

GEOLOGICAL SURVEY REPORT  
on the  
CREE and SIOUX MINERAL CLAIMS  
Macmillan Pass Area

Watson Lake and Mayo Mining Districts  
Yukon Territory

Longitude: 130°07'W

Latitude: 63°10'N

Map Sheet: N.T.S. 105-0-1



by

Edward J. Debicki

District Geologist, Northwestern Canada

CANADIAN NICKEL COMPANY LIMITED

June 1, 1977 - July 9, 1977



090238

This report has been examined by the Geological Evaluation Unit and is recommended to the Council to be considered as representation work in the amount of \$2110.47

*[Handwritten Signature]*  
Resident Geologist  
Mining Division

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

*[Handwritten Signature]*  
B. R. BAXTER  
Supervising Mining Recorder  
Commissioner of Yukon Territory



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Claim Location Map - Scale: 1" = 65 miles

Claim Map - Welcome North Option, East Group - Scale: 1" = 2640'

Back Pocket:

Geology Survey - Sheet 1 - 1" = 200'

Geology Survey - Sheet 2 - 1" = 200'

Geology Survey - Sheet 3 - 1" = 200'

Geology Survey - Sheet 4 - 1" = 200'

Geology Survey - Sheet 5 - 1" = 200'

Geology Survey - Sheet 6 - 1" = 200'

Geology Survey - Sheet 7 - 1" = 200'

Geology Survey and Legend - Sheet 8 - 1" = 200'

## INTRODUCTION

The CREE and SIOUX claim groups were staked by Welcome North Mines Ltd. (N.P.L.) during July and August, 1976. The groups, consisting of 44 claims, are adjacent to and east of the TOM claim group, held by Hudson Bay Exploration and Development, where present ore reserves are quoted at 8,645,000 tons averaging 8.1% Pb, 8.4% Zn and 2.75 oz/ton Ag.

The CREE and SIOUX claim groups were acquired under option by Canadian Nickel Company Limited during 1977. Exploration to date has consisted of a magnetometer survey and geological survey. Additional staking of CREE 21F-28F was carried out during June, 1977, bringing to 52 the total number of claims.

## LOCATION AND ACCESS

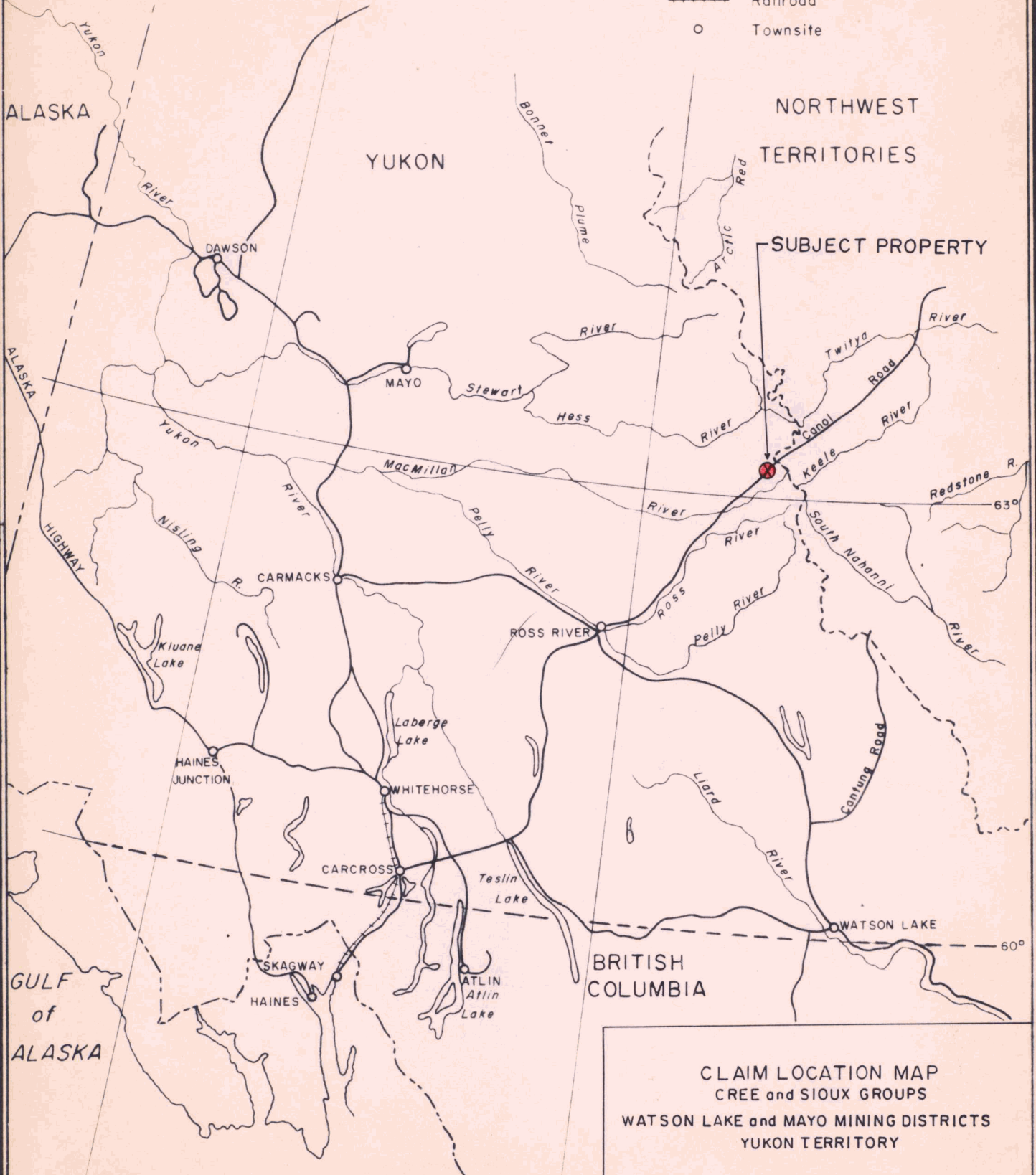
The CREE and SIOUX claim groups are situated in the Mayo Mining District and Watson Lake Mining District, Yukon Territory. The claim groups lie within N.T.S. area 105-0-1 at 130°07'W longitude and 63°10'N latitude. Ross River, Yukon Territory, is located approximately 115 air miles to the southwest of the claim groups.

Access to the area is by way of the North Canal Road (summer traffic only) from Ross River, Yukon. The road transects the claim groups at Mile 278 and forms the boundary between the Watson Lake and Mayo Mining Districts. Access within the claim groups is by means of helicopter and foot. A base camp was situated on claim FETCH 21 (YA15167) located at Mile 268.1 of the North Canal Road, some 10 miles south-southwest of the claim group. An airstrip is located near Macmillan Pass, alongside the North Canal Road, approximately three miles south of the claim groups.

# SOUTHERN YUKON TERRITORY

Scale 1 inch = 65 miles

- International Boundary
- Provincial Boundary
- Highway
- +—— Railroad
- Townsite



CLAIM LOCATION MAP  
CREE and SIOUX GROUPS  
WATSON LAKE and MAYO MINING DISTRICTS  
YUKON TERRITORY

TOPOGRAPHY AND CLIMATE

The claims are in the Hess Mountain region of the Selwyn Mountains. Elevations range from 4,000 feet to 7,000 feet above sea level. Most of the claim groups is accessible by foot except several areas on the west side of the claim groups where steep rock faces and/or the danger of snow slides prevent access.

The first two weeks of June were marked with exceptionally warm and sunny weather; the latter part of June and early July were wet and cold, with snow at higher elevations.

CLAIMS COVERED

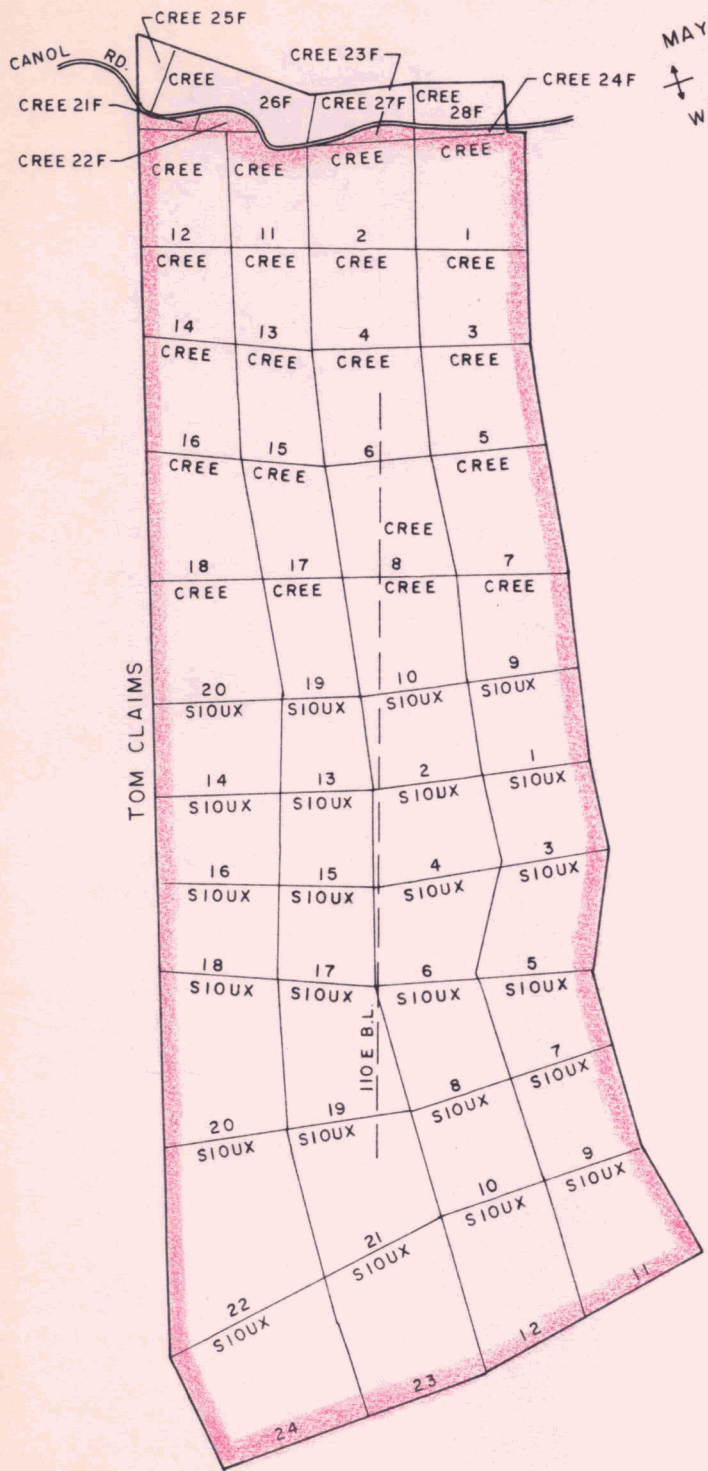
All work was performed by personnel of the Canadian Nickel Company Limited.

<u>Claims</u>	<u>Record Numbers</u>	<u>Mining District</u>
SIoux 1-8	YA232 - YA239	Watson Lake
SIoux 9-24	YA465 - YA480	Watson Lake
CREE 1-2	YA6027 - YA6028	Watson Lake
CREE 3-10	YA216 - YA223	Watson Lake
CREE 11-12	YA6029 - YA6030	Watson Lake
CREE 13-20	YA224 - YA231	Watson Lake
CREE 21F-24F	YA20224 - YA20227	Watson Lake
CREE 25F-28F	YA15163 - YA15166	Mayo
	<u>Total: 52 claims</u>	

All claims are held at present by Canadian Nickel Company Limited except CREE 25F-28F which are in the process of being transferred to Canadian Nickel at the time of writing this report.



MAYO MINING DIVISION  
WATSON LAKE MINING DIVISION



CLAIM MAP  
WELCOME NORTH OPTION  
EAST GROUP  
CREE and SIOUX GROUPS  
WATSON LAKE-MAYO MINING DIVISIONS  
YUKON TERRITORY

2640 0 1320 2640 FT  
1" = 2640'

105-0-1 7/77

## GENERAL GEOLOGY

The geology of the area is covered by G.S.C. Open File 205, "Niddery Lake". Geologically, the area is located on the eastern margin of the Selwyn Basin in Paleozoic fine-grained clastics and shales.

The stratigraphic succession of the Macmillan Pass area has been defined by Clyde Smith of Ventures West Capital, after approximately five summers' field work in the area. He considers the TOM and JASON Pb-Zn-Ag deposits to lie within a small miogeosynclinal basin about six miles by eight miles in extent on the margin of a larger geosynclinal basin. This basin centres on the TOM claims, abuts against a possible graben in the HASTEN claims to the southwest and thins out to the east across the southern part of the SIOUX claims. The stratigraphic succession within the miogeosynclinal sub-basin consists of Devonian to Mississippian clastics and shales of the Besa River Formation overlying Ordovician to Silurian clastics, shales and carbonates of the Road River Formation. The area has been intruded by numerous Cretaceous granodiorite intrusions.

Structurally, folding consists of broad open folds with northwest-northeast trending axis and tight, smaller scale folds with east-west trending axis.

## GEOLOGY OF THE CREE AND SIOUX CLAIM GROUPS

### (a) Stratigraphy

A generalized stratigraphic section is given below. The stratigraphy is more specifically defined and cross-referenced to Clyde Smith's regional stratigraphy in the Legend on Sheet 8 (back pocket of this report).

CRETACEOUS	Unit 4	Hornblende-biotite granodiorite and quartz-feldspar porphyry.
<hr/>		
	Unit 3	Orange-brown weathering silty sandstones; grey laminated siltstones; intraformational conglomerate.
DEVONIAN-MISSISSIPPIAN (Besa River Formation)	Unit 2	Grey shales; orange-brown sandstones; intraformational conglomerates; black carbonaceous shale with cherty layers; spotted barite; dark grey to rusty-brown weathering shale with pyritic siltstone; chert pebble conglomerate. (Upper part of this unit hosts TOM and JASON Pb-Zn-Ag mineralization.)
	Unit 1	Silty shale with pyritic siltstone; light grey, silvery weathering carbonaceous shale.
<hr/>		
ORDOVICIAN-SILURIAN (Road River Formation)		Black limestones, chert, graptolitic shales (not exposed on CREE and SIOUX claim groups).

The clastics belong to the lower part of the Besa River group and can be broken down into four distinct units. These are, from oldest to youngest: (1) laminated silty shale; (2)(a), (b), (c) chert pebble conglomerate; (2)(d), (e), (f) Canol formation shales, and (3) lower Imperial group red-brown siltstones. Small-scale folding makes determination of true thickness difficult.

(i) Unit 1

Unit 1 predominates over most of the map area. It consists of laminated silty shale with minor interbeds of cherty conglomerate and sandstone. The rock is black on fresh surfaces with 10% - 25%, 1 - 10 mm, tan to brown silty laminations which are commonly pyritic (1% - 5%) with cube casts on lamination surfaces occasionally attaining 1 cm in size. No consistent variation in the lamination thickness or abundance was noticed in the map area, although a thickening of the laminations towards the top of the unit has been reported on the TOM claim group. The weathering colour varies from light to dark grey in talus to rust-brown on outcrop due to the weathering of the pyrite.

The silty interbeds are irregular and show scouring of the underlying shales, indicating a moderately-high energy environment with pyrite perhaps being deposited along the more porous laminations at a later date.

There appears to be a slight facies change with sandy interbeds becoming more numerous and thicker to the northeast. The contact with the overlying conglomerate is sharp but also shows signs of scouring.

The unit correlates with Unit 1(b) of Clyde Smith's stratigraphy on the JASON claims but his Units 1(a) and (c) were not seen, although a 30-foot thick bed of well-laminated light grey weathering black shale (1(b)) was seen within the Unit 1 sequence.

### (ii) Unit 2

Unit 2 rocks, which occur along ridges down both sides of the valley running down the centre of the claim block, outcrop due to the resistant nature of the 2(b) conglomerate combined with a large, one-mile-wide anticline with its axis down the valley. The chert pebble conglomerate with associated turbidite sequences (Units 2(a), (b) and (c)) could be a separate formation but they appear to represent a part of a series of repetitious events ranging from very high energy conditions depositing the conglomerate and turbidite to low energy conditions depositing the graphitic shales.

Unit 2(a) only occurs at one location in the claim groups and consists of a 30-foot thick bed of chert pebble conglomerate with very light coloured pebbles and matrix. It was correlated with a similar bed on the opposite side of the valley, which was thicker, more extensive laterally and located just to the east of the map area on the opposite limb of the large anticline. The rest of the unit consists of a series of turbidites identical to Unit 2(c).

Over the rest of the map area, Unit 2(b) massive chert pebble conglomerate directly overlies Unit 1 rocks. The pebbles are poorly sorted, subrounded, white to gray to brown chert fragments in a fine to coarse chert sand matrix. The unit varies in thickness from 75 to 250 feet, increasing in thickness to the northeast.

Unit 2(c) consists of a number of turbidite sequences varying in thickness from less than one foot to over 30 feet, the most complete of which exhibits characteristics of the Bouma series A to D and grades from medium-grained cherty sandstones to the laminated shales of Unit 2(d). Unit 2(c) is not continuous and tends to be thicker to the north and east and may contain beds of chert pebble conglomerate.

Unit 2(d) is very similar to Unit 1, with the pyritic silty laminations being less numerous and slightly thicker. It weathers dark grey to rust-brown and is discontinuous.

Unit 2(e) is the most interesting since it hosts the TOM deposit. It consists of black variably carbonaceous to graphitic shales and is not laminated. The silica content also varies considerably with the rock becoming cherty in places. The rock is very recessive and may be interbedded with Unit 2(f) on occasion. Several fragments were found in talus containing up to 20% lenses and discontinuous lamellae of barite. The talus weathers from black to silvery grey.

Unit 2(f) appears to be part of the 3(a) siltstones but is interbedded with 2(e) shales. It consists of alternating beds of grey laminated shales, orange-brown silty sandstones and minor intraformational conglomerate with grey to brown shale fragments in a limonitic matrix. The repetition of these units may be due to tight folding as overturned bedding was found in a nearby outcrop of 3(a) siltstones and the unit is only found in this one area.

### (iii) Unit 3

Unit 3 is considered to be the lower part of Imperial Group sediments and occurs only in the southwest corner of the map area.

Unit 3(a) consists of light to dark grey laminated siltstones and shales with occasional beds of orange-brown weathering silty sandstones.

Unit 3(b) is similar to 3(a) except that the silty sandstones predominate and are frequently cross-laminated with grey to black to hematitic red laminations.

(iv) Unit 4

Unit 4 rocks are a series of vertically-dipping granodiorite dikes which can contain phenocrysts of quartz and feldspar. The rock weathers a light brown and is tan on fresh surfaces. The dikes tend to follow structural or stratigraphic weaknesses and can be from a few feet to 75 feet in thickness. The dikes are associated with a large cretaceous hornblende, biotite granodiorite stock located about 1½ miles to the west of the map area. The dikes cross-cut all the rock units and have very little effect on the country rock.

Quartz veining is present in Unit 1 and can be very common in Unit 2(b), with veins up to three inches wide.

(b) Structure

The structure of the CREE and SIOUX claim groups is dominated by a large anticline, with its axis trending northwest down the main valley of the claim groups. The east limb of the anticline occurs slightly to the east of the map area. A number of smaller, almost isoclinal folds occur with east-west axes which dip away from the major anticlinal axis. This would tend to indicate that the area was first folded along the east-west axis. The folding in Unit 1 is very complex on the west side of the valley, with many small-scale folds. A few small, displacement, east-west trending faults were observed cutting the chert pebble conglomerate of Unit 2.

(c) Mineralization

Mineralization consists only of 0.1% - 3% disseminated pyrite in Unit 1 rocks, spotted barite in the southwest corner of the claim groups and finely disseminated galena, sphalerite and stibnite occurring occasionally on fracture surfaces within a granodiorite dike cross-cutting the southern part of the SIOUX claims.

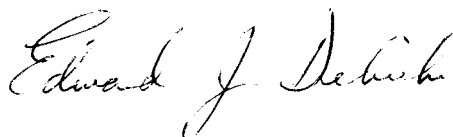
## RECOMMENDATIONS

A magnetometer survey, carried out at the same time as the geological mapping, has not proven to be a useful tool in distinguishing stratigraphic units and structural trends in overburden- and talus-covered areas of the CREE and SIOUX claim groups. This is attributable to the lack of magnetic components associated with any stratigraphic units or structural elements.

The ore horizon of the TOM Pb-Zn-Ag deposit on the adjacent claim group to the CREE and SIOUX claim groups crosses the southwest corner of the SIOUX claims but dips moderately ( $30^{\circ}$  -  $45^{\circ}$ ) towards the TOM property. Spotted barite was found in this Unit 2(d) horizon, with up to 9% barium; however, no significant lead or zinc mineralization was found. Any economic potential for lead-zinc-silver mineralization extrapolated down dip on the CREE and SIOUX claim groups would then occur on the TOM claim group.

On this basis, no further work is recommended on the CREE and SIOUX claim groups at this time.

Respectfully submitted,  
CANADIAN NICKEL COMPANY LIMITED.



Edward J. Debicki,  
District Geologist, NW Canada.

Dated: October 3rd, 1977.

A P P E N D I C E S

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APPENDIX 1 - PERSONNEL

Personnel employed during the course of this work:


E. J. Debicki	41 Ketz Road, Whitehorse, Yukon. Y1A 3V3
T. Little	c/o D. Blake, Penage Road, Whitefish, Ontario.
J. D. Williams	3029 Rue La Forest, Apt. 11, Ste. Foy, Quebec. G1W 1L6
M. Greer	P.O. Box 5033, Whitehorse, Yukon.
I. McCaskill	c/o Canadian Nickel Company Limited, Copper Cliff, Ontario. POM 1N0

APPENDIX 2 - CERTIFICATE OF QUALIFICATIONS

I, EDWARD J. DEBICKI, of the City of Whitehorse, in the Yukon Territory,  
HEREBY CERTIFY:

1. THAT I reside at 41 Ketz Road, Whitehorse, Yukon Territory, Y1A 3V3;
2. THAT I am a graduate of McMaster University with a degree of Bachelor of Science (1971);
3. THAT I am District Geologist, Northwestern Canada, with Canadian Nickel Company (subsidiary of Inco Metals Company) of Copper Cliff, Ontario, POM 1N0;
4. THAT I have practised my profession as a geologist for six (6) years, having worked in Ontario, Quebec, Northwest Territories and the Yukon;
5. THAT I visited the property discussed in this report and that the work described in this report was carried out under my supervision;
6. THAT I am an Associate Member of the Geological Association of Canada.

DATED at Whitehorse, Yukon Territory, this 3rd day of October, 1977.

  
\_\_\_\_\_  
Edward J. Debicki

M A P S

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Canadian Nickel Company Limited  
 GEOLOGY SURVEY  
**WELCOME NORTH MINES OPTION**  
 EAST GROUP  
 CREE and SIOUX CLAIMS  
 Mac MILLAN PASS, YUKON  
 SCALE: 1 IN. = 200 FT.

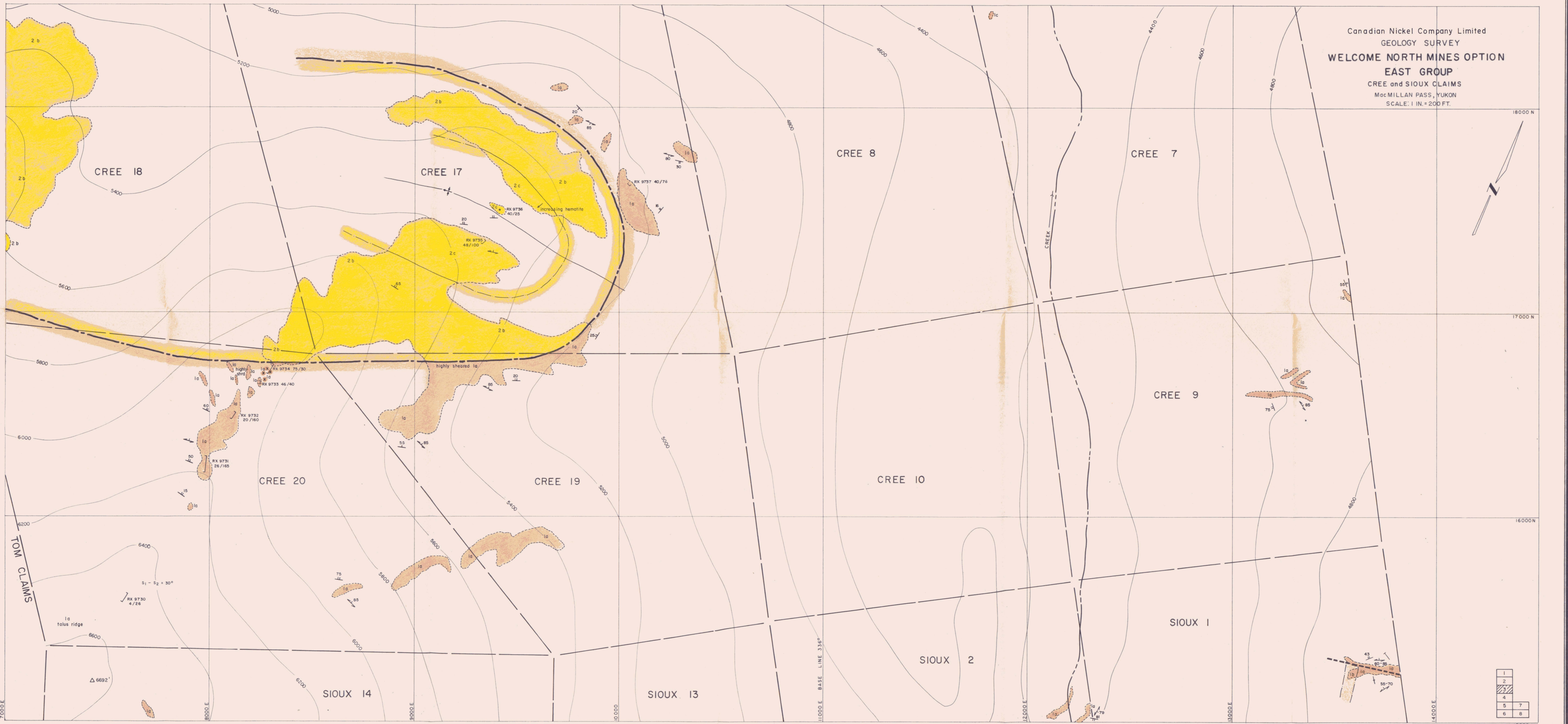
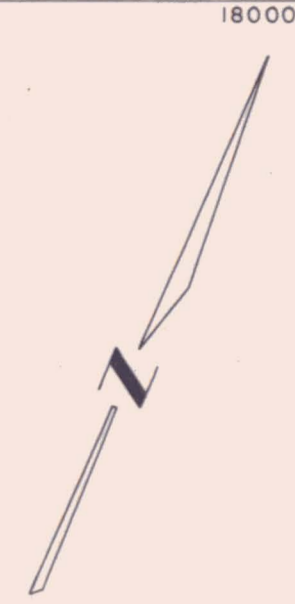
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Canadian Nickel Company Limited  
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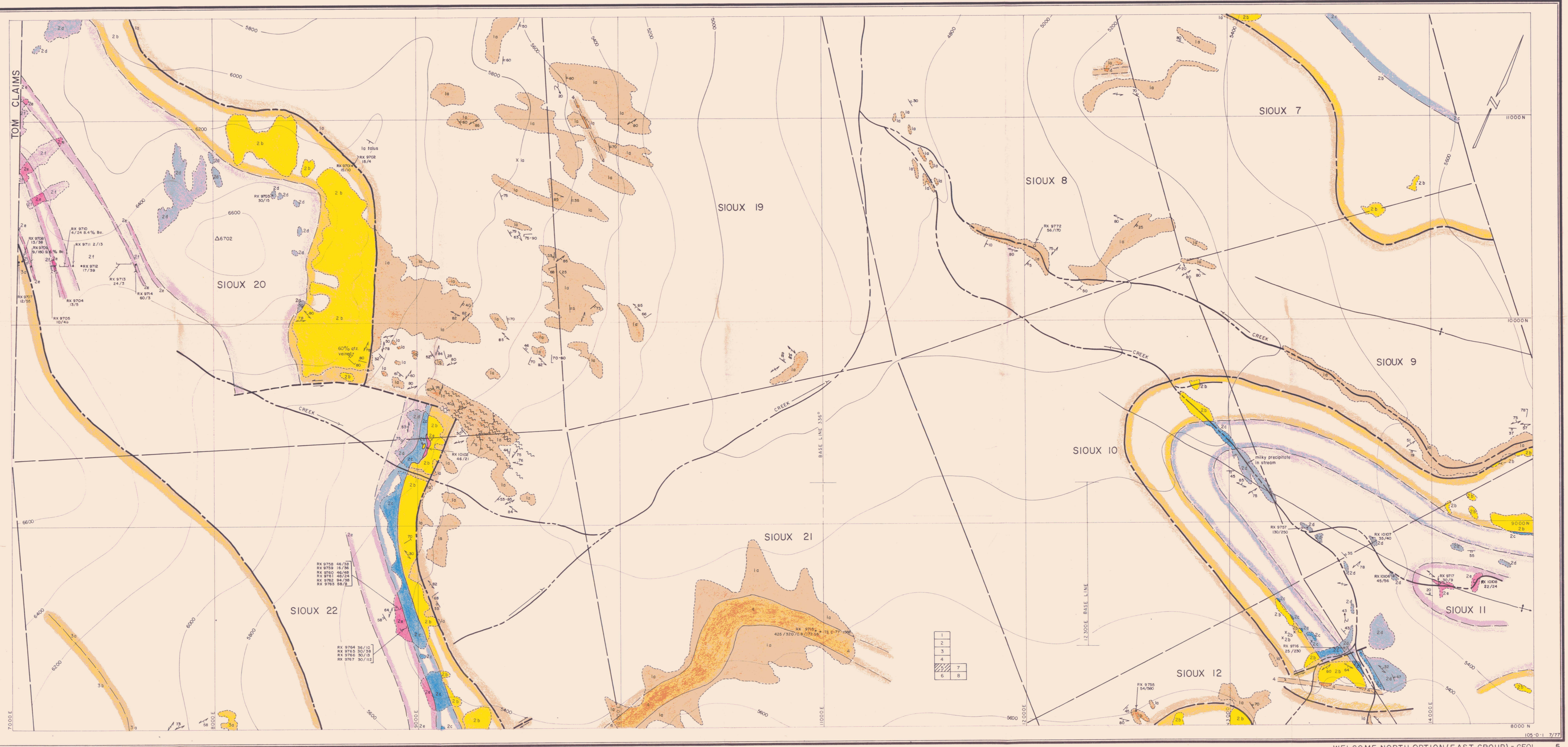
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 SCALE: 1 IN. = 200 FT.



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TOM CLAIMS

SIoux 20

SIoux 19

SIoux 8

SIoux 7

SIoux 9

SIoux 10

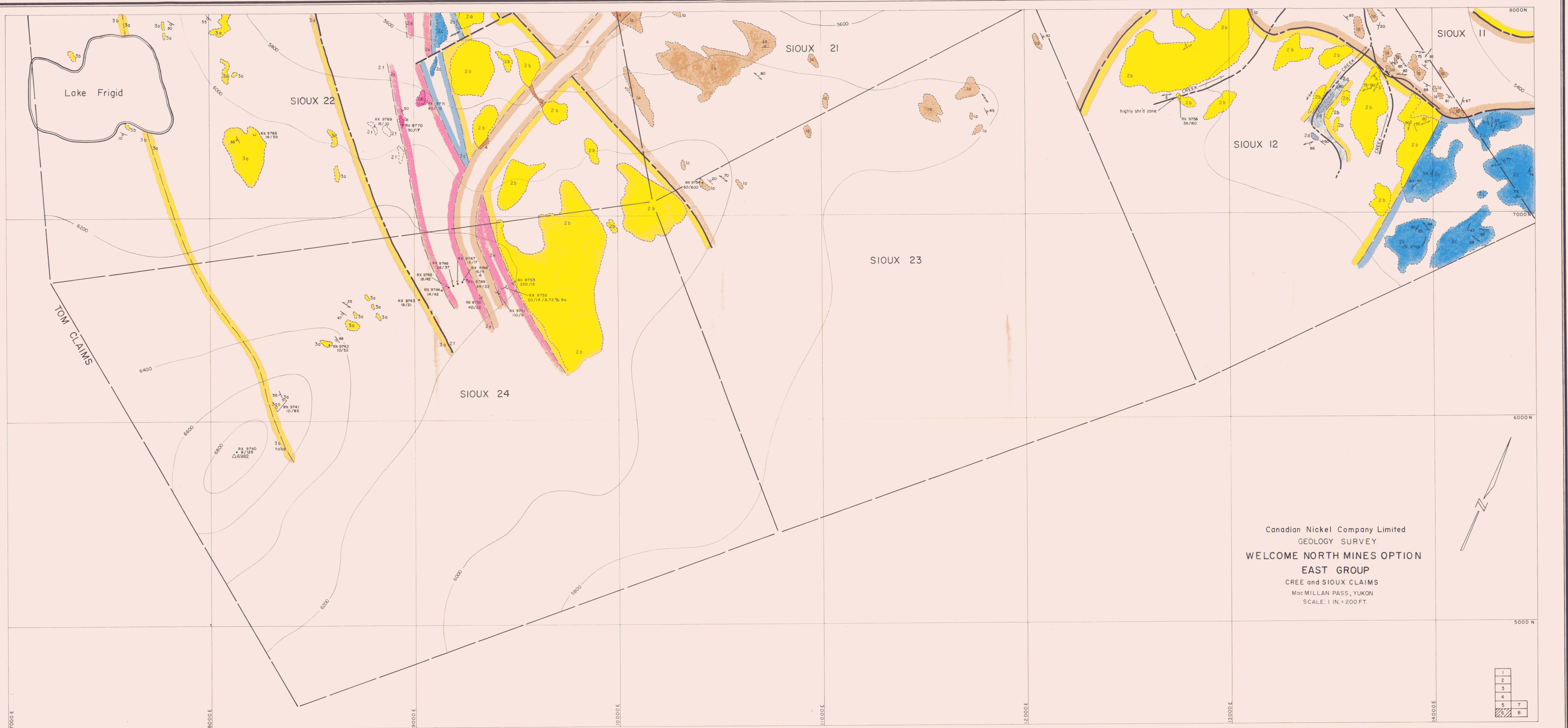
SIoux 21

SIoux 22

SIoux 11

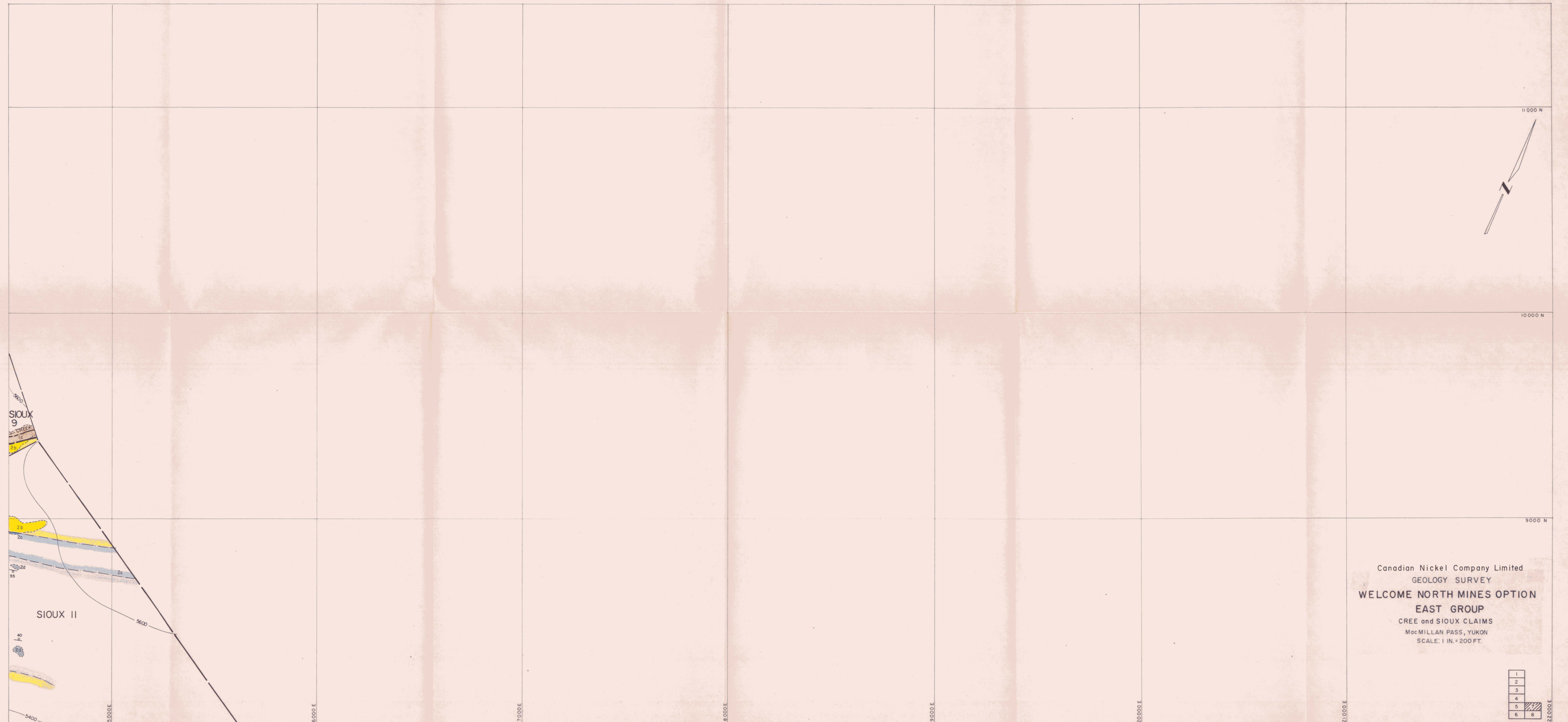
SIoux 12

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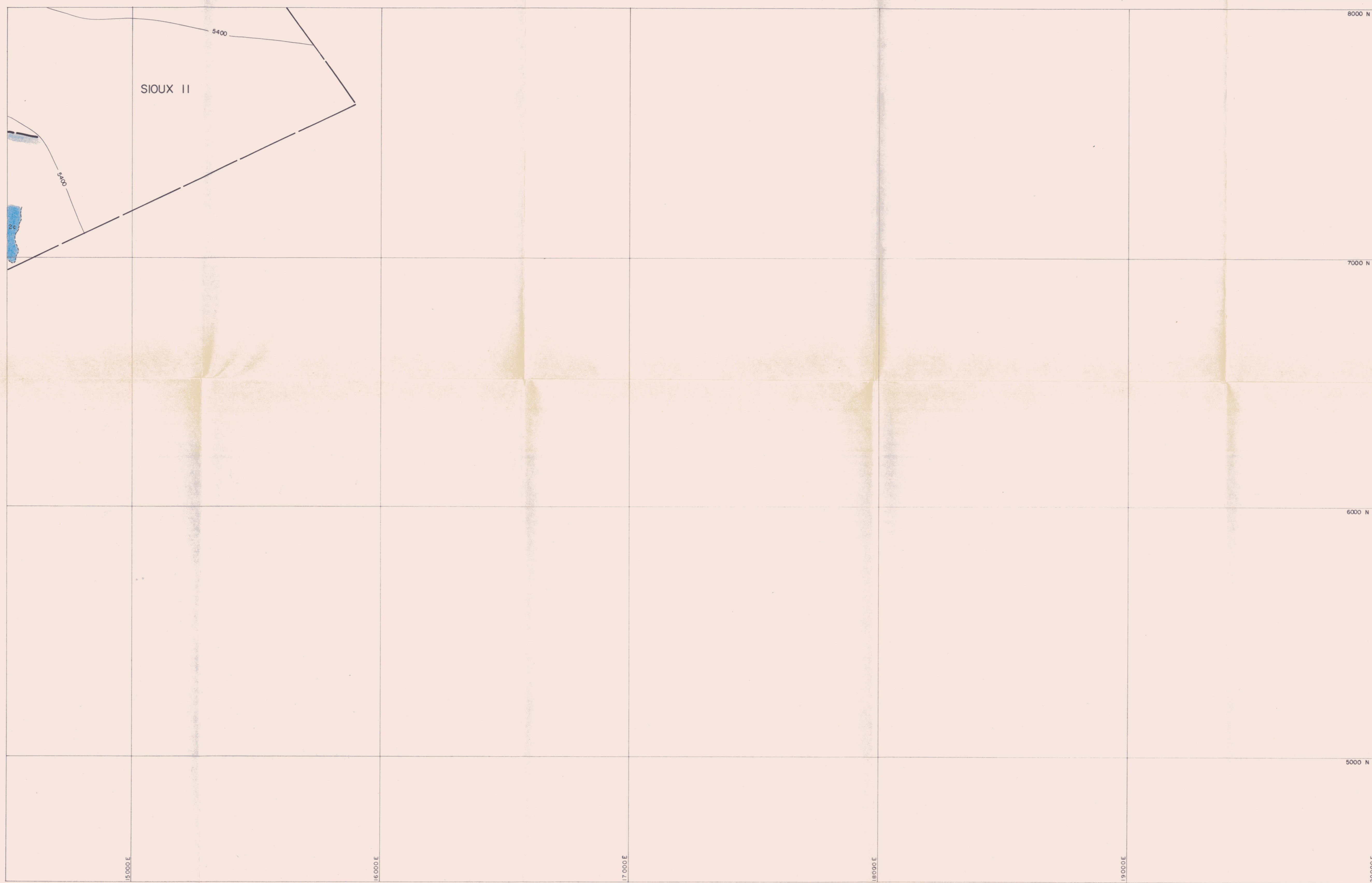
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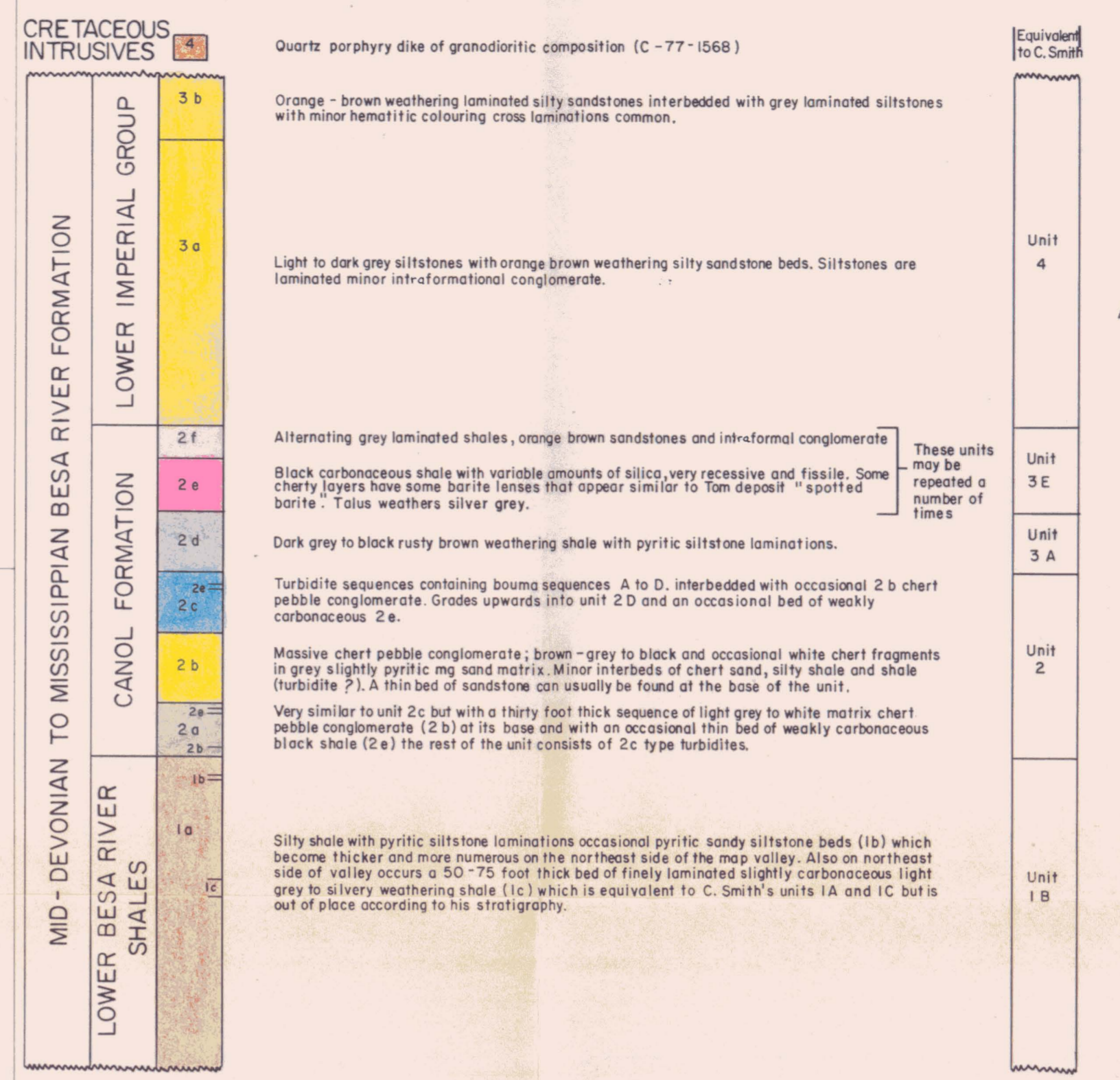


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 Mac MILLAN PASS, YUKON  
 SCALE: 1 IN. = 200 FT.

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**GEOLOGICAL LEGEND AND COMPOSITE STRATIGRAPHIC SECTION**



- Bedding (tops known): inclined, overturned
- Bedding (tops known): inclined, vertical, dip unknown
- Bedding: dip estimated steep, tops unknown
- Bedding: general trend, tops unknown
- Jointing: inclined, vertical
- Schistosity: horizontal, inclined, vertical, steep, strong
- Axial Plane of Minor Fold: vertical, dip unknown
- Fold Axis: trend & plunge
- Fault: defined, approximate, assumed
- Fault: solid circle indicates down - throw side, arrows indicate relative movement
- Shear Zone: defined, approximate, assumed
- Anticline: defined, approximate, plunge indicated
- Syncline: defined, approximate, plunge indicated
- Outcrop: point, area
- Geological Contact: defined, approximate, assumed
- Formation Contact
- River
- Stream
- Swamp
- Sample Location
- Sample Interval
- Thin Section
- Sample Number and elements
- Elevation Contour
- Mountain Peak, Elevation
- Milage Post
- X
- TS - C - 77 - 1085
- Rx 7777 Pb / Zn / Ag ppm
- Ba, Sb, as noted
- 5600
- Δ 6990
- ☆ 279

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