

MAR 19710008: SOUTHWEST ALBERTA

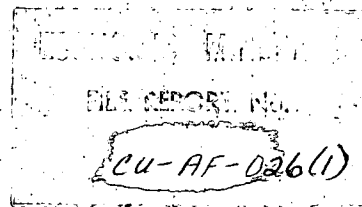
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PROSPECTING AND STREAM SEDIMENT SAMPLING
IN QUARTZ MINERAL EXPLORATION PERMIT
AREA 148 - SW ALBERTA

Sections 18 and 19, Range 1 and Sections 13-16, 20-24, S $\frac{1}{2}$ 25,
and 26-29, Range 2; all west of 5th Meridian, Township 4.

N.T.S. 82 G8

Conducted June 1970

by Falconbridge Nickel Mines Limited

Vancouver, B. C.

February, 1971

T. Gyr

Geologist

C O N T E N T S

	<u>Page</u>
INTRODUCTION	1
LOCATION AND ACCESS	1
REGIONAL GEOLOGY	1
GRINNELL FORMATION	2
MINERALIZATION	4
STREAM SEDIMENT SAMPLING	5
Sampling Method	5
Laboratory Procedure	5
Interpretation and Conclusions	6
STATEMENT OF WORK	7
ILLUSTRATIONS:	
Index Map	Following Page 1
Geochemical Map with copper showings	In pocket

INTRODUCTION

The examination of the Quartz Exploration Permit Area 148 was part of a larger exploration program carried out by Falconbridge Nickel Mines Limited on strataform copper deposits in southeastern B.C. and southwestern Alberta.

The object was to examine the Pre-Cambrian Belt Formations in general and the Grinnell Formation in particular for possible economic copper concentrations. The search for strata-bound copper in the Grinnell Formation of Canada was initiated after a large strataform copper deposit had been found in the Revett Quartzites west of the Bull Lake in northwestern Montana. The Grinnell Formation is probably the stratigraphic equivalent of the Revett Quartzites, and minor copper mineralization within it had been known for some time.

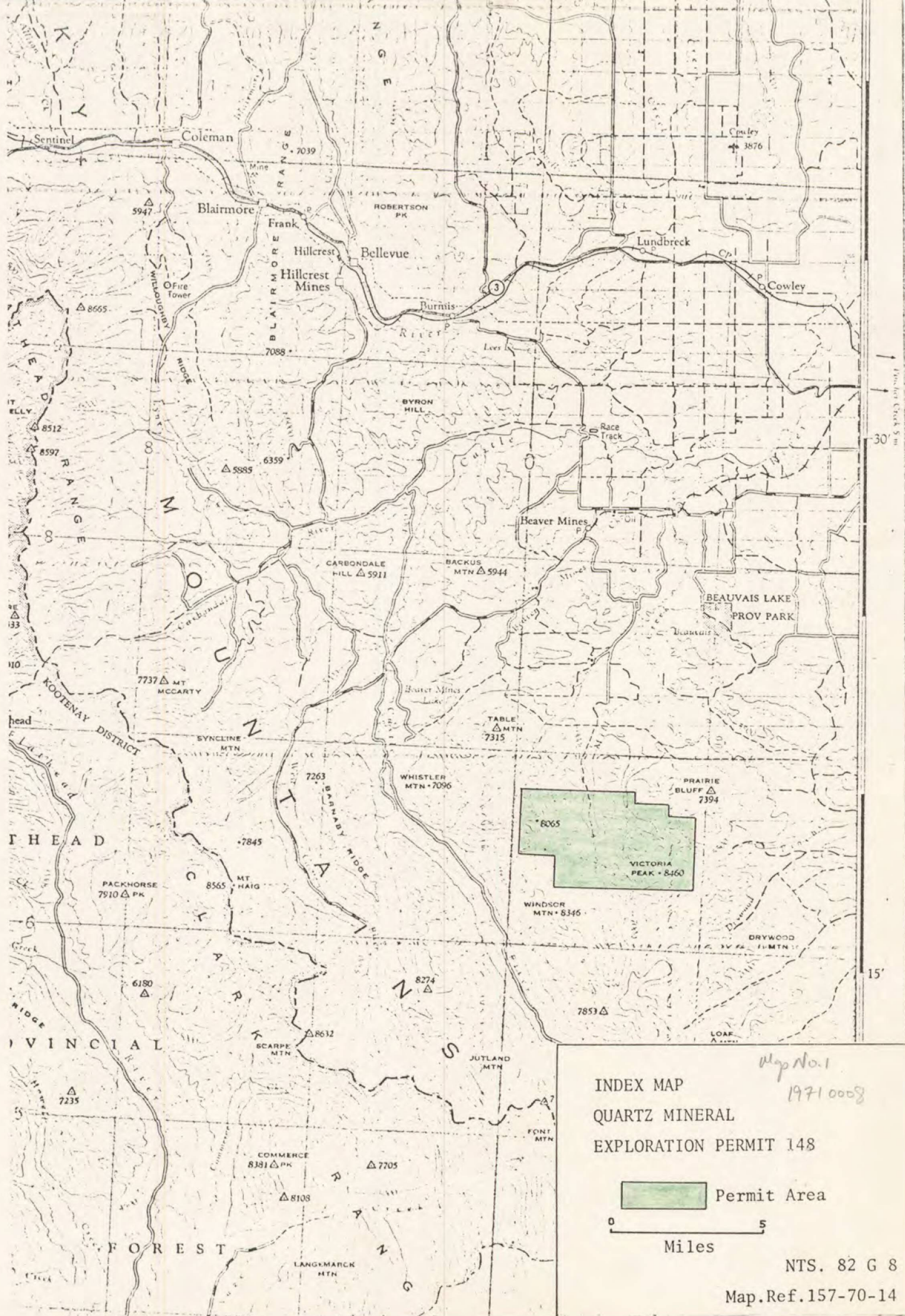
The Quartz Exploration Permit Area 148 was acquired in February 1970, in order to carry out prospecting and stream sediment sampling. Prospecting was intensified in the Grinnell Formation since no other formation in the Permit area revealed copper prospects of any interest.

LOCATION AND ACCESS


The permit area is located approximately 15 miles south west of Pincher Creek, Alberta. Its northern border can be reached by gravel road from Pincher Creek or Burmis. Elevations range from 5,000 ft. at Mill, Whitney, and Pincher Creek Valley to 8,000 ft. plus at Mt. Gladstone and Victoria Peak. Hunting trails lead through all main valleys and make access by foot easy.

REGIONAL GEOLOGY

The regional geology was mapped by R. A. Price (G.S.C. Paper 61-24 accompanied by map 35-1961, Fernie East Half). The general geological setting



INDEX MAP
 QUARTZ MINERAL
 EXPLORATION PERMIT 148

 Permit Area

0 5
 Miles

Map No. 1
 1971 0008

NTS. 82 G 8
 Map. Ref. 157-70-14

east of the Flathead River is that of a synclinorium (Akamina Syncline) of Precambrian and Lower Cambrian rocks which is overthrust from the west (relatively) onto younger sediments along a structure known as the Lewis Thrust Fault. These rocks represent the most eastern outcrops of the Pre-Cambrian Belt Series.

The Grinnell Formation of the Clarke Range with its conspicuous red argillites can be traced westwards into the American Whitefish Range. However, west of this last mentioned range, the lithology of the formation changes considerably. Most of the red argillite beds disappear and thick quartzite beds take over (Revett quartzites). The correlation can only be maintained by the relative stratigraphic position of the two units.

Locally, the Precambrian succession includes the following formations (with increasing age):

Rooseville Formation

Phillips Formation

Gateway Formation

Sheppard Formation

Purcell Lava

Siyeh Formation

Grinnell Formation

Appekunny Formation

Altyn Formation

Waterton Formation

GRINNELL FORMATION

The Grinnell Formation is underlain by grey-green argillites and brownish white quartzites of the Appekunny Formation. The contact with the Appekunny Formation is gradational with an increase of quartzitic material and a decrease

of red argillite interbeds.

The upper contact with the Siyeh Formation is better established by the sudden appearance of dark, thin bedded limestones.

The total thickness of the Grinnell Formation varies between 650 and 1,000 ft; however, several thrust faults in the area north of Victoria Peak produce repetitions of sections several hundred feet thick which increases the total outcropping thickness of the formation locally to over 2,000 feet.

Within the permit area, the Grinnell Formation can be divided into three sub-divisions: Lower, Middle and Upper.

The Lower Grinnell Formation (approx. 300-500 ft.) consists of grey-green, thin-bedded argillites with interbedded red argillites and white quartzites. The red interbeds vary in thickness between 1-3 feet, the quartzites between 5-20 inches.

The lower part of the formation was first considered to belong to the Appekunny Formation due to the relative lack of red argillites. A comparison with Grinnell sections further south in B.C. shows, however, that greenish sub-divisions within the formation vary considerably in thickness as well as in stratigraphic position. The colour difference seems to be due either to changing PH conditions during sedimentation or to post-sedimentary leaching. Furthermore, this greenish sub-division lacks the brownish colours usually observed with the Appekunny Formation.

The Middle Grinnell Formation is a transition zone, approximately 80 feet thick, between the underlying mainly green argillites and the overlying, mainly red argillites. It is recognized by an increase in the number of quartzite bands which, however, rarely exceed 3 feet in thickness. Several of these quartzite bands are mineralized (see "Mineralization").

The Upper Grinnell Formation has a stratigraphic thickness of 250-500 ft. However, north of Victoria Peak several east-west trending and south

dipping thrust faults cause local repetitions of 200-300 ft. thick sections. It consists mainly of red, thin bedded argillites with minor interbedded green argillites and quartzite bands (1-3 ft. thickness). One quartzite band near Siyeh contact is weakly mineralized over several inches.

The argillites in all sub-divisions are thin bedded, slightly arenaceous and show mud cracks and ripple marks on bedding surfaces. The quartzites in 1-3 inch thick beds are generally medium grained. Occasionally, they have inclusions of green or red argillite pebbles $\frac{1}{4}$ - $\frac{1}{2}$ inch in diameter.

MINERALIZATION

Copper mineralization is confined almost exclusively to quartzite bands of the Middle Grinnell Formation. The sulfide minerals are bornite, chalcopryrite, chalcocite and pyrite. Malachite is widespread in surface outcrops and does not decrease effectively within 2-4 ft. of the surface. The sulfides are usually finely disseminated. The malachite coats bedding planes and extends for several inches into the under and overlying argillites. One of the mineralized bands can be traced almost continuously for over 2,000 ft.; however its thickness never exceeds 8 inches.

The grade of mineralization varies considerably. The best grades were observed north of Victoria Peak and in Pincher Creek Valley where the sulfide content reaches up to 2% over 5-7 inches. Repetitions of up to 5 mineralized quartzite bands were noticed, however, with abundant barren argillite material in between (1-20 feet at the time).

One showing was found in an upper horizon of the Grinnell Formation, close to the Siyeh contact north of Victoria Peak. A mineralized quartzite band, 5 inches thick does not extend laterally for more than 20 feet. None of this mineralization is considered to be of economic significance at the present time.

Additional minor copper mineralization was observed in the Purcell Lava south of Victoria Peak and north of Pincher Creek Valley. Scattered vesicles in the lava are partially filled with chalcopyrite.

The distribution of the mineralized outcrops is shown on the included map (157-70-13).

STREAM SEDIMENT SAMPLING

Stream sediment sampling was carried out tentatively. The purpose was to determine whether or not the known copper occurrences would be reflected in a stream sediment survey in which case a positive response could guide further prospecting for undetected and possibly over burdened copper showings.

Sampling Method

Samples were collected from most streams in the permit area containing active sediment. Sampling interval was generally 500 ft., but a 200 ft. interval was chosen occasionally for better detail.

Samples were collected in the stream centre by removing larger pebbles and placing the silt portion in water resistant paper bags on which the following information was recorded: sample number, stream name, footage, date, colour and fraction. The samples were sun-dried and shipped to the Falconbridge Laboratory in Vancouver for analysis.

Laboratory Technique

The samples were dried in a gas fired hot air drier and hand screened through 80 mesh standard nylon screens.

The minus 80 mesh portion of the dried sample was analyzed for copper and a limited number of selected samples were also analyzed for silver.

500 mg. of the sample was boiled for one hour in 10 ml. of 10% nitric acid, the solution filtered and the metal content determined by standard Atomic Absorption techniques.

Interpretation and Conclusions

The concentration levels for the samples are (in ppm):

	Regional Bkd.	Local Bkd.	Anom.	Range	Mode
Cu	<40	40-70	>70	8-150	15-25

For reconnaissance purpose only:


Ag	<0.6	0.7-0.8	>0.8	0.3-1.0	0.4-0.6
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The reconnaissance result indicated that no significant additional information was obtained by analyzing for silver and subsequently only copper values were plotted (see Map 157-70-13).

A comparison of the results with the located copper bearing beds shows that only a few deposits are reflected in the drainage. This is probably due to the extremely small size of the occurrences in relation to the sampling interval and to the alkaline condition of the streams caused by the proximity to overlying Siyeh limestones. The copper forms an insoluble carbonate in this alkaline environment and transportation is limited.

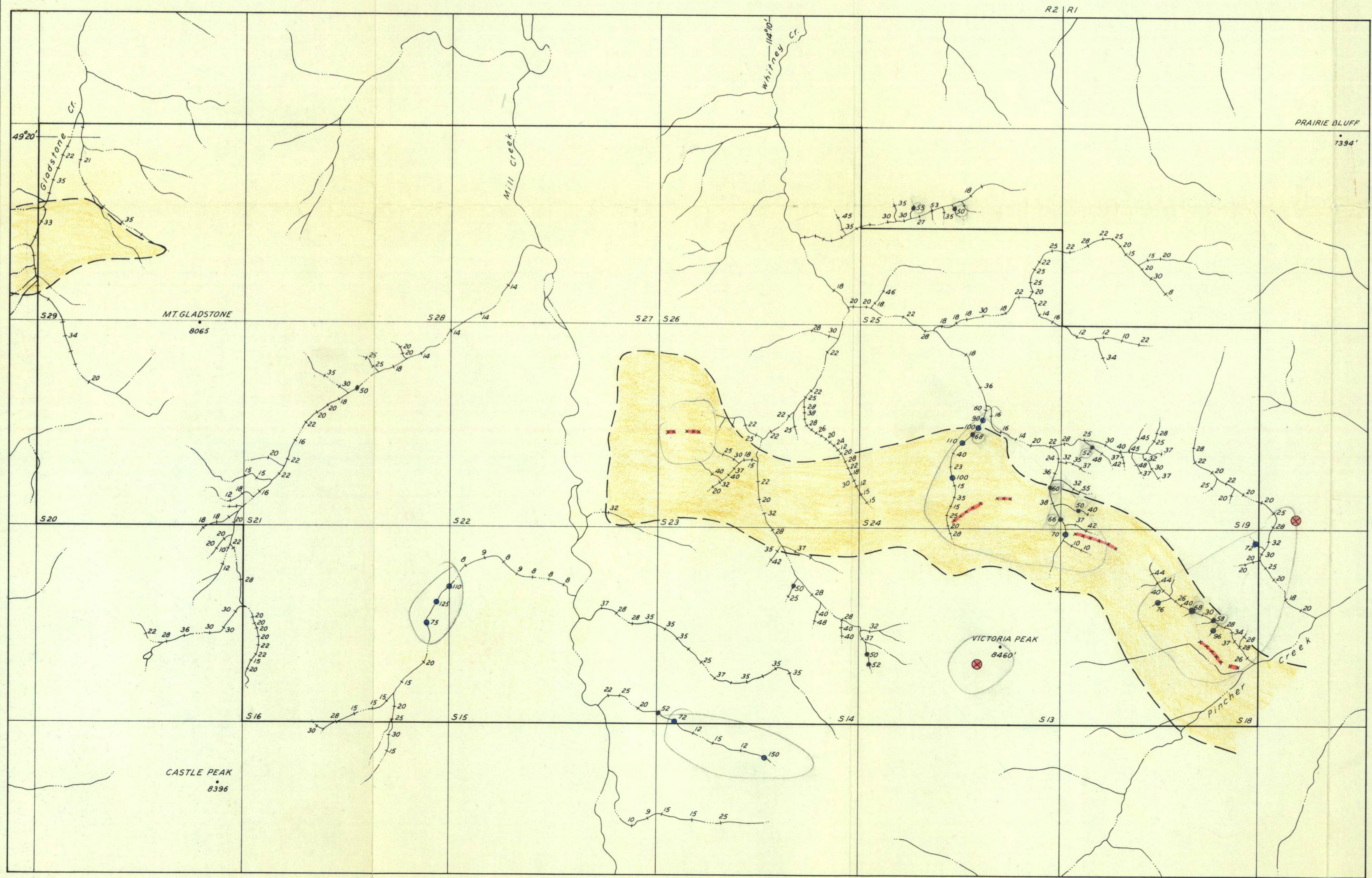
The area surrounding the anomalous values in section 16, Range 2 was prospected thoroughly. The location of the anomalous samples was, in all cases, within fine grained moraine material and no copper mineralization was found in the vicinity.

The present survey leads to the conclusion that for this specific type of narrow strata bound copper deposit geochemical stream sediment sampling is no more effective than conventional prospecting methods.

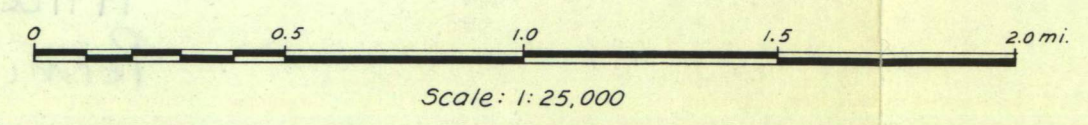
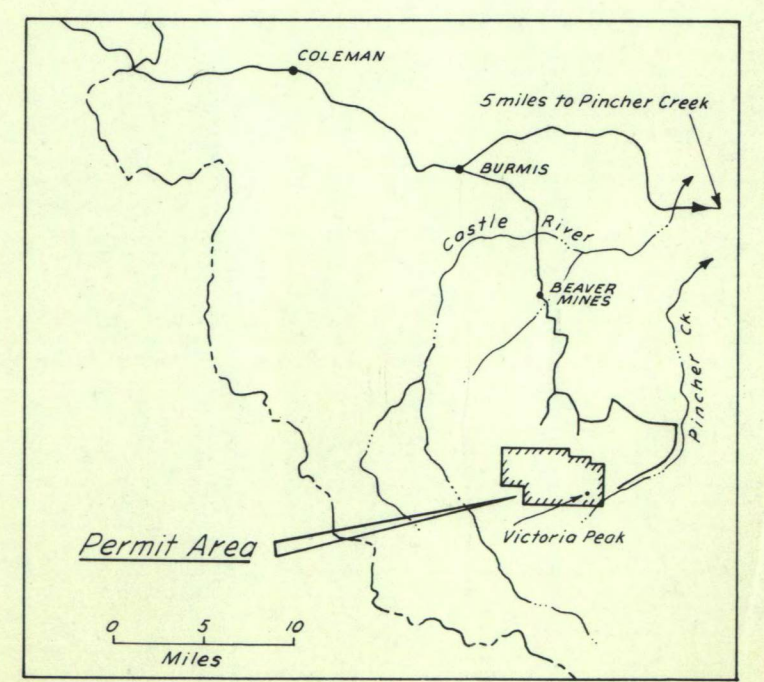

T. Gyr

Vancouver, B. C.

February, 1971



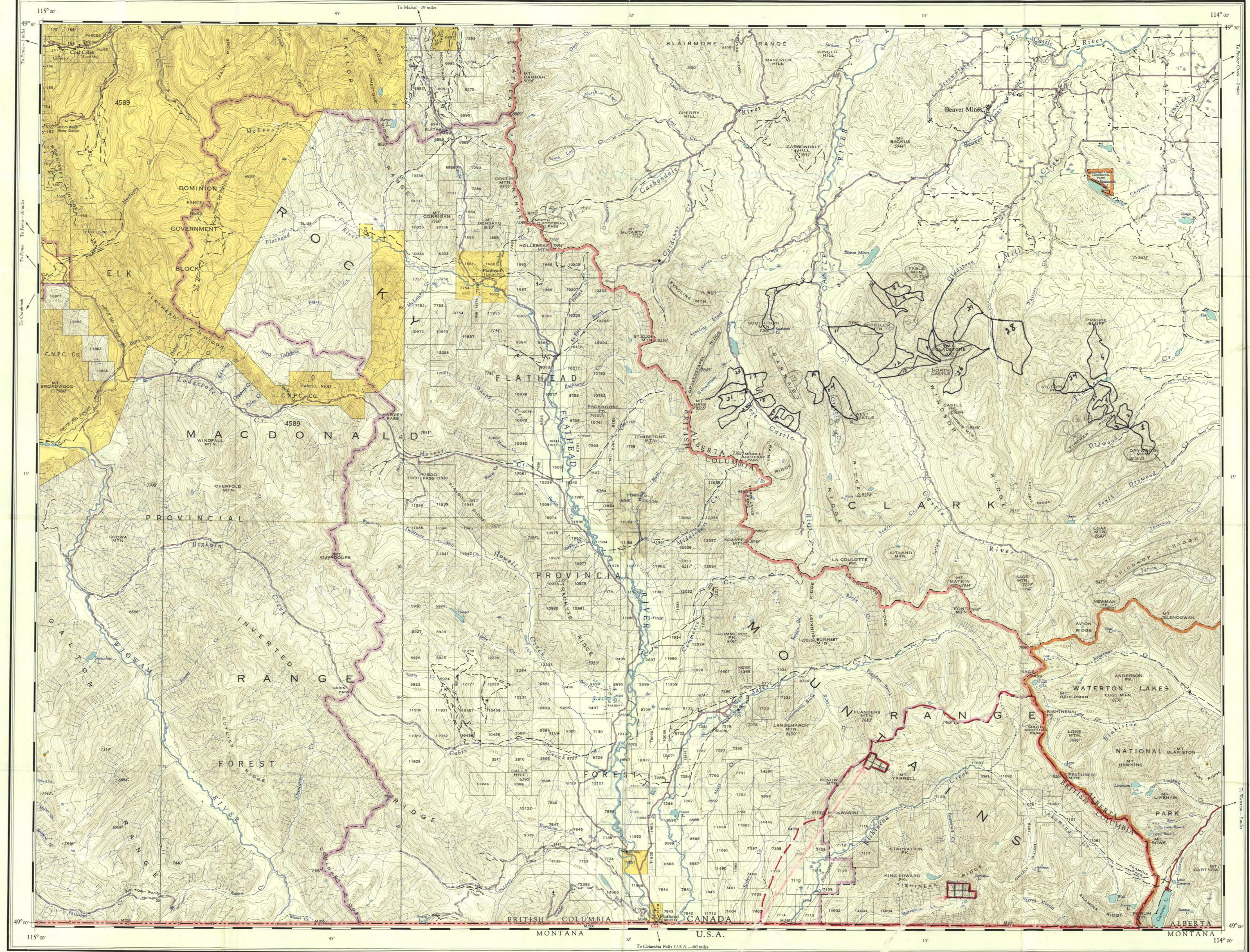
- LEGEND**
- Cu value in p.p.m.
 - No silt fraction.
 - Anomalous Cu value.
 - Surface projection of Grinnell Formation.
 - Cu mineralization in quartzites.
 - Isolated Cu mineralization related to Purcell sills.
 - Permit area with section number.



COMPANY FALCONBRIDGE NICKEL MINES LTD. DATE Sept, 1970
 LOCATION PERMIT 148 S.W. ALBERTA DRAWN BY H.G.T.
 WORK Stream sediment sampling

19710008

REF. No. 157-70-13
 N.T.S. No. 82-G-8



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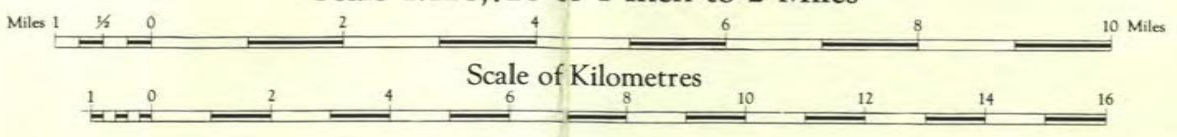
RELIABILITY
 Planimetry compiled from Provincial Government air surveys interim mapping, 1951; B.C. air photos 1951.
 Contours compiled from Dept. of Mines & Technical Surveys, Ottawa, mapping 1953-54.
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REFERENCE

	Lands alienated or owned by application under the Land Act
	Surveyed Timber Lease, License, or Berth
	Indian Reserve
	Government Reserve
	Land Diversion Boundary
	Tree Farm License
	Provincial Forest Boundary
	Municipality
	Park
	Campsite or Picnic Site
	Forest Service Lookout
	Post Office
	School
	Church
	Hospital
	Building
	Cemetery
	Water Gauge
	Historic Monument
	International Boundary and Monument
	Interprovincial Boundary and Monument

FLATHEAD
 BRITISH COLUMBIA
 KOOTENAY LAND DISTRICT
 Scale 1:126,720 or 1 Inch to 2 Miles

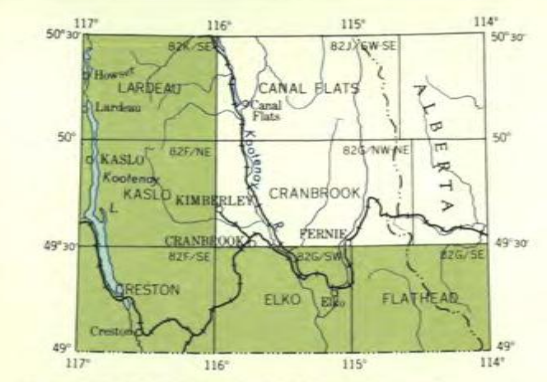


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REFERENCE

	Road, Hard Surface, All Weather
	Loose Surface, All Weather
	Loose Surface, Dry Weather
	Trail
	Abandoned Railway
	Railway
	Main Telephone Line
	Main Electric Power Line
	Horizontal Control Station
	Control Station (Interval 100 feet)
	Elevation in feet above mean sea-level
	Information Stream
	Swamp or Marsh
	Dam
	Water Tank
	Saw Mill
	Gravel Pit
	Spring
	Cleaver
	Mine
	Customs Office
	Navigation Light
	Intermittent Lake or Seasonal Inundation

Universal Transverse Mercator Projection



Note: On the above index the sheets published are shown coloured green.
 Government Agents at Fernie.
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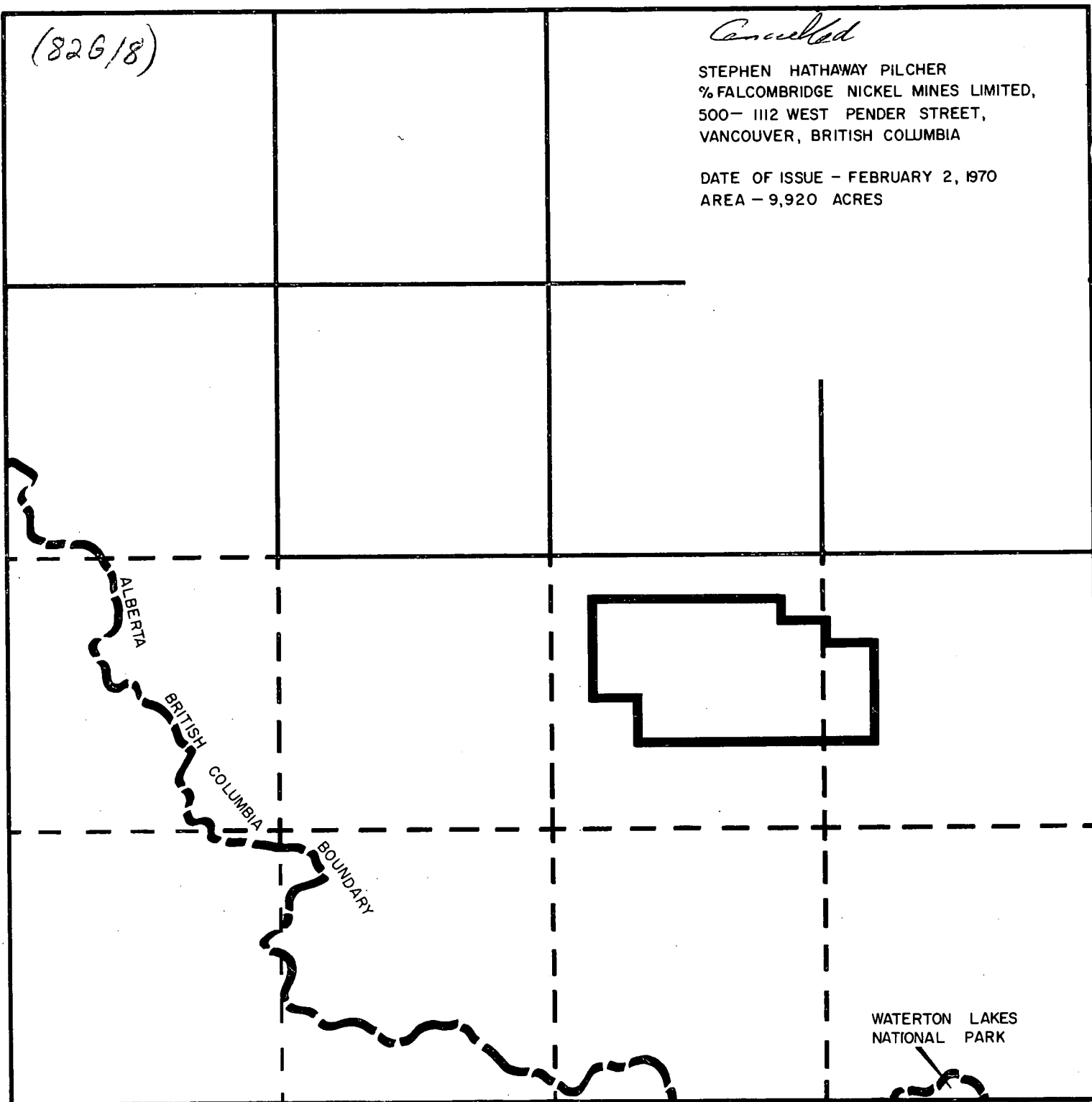
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Cancelled

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R.2

R. 1 W. 5 M.

TP.4

TP.3