

CHINOOK CONSTRUCTION & ENGINEERING LTD.

ASSESSMENT REPORT ON THE JAN CLAIM

GREENWOOD MINING DISTRICT, B.C.

10TH JULY TO 30TH AUGUST 1977

A.M. de Quadros
Project Geologist

30 November, 1977

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INTRODUCTION

The Jan Claim is part of the Granby Property, consisting of several claims assembled into one mining property jointly by Chinook Construction & Engineering Ltd., Consolidated Boundary Exploration Ltd. and Cassiar Asbestos Corporation Ltd., for the purpose of investigating the uranium showings in the Christina Range of the Monashee Mountains, approximately 12 kilometres north of Grand Forks, B.C.

During the period of 10th July to 30th August, 1977, the Jan Claim was investigated by geological, geochemical and radiometric methods as part of the investigation of the Granby Property by Chinook Construction & Engineering Ltd. on behalf of the joint venture. The following is a report on the work carried out on the Jan Claim.

Property

The Jan Claim consists of 12 units bearing the tag number 26415 staked on 4th November 1976. The claim was recorded on 9th November 1977, reference number 122-4 and claim number 573.

Location and Access

The Jan Claim is located about 12 kms NNE of Grand Forks between Snowball Creek and Sand Creek in the Greenwood Mining Division. The latitude is approximately $49^{\circ} 06' N$ and longitude is $118^{\circ} 26' W$, N.T.S. (82 D/11). Access to the property is by a dirt road extending North from Highway 3 at Grand Forks (Fig. 1).

82E/1W

General Geology

The general geology of the Grand Forks area has been presented in two publications:

- | | | |
|----|--------------------|--|
| a) | H.W. Little, 1957: | Map 6-1957, Kettle River, East Half Geological Survey of Canada. Scale 1 inch to 4 miles. |
| b) | V.A. Preto, 1970 : | Structure and Petrology of the Grand Forks Group, B.C. Paper 69-22, Geological Survey of Canada. |

The area is underlain by rocks of the Grand Forks Group, a raised fault block of high grade metamorphic rocks which are part of the Sushwap Metamorphic Complex. The rocks consist of biotite, amphibole and pyroxene gneisses and schists with minor quartzites and calcareous rocks. A later metamorphic foliation has been imposed on these rocks. The fold axes appear to be east-west. The whole complex has been intruded by the early basic sills and dykes (now amphibolites) and later acid intrusives ranging from quartz-diorites to quartz monzonite, monzonite and syenite. Block faults are prominent throughout these rocks. The rocks show extreme folding in a general NE - SW direction and prominent jointing and dyke emplacement in a rather N - S trend.

Maximum mineralization appears to be associated with pegmatite lenses and also in the North-South shear zones; the mineralization is predominantly uraninite. Secondary uranium minerals are rare, but have been observed in the showings.

WORK DONESurvey Grid

In the interest of conformity with the grid established by G.E. White in 1976, the same N-S base line was used. During this programme, the base line was resurveyed by compass and chain, cut out, blazed and flagged. Pickets were placed every 50 metres on the base line.

East-west lines were turned off every 100 metres; these were flagged and stations were established every 50 metres. In the interest of accuracy, accurate control lines were established along 10E and 20E and 15W to which cross-lines were tied.

Geochemical Survey

Soil samples were obtained at 50-metre intervals along the traverse lines, care being taken to ensure that all came from the 'B' horizon. Approximately 500 samples were taken. These were sent to Chemex Labs Ltd. in North Vancouver for Uranium determination. Results are on Fig. 3. The analysis was carried out as follows:

One-half gram of -80 mesh sample was ashed and then digested twice with 4M HNO₃. The residue was then dissolved in 25 millilitres of 4M HNO₃ and shaken. After settling, 0.2 millilitres of the solution were placed on a platinum dish and evaporated to dryness. A pellet of uranium-fluorescent flux was added to the residue and the mixture fused at 650°C. The resultant pellet was placed in a Tanner III Fluorometer and its fluorescence measured to an accuracy of 0.05 ppm.

Radiometric Survey

The scintillometer survey was carried out using two scintillometers, the Scintrex GIS-3 gamma ray spectrometer, capable of giving separate counts for the broad band, K-U-Th, U-Th and Th. The instrument was calibrated at least four times a day with the Scintrex standard TS-1.

The instrument was used two ways:

- a) Between stations and during open traverses, the instrument was carried by hand, set on broad band with the short counting interval (1 second); the squealer being set at approximately two times the background. Thus, any abnormally high count rate could be easily detected and a more quantitative count carried out.
- b) At the stations and for more quantitative measurements, the instrument was placed on the ground. Three measurements were made at each station for the K-U-Th, U-Th and Th using the long counting interval (3 seconds).

Geologic Survey

The geologic survey was carried out in conjunction with the radiometric survey. Most of the mapping was carried out along the lines, though it was necessary to zig-zag across the lines to cover a reasonable area. Any high count rock was noted; counts were taken to obtain a general impression of the source of increased radiation. These rocks were also examined and samples collected for further work.

Radon Survey

A test radon survey was run over the main geochemical anomaly in the Jan Claim. The results of this work, by Glen E. White, is attached to this report (Appendix).

DISCUSSION OF RESULTS

A. Geology (Fig. 2)

The rocks of the Jan Claim consist mainly of metapellites of the Grand Forks Group. These have suffered some anatexis and are in general migmatites. Numerous intrusive veins of alaskitic composition occur; these range in texture from aplitic to pegmatitic. The whole complex appears to have been folded about ESE and NE trending axes but as yet structural and stratigraphic relationships are unknown.

1. Petrology

The rocks of the Jan Claim have been divided into four lithologic units based on field examination and observation.

a) Mixed Schists and Gneisses

These rocks occur in generally poorly exposed areas in the north and south-east of the claim and consist of a mixture of well-foliated biotite schists, clinopyroxene-biotite schists and gneisses and minor quartzite. Invariably this unit has been widely intruded by concordant quartz-veins and pegmatite, generally making up to 30% of the rock. Minor garnet, graphite and sillimanite bearing schists and gneisses also occur within this unit.

Generally, the only structural feature measurable in this unit is the foliation, which is parallel to the regional foliation. The relationship of this unit to others is not known.

b) Granodiorite Gneiss

The granodiorite gneiss is a well-foliated mesocratic rock, apparently conformable with the surrounding meta-sedimentary rocks. Minor schists may occur within this unit. It is a dark grey, medium grained and slightly porphyritic rock with a well-developed foliation due to segregation of biotite. It is a homogeneous unit, though with minor clots of mafic minerals.

In hand specimen, orthoclase, quartz, biotite and hornblende are easily identified. Accessory minerals present are magnetite, apatite and garnet. The unit appears to be of magmatic origin, the foliation being imposed by later deformation and recrystallization. Numerous concordant aplites and pegmatites are observed.

c) Amphibolite Gneisses

Dark coarse grained well-foliated hornblende-plagioclase rocks commonly occur in layers and lenses from 50 centimetres to 6 metres across. These layers are generally concordant and may be in part metasedimentary and in part igneous.

d) Granitic Rocks

Layers, lenses and knots of leucogranite, aplites and pegmatites are common throughout the metasedimentary sequence.

These rocks are seen to contain potash feldspar, oligoclase and quartz with minor biotite, muscovite

and almandine. Compositionally, they range from quartz-monzonite to granodiorites and texturally from aplitic to pegmatitic. Small lenses of various schists and gneisses occur within this unit, but seldom more than four to five metres across.

This unit grades into the others with an increase in the amount of schists and gneisses; boundaries are therefore subjective and complicated by the fact that the granites do outcrop better.

2. Contact Relations

The rapidly alternating character of most Jan rocks suggests that the whole complex is a migmatite, due in part to anatexis and in part to intrusion of concordant dykes. The relationships between various units are complex, and a proper understanding of these relationships has not yet been arrived at. Apart from the foliation, petrofabric elements are poorly developed and seldom visible in outcrop.

The most consistent structural element is the compositional layering. This feature can be observed in most outcrop and suggest a monocline, with a strike ranging from NNW to NNE, and dipping 30° to 50° to the west. The exact nature of this compositional banding is not understood, but appears to be partly due to deformation and partly to anatexis. Intrusives are generally parallel to this foliation and thus reinforce it.

The second most common feature is a strong N-S sub-vertical jointing which controls the outcrop pattern

and topography. This jointing appears to have controlled the intrusion of the aplites and the thin veneers of epidote and chlorite in fractures in the granitic rocks.

Other structural elements have been observed, but these are developed faintly and too rarely for any statistical generalization. Some minor E-W lineations have been observed; these may be related to the E-W fold axes described by Preto and others.

B. GeochemistryStatistical Analysis

A total of 5074 geochemical analyses were available from the Granby Property and these have been used to interpret the Jan geochemistry. These analyses show a log-normal distribution, though with a possible second population above threshold values. The following are the values determined:

mode	0.5 ppm
mean (\bar{x})	1.3 ppm
standard deviation (s)	\pm 4.9 ppm
threshold ($\bar{x} + s$)	6.2 ppm
low anomaly ($\bar{x} + 2s$)	11.0 ppm
high anomaly ($\bar{x} + 3s$)	16.0 ppm

The anomalous values are distributed as follows:

Above threshold ($\bar{x} + s$)	5.26%
Above low anomaly ($\bar{x} + 2s$)	3.04%
Above high anomaly ($\bar{x} + 3s$)	2.70%

These values are higher than predicted by the mathematical model, suggesting a second population. The anomalous areas defined appear neither overly restricted nor overly large.

Geochemical Analysis

The geochemical results have been plotted on Fig. 3 and are contoured on the basis of the statistical analyses. They show several anomalous areas, generally linear and trending either NE or EW, the most interesting being the anomalies in the west-central and east-central part of the claim. Minor amounts of autunite have been

observed in fractures in rocks near the west-central anomaly, though the radiometric readings are low. The east-central anomaly occurs mainly in overburden; follow-up work with a radon emanometer is attached to this report (Appendix). Further follow up is planned on both these anomalies.

C. Radiometry

Separate counts were taken of every station for Total Count, K-U-Th, U-Th and Th. The background values were:


Total Count	350-500 counts (for 3 seconds)
K-U-Th	7- 12 counts (" " ")
U-Th	4- 12 counts (" " ")
Th	0- 4 counts (" " ")

No significantly larger values were obtained during the survey and hence these have not been plotted.

14.

SUMMARY

This investigation of Jan Claim has pinpointed two possible areas of mineralisation. Detailed examination of the anomalous areas is planned in order to assess the significance of the two geochemical anomalies.



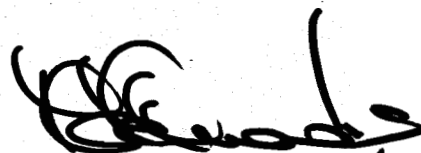
A.M. de Quadros
Project Geologist

STATEMENT OF COSTS

Period July 10th - August 30th 1977

Costs assigned to Jan Claim:

a) Wages		
A.M. de Quadros, Project Geologist		
15 days @ \$90.00		\$1,350.00
5 Assistants	25 man-days @ \$60.00	<u>\$1,500.00</u>
	Total Wages	\$2,850.00
b) Room and Board (Motel)		
40 man-days @ \$32.00		1,280.00
c) Transportation		
2 4x4 trucks @ \$500.00/month		400.00
d) Gamma-ray Spectrometers		
Rental of 2 units		100.00
e) Geochemical Assays		
500 @ \$3.25		1,625.00
f) Expendables (flagging, thread, etc.)		200.00
g) Report Preparation		400.00
	Total Costs	<u>\$6,855.00</u>


 A.M. de Quadros
 Project Geologist

STATEMENT OF QUALIFICATIONS

I, Antonio M. de Quadros, certify that:

a) I hold the following degrees in Geology:

B.Sc. Hons.	University of London	1964
M.S.	U.C.L.A.	1968
Ph.D.	University of Nairobi	1972

b) I have worked on geological projects since 1959, including:

- i 1964-1965: Geologist, Geological Survey of Tanzania
- ii 1968-1972: Lecturer in Geology, University of Nairobi, Kenya
- iii 1973 : Geologist, Agilis Exploration Services, Vancouver, B.C.
- iv 1974 : Geologist, Union Carbide Exploration, Vancouver, B.C.
- v 1974-1975: Geologist, Dolmage Campbell & Associates, Diamond Drilling of Hat Creek Coal Deposit.
- vi 1975-1976: Geologist, Kerr Addison Mines, Feasibility & Exploration, Grum Joint Venture
- vii 1976-1977: Geologist, Dolmage Campbell & Associates, Interpretation, Hat Creek Coal Deposit

c) I am a pupil member of the Association of Professional Engineers of British Columbia.



A.M. de Quadros,
Project Geologist

APPENDIX

RADON SURVEY

Glen E. White

GEOPHYSICAL CONSULTING & SERVICES LTD.

9251 Beckwith Road, Richmond, British Columbia, V6X 1V7

Telephone: (604) 273-6962

August 25, 1977

Mr. T. Schorn
Minerals Manager
Chinook Construction
3rd Fl. 1201 W. Pender St.
Vancouver, B. C.

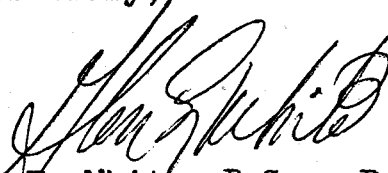
Dear Mr. Schorn:

Pursuant to your request, we have tested a radon gas detector unit over anomalous geochemical values as directed by your field geologist.

Enclosed is a sketch survey map over an area where a number of lines were tested. The radon gas values show a well defined trend and reached a value of 116 c.p.m. Several geochemical values in swampy areas did not give radon gas readings which may indicate a method of evaluating the geochemical anomalies.

Thus, it would appear that the radon gas method may be of valuable assistance in this area.

Yours truly,

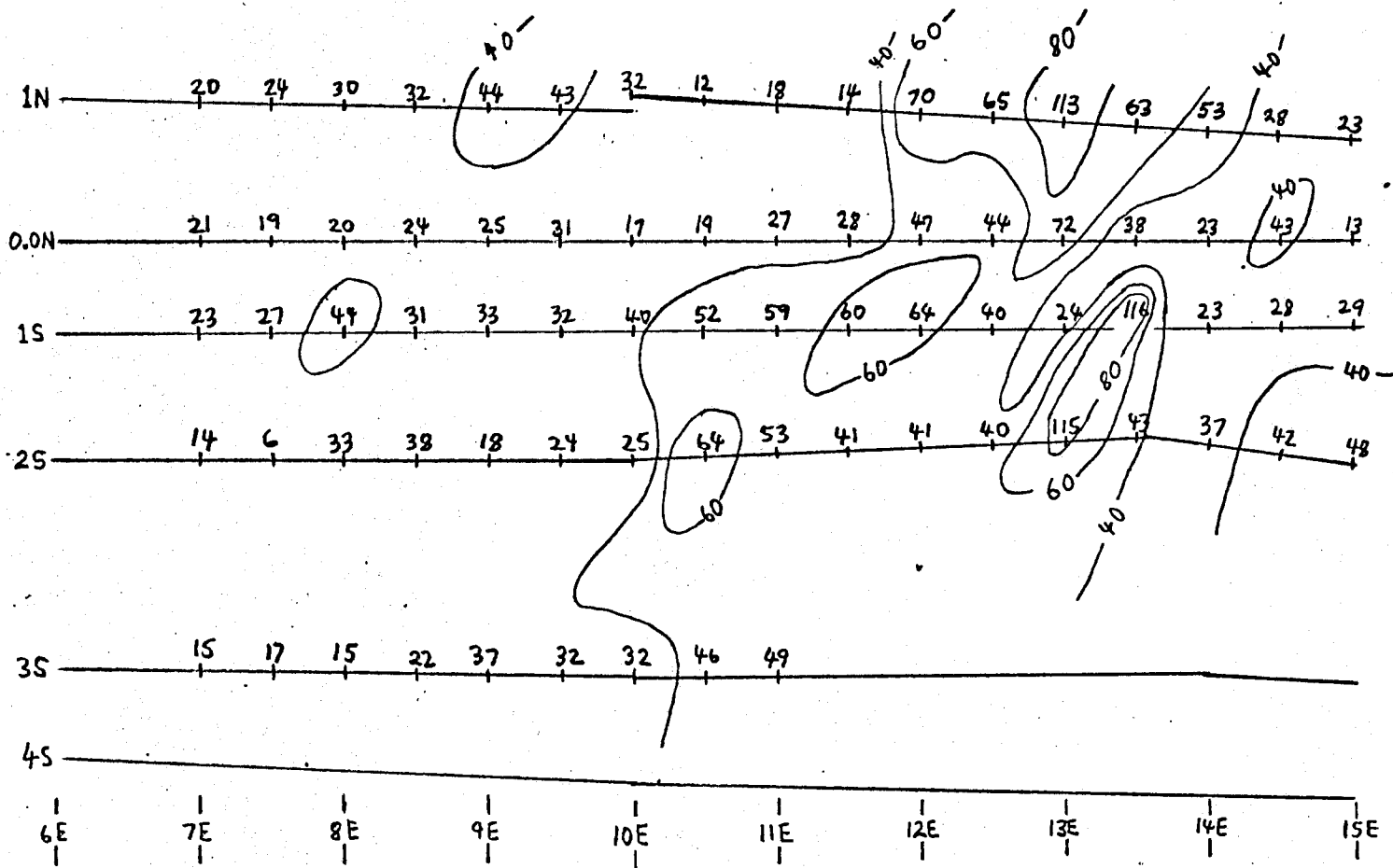


Glen E. White, B.Sc., P. Eng.
Consulting Geophysicist

GW/kw

encl/

RADON GAS (CPM)



Glen E. White
 geophysical consulting
 3
 114

1cm = 50m

CHINOOK CONSTRUCTION & ENGINEERING LTD.
 WENDY CLAIMS - LAST 1 & 2
 GREENWOOD MINING DIVISION - BRITISH COLUMBIA

October 25, 1977

Discussion:

This is an example of an enhanced reduction and interpretation technique for the radon gas detector. The technique is applied here to data from the survey performed on the Wendy Claims, Grand Forks area, in July 1977 for Chinook Construction.

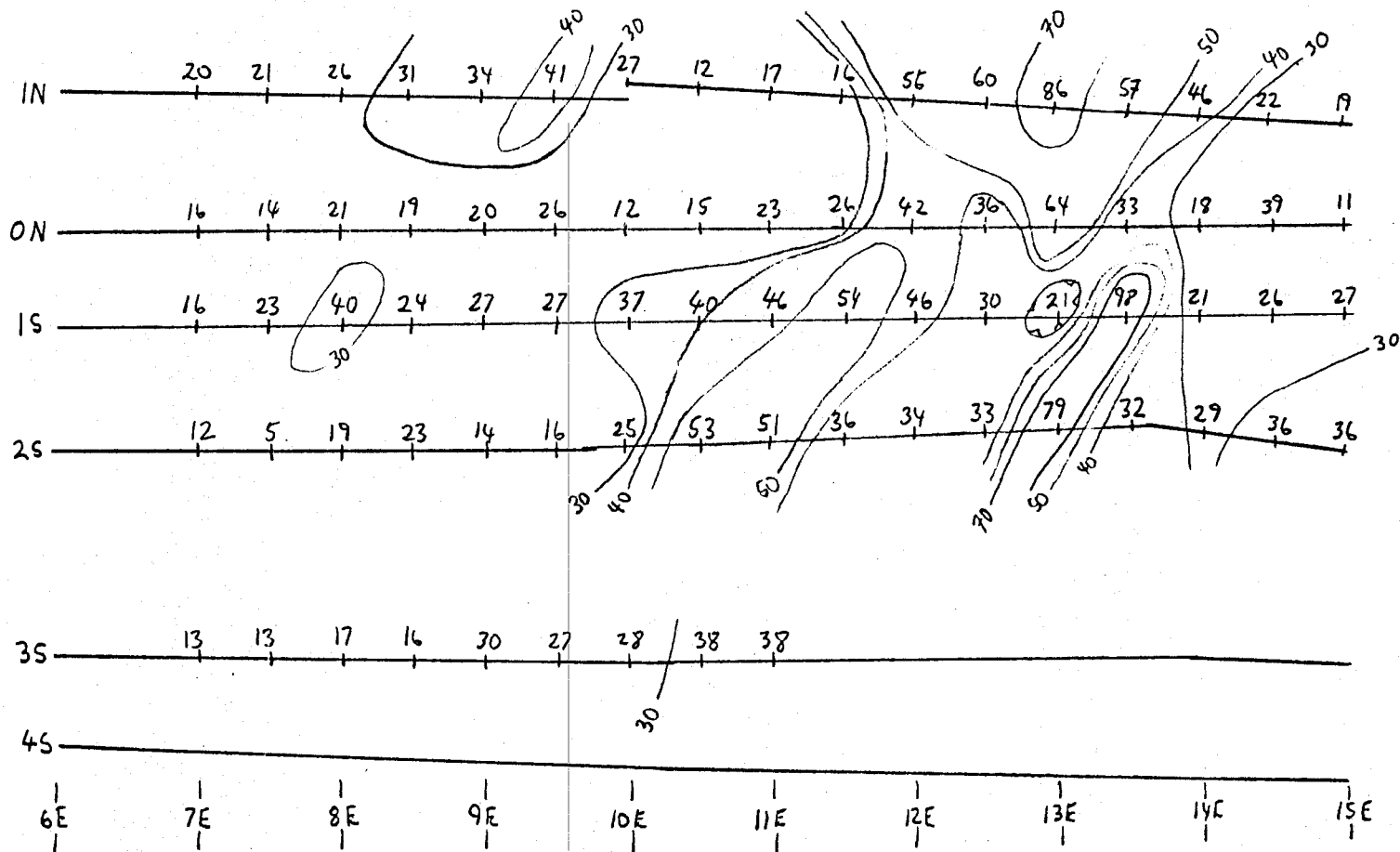
This method allows the determination of the relative contribution of radon and thoron gas at each station by the application of a formula based on a knowledge of the half-lives of these two gases.* This provides a way of separating anomalies caused by radon gas (Rn 222) a daughter product of the uranium (U 238) decay series, from those caused predominantly by thoron gas (Rn 220), a daughter product of the thorium (Th 232) decay series. This is obviously of value in picking the most favourable targets. In the example, figure 1&2, radon gas plays the major role, indicating that the source is primarily uranium.

In addition to this the ratio of radon to thoron gas proves to be diagnostic in the separation of anomalies due to unusually permeable soils. High soil permeability produces an increase in count rate but is usually without an attendant increase in radon-thoron ratio. This is due to the fact that the permeability affects both gases very nearly equally. In figure 3&4 all total count anomalies are paralleled by increases in radon-thoron ratio with the possible exception of the area near 13E on line 2S where the total count rate may be somewhat enhanced by increased soil permeability.

Thus the area of major interest in this data would be the SW-NE trend show dashed on figure 4.

T.V.W. 3/77

*(R. H. Morse; 'Radon Counters in Uranium Exploration', March 1976)

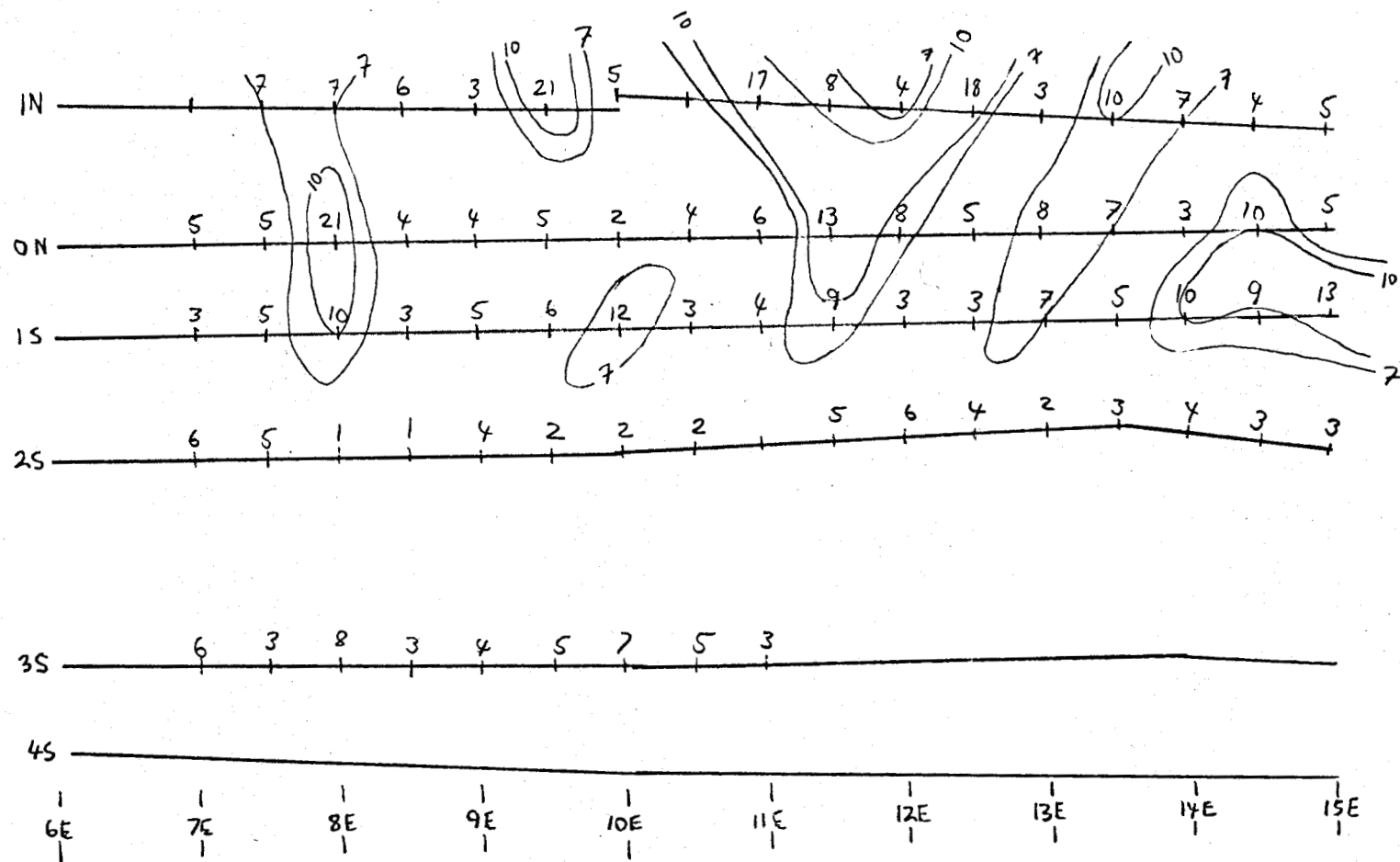


Counts per minute due to Radon Gas (Rn 222)

JAN
Wendy Claims

1cm = 50m

Fig. 1

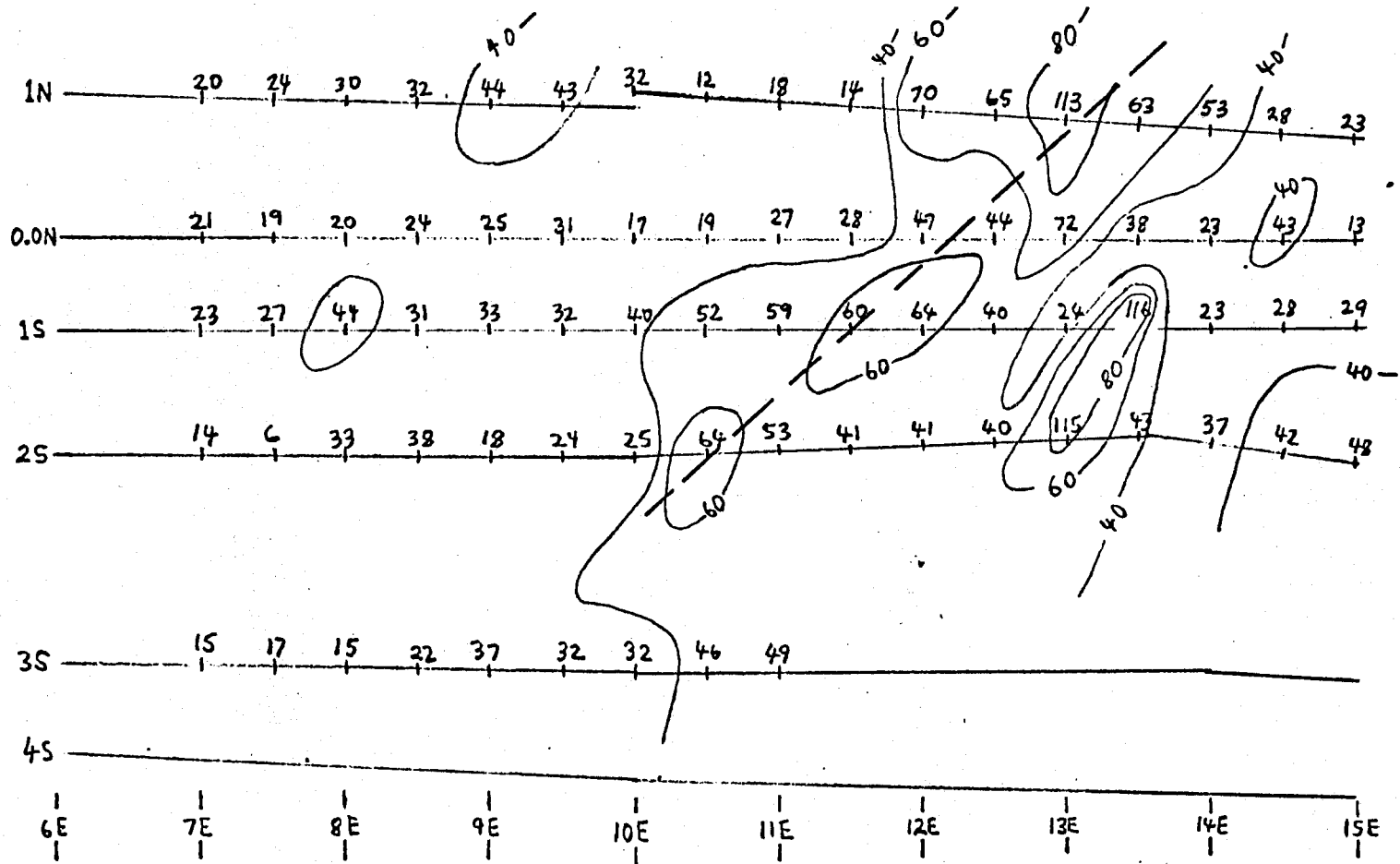


Radon-Thoron Ratio $\left(\frac{Rn\ 222\ CPM}{Rn\ 220\ CPM} \right)$

JAN
Wendy Claims

1cm = 50 m

Fig. 3

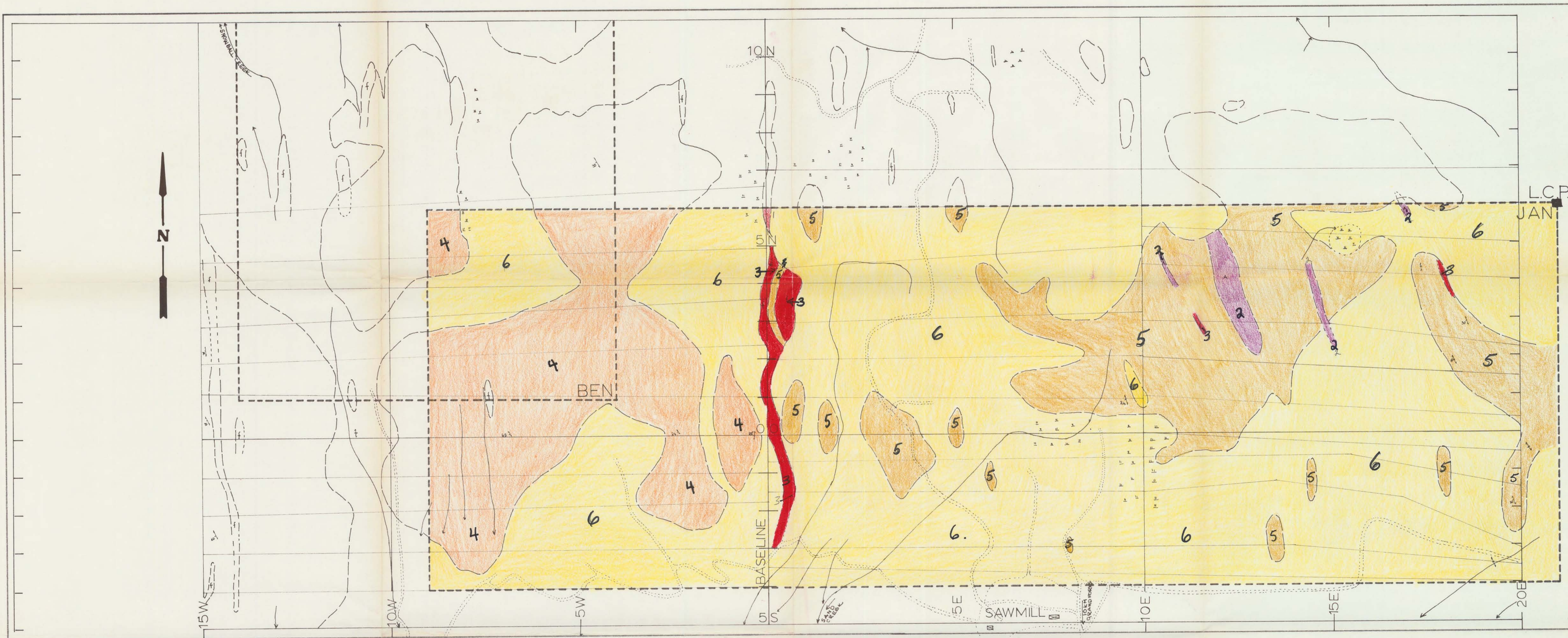


Total Count

JAN
Wendy Claims

1cm = 50m

Fig. 4



CBC JOINT VENTURE - GRAND FORKS, B.C.

FIG.2: GEOLOGY- JAN CLAIM

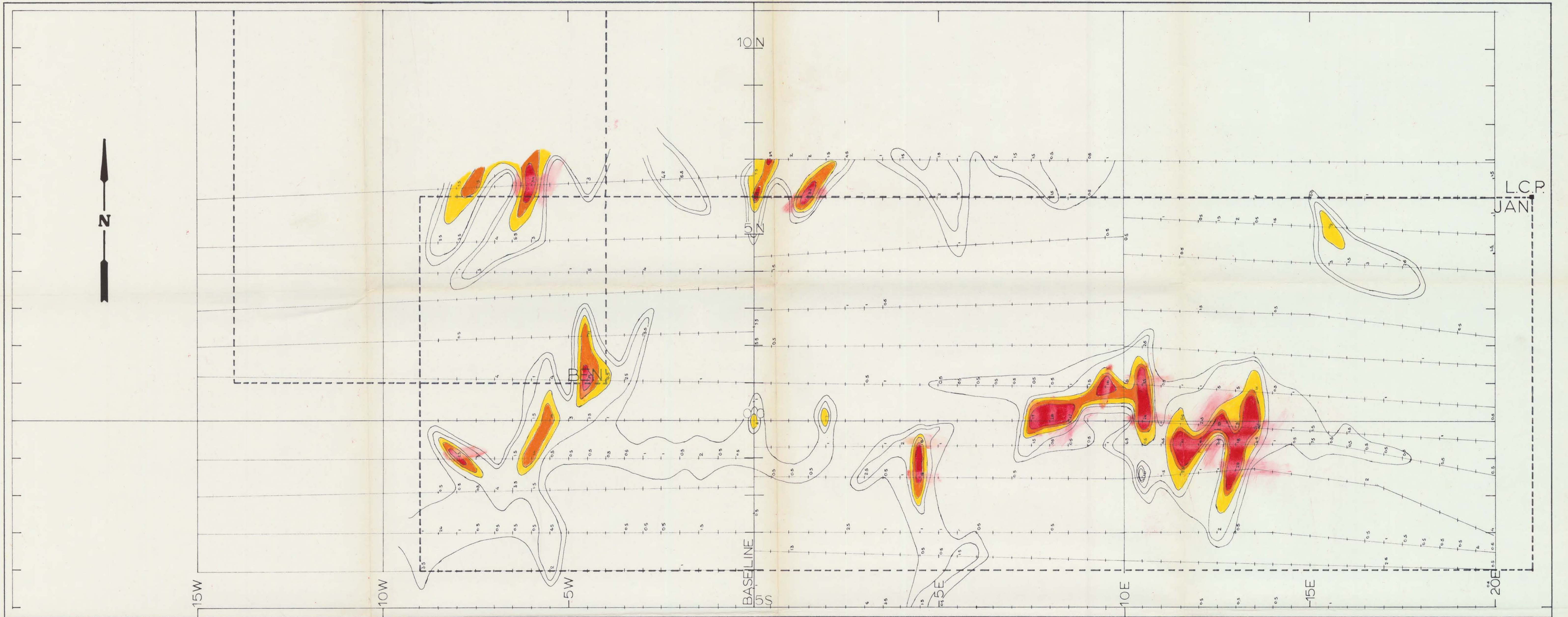
- LITHOLOGY
- 6 overburden
 - 5 biotite gneiss & schist
 - 4 granodiorite gneiss
 - 3 felsite
 - 2 amphibolite
 - 1 granite

- SCALE
0 50 100 200 300 400 500 metres
- Seasonal creek
 - Claim boundary (approx)
 - Dirt road
 - Geological boundary (approx, inferred)
- 30 NOVEMBER 1977

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
6535
NO.

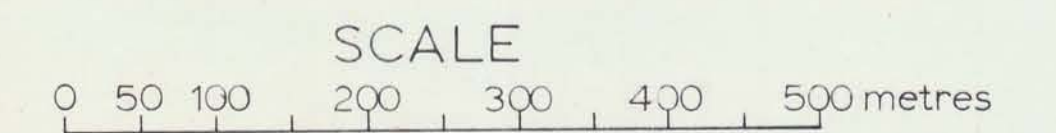
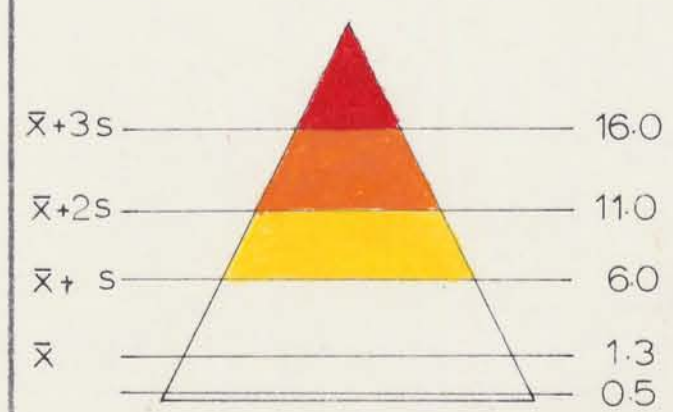
Chinook Construction & Engineering Ltd.

[Handwritten signature]



CBC JOINT VENTURE - GRAND FORKS, B.C.
 FIG.3: GEOCHEMISTRY - JAN CLAIM

URANIUM KEY (PPM)



----- Claim boundary (approx)

MINERAL RESOURCES BRANCH
 ASSESSMENT REPORT
 NO. **6535**

25 NOVEMBER 1977

Chinook Construction & Engineering Ltd.