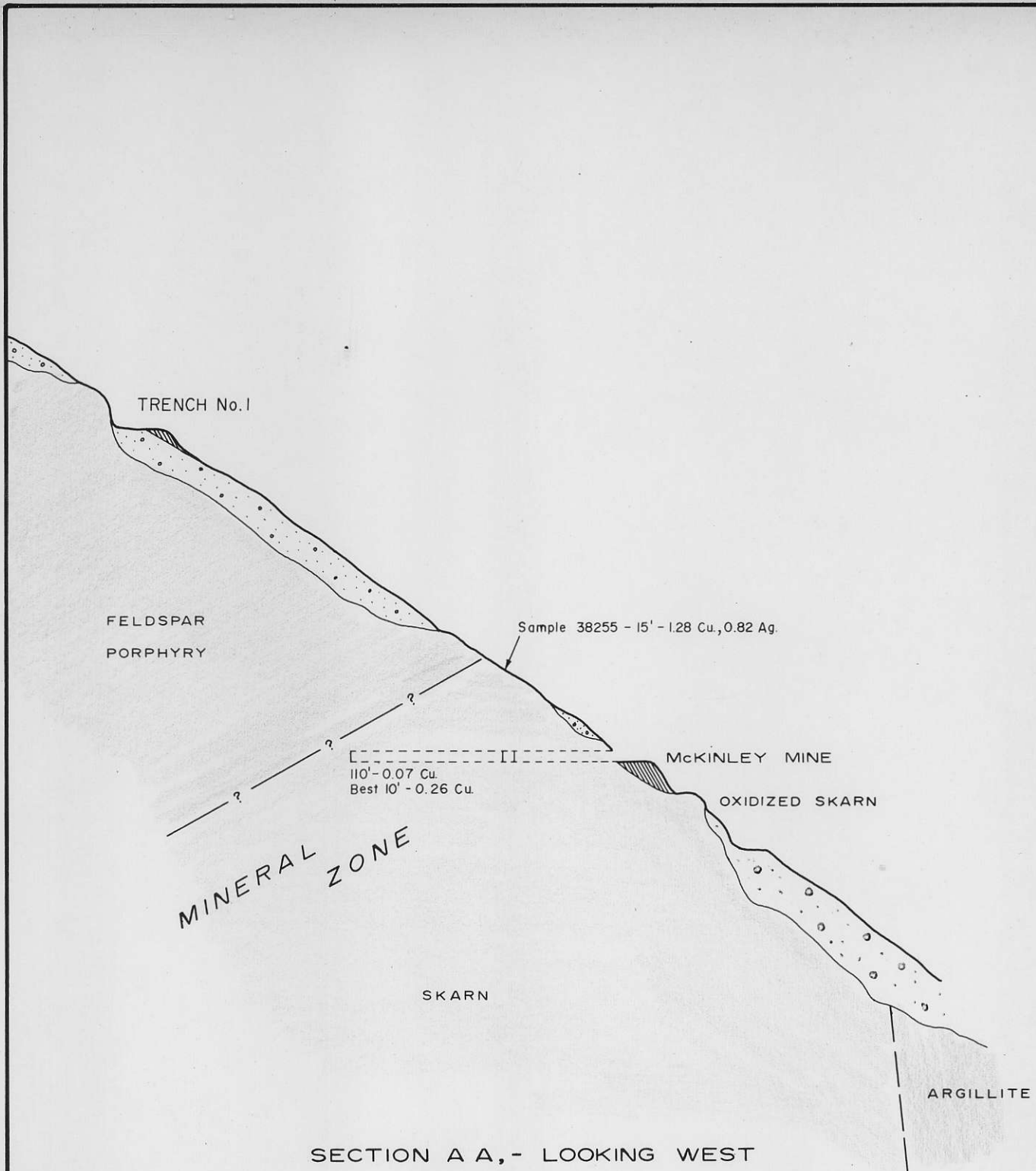
- 8 Pulaskite Dyke
- 7 Rhyolite Flow
- 6 Feldspar Porphyry, Silicified, Pyritic
- 5 Feldspar Porphyry Dyke
- 4 Sharpstone Conglomerate
- 3 Limestone
- 2 Skarn Epidote, Pyrite, Magnetite, Chalcopyrite
- 1 Argillite, Siltstone
- Geological Contact
- == Road
- ⋯ Underground Working

FRANKLIN BASE LINE  
 2+00 N.  
 0+00 N.

BACON & CROWHURST LTD.  
**GEOLOGICAL MAP**  
 of  
**McKINLEY MINE, FRANKLIN CAMP**  
 GRAND FORKS, BRITISH COLUMBIA

FEET 100 0 100 200 FEET





BACON & CROWHURST LTD.  
**VERTICAL SECTION**  
of  
**McKINLEY MINE, FRANKLIN CAMP**  
GRAND FORKS, BRITISH COLUMBIA

GEOLOGY BY NEWMONT MINING CORP. OF CANADA LTD.



JUNE-1970

FIG. 4