**Summary of Work**
**Weasel Lake Area**
Yukon Territory, NTS 115 G/13
Yukon Mining Incentives Program
Economic Development, Government of the Yukon
Box 2703, Whitehorse, Yukon  Y1A 2C6
**File Number 01-066**
**John Peter Ross, December 2001**

EIP
01-066
01

# Summary of Work
# Weasel Lake Area
# Yukon Territory, N.T.S. 105 G/13

for

Yukon Mining Incentives Program
Economic Development
Government of the Yukon
Box 2703, Whitehorse, Yukon Y1A 2C6

File Number 01-066

John Peter Ross, Prospector
December 2001

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# LIST OF FIGURES



# APPENDICES

# Chapter One: INTRODUCTION

## 1 1 Introductory Statement

The CINTA 1-20 claims were staked and recorded by J Peter Ross of Whitehorse, Yukon on June 12, 2001

The Weasel Lake area (CINTA claim group) was chosen because,

1 I wanted to diversify my claim groups (mostly gold)

2 VMS are 5 elements, a good diversification and is in demand by many companies involved in mineral exploration

3 Don Murphy (Yukon government geologist) is high on this area, he says the Kudz de Kayah and Wolverine VMS deposits are only 60 km away, in Yukon Tanana Terrane and overlain by Slide Mountain Terrane which contains many basalts He says the same geology is in my project area

4 In the past the area has been poorly explored because of a lack of outcrop, low topography, and low values in stream geochemistry

5 Surficial Geology and Till Geochemistry of Weasel Lake (105 G/13) Yukon by Jeff Bond 2000 The 230 mesh till samples suggest unknown mineral occurrences are present

6 The sample JB00-076 is a clue to an unknown VMS occurrence It has a KUROKO VMS geochemical signature

| Element | Ppm | Percentile % |
|---|---|---|
| Mo | 5 10 | +97 |
| Cu | 61 96 | +75 |
| Pb | 24 29 | +97 |
| Zn | 171 6 | +97 |
| Ag | 1153 | +97 |
| As | 21 8 | +75 |
| Sb | 4 32 | +95 |
| S | 0 48 | Highest value |
| Hg | 988 | +97 |
| Se | 3 5 | +99 |
| Tl | 0 27 | +98 |

7 A 2 5 mile long magnetic anomaly lies under JB00-076 and up glacial till movement and parallel to it (till movement) JB00-083, 084, 085 are up till movement and do not have a KUROKO VMS signature Possibly the source of the JB00-076 till anomaly may be the magnetic anomaly

8 Don Murphy says the Kudz de Kayah VMS deposit is a stream silt geochemical anomaly and sits under a lake i e ) VMS are recessive and may form a depression or a lake The Wolverine deposit was found by it's 'Kill Zone" (caused by base metals killing the vegetation) A VMS occurrence may be under the lake which is up-till movement from JB00-076

9 The area is close to a highway and so would be cheap to explore and/or develop

10 Geology Outcrop is quite rare The project area is Yukon Tanana Terrane VMS=KUROKO, type=Zn, Pb, Ag, (Cu, Au) Carboniferous and Permian Age Anvil Range Group Andesite, basalt, slatey chert and limestone

Slide Mountain Terrane is to the north and has more basalts (which are elevated on hills and are resistant to weathering) It is younger and sits on top of the Yukon Tanana Terrane

Exact or approximate boundaries can not be easily determined because of extensive till, and lack of outcrop The geology here is not fully understood

11 Government geochemical survey found no anomalies in the area (streams) because of flat terrane and heavy till cover

12 Till depth at the lake is quite shallow and bedrock may be found north and northwest of the lake Permafrost is strong southeast of the lake

13 Mineralization in the area Numerous Archer Cathro company claim groups are present VMS targets?

Northeast corner of 105 F/16 SKATE claims, southeast corner of 105 H/1 BREAKAWAY claims, southwest corner of 105 J/4 has none To the east and southeast are the ASSIST, ICS, PLAY, DOT, REPLAY On 105 F/14 is the CYPRUS VMS deposit (has reserves) Cu (Co Au), in Slide Mt Terrane In references are Minfile occurrences that are close by

14 On the first trip J P Ross prospected and staked and recorded the CINTA 1-20 claims, J P Ross took 7 bedrock samples and 2 float samples

On the second trip J P Ross did a partial Beep Mat survey of the claims Seven conductors were found J P Ross dug up one conductor to a depth of ~106" (2 7 m) J P Ross took 24 pit samples, 1 float and 1 bedrock sample Results were poor The best value was Pd 107 ppb

## 1 2 Location and Access

Access was by helicopter about 34 km southeast of Ross River A landing pad was prepared at the north end of the lake

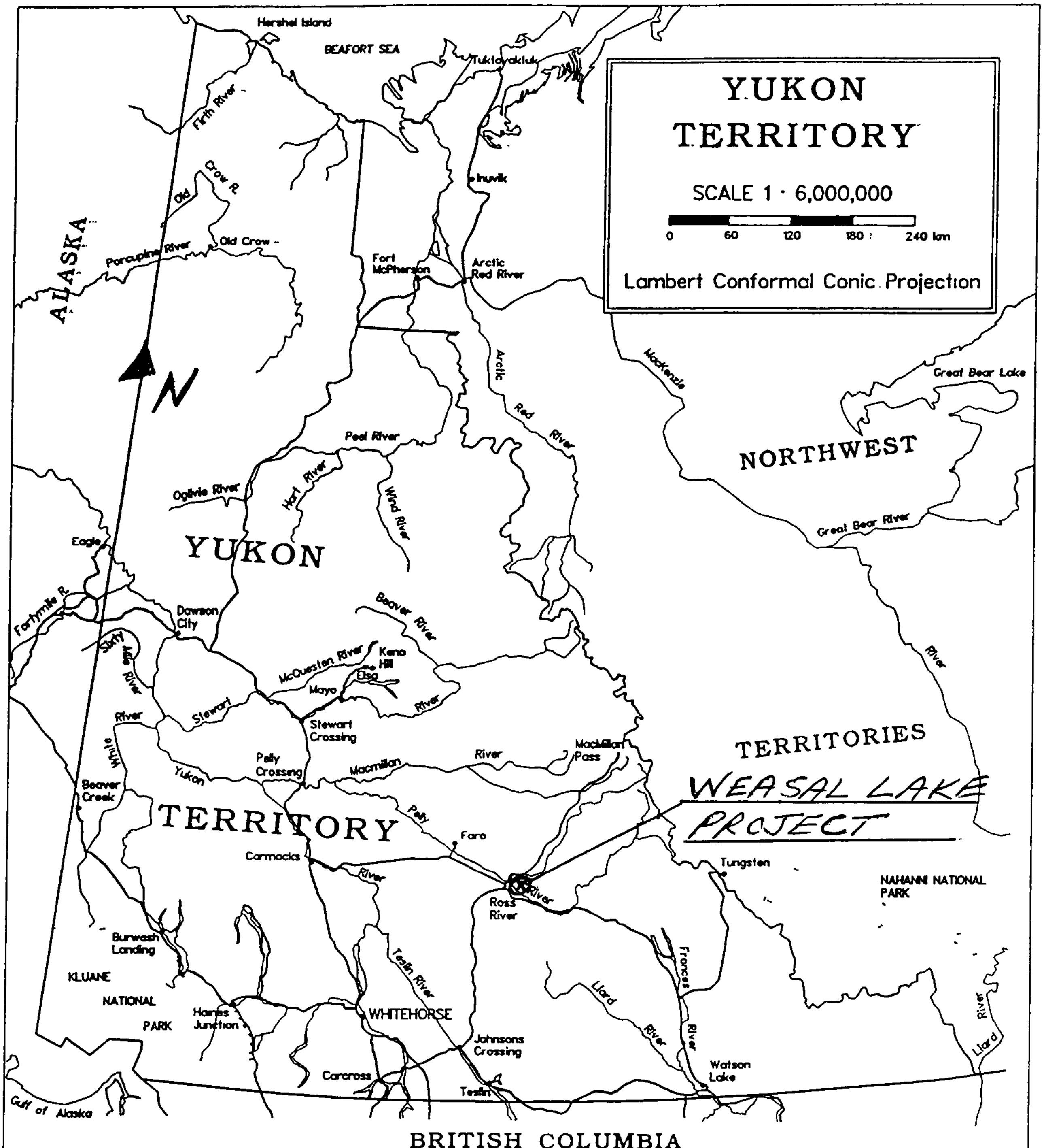



FIGURE #1

# LOCATION MAP

WEASEL LAKE

2001 GRASSROOTS

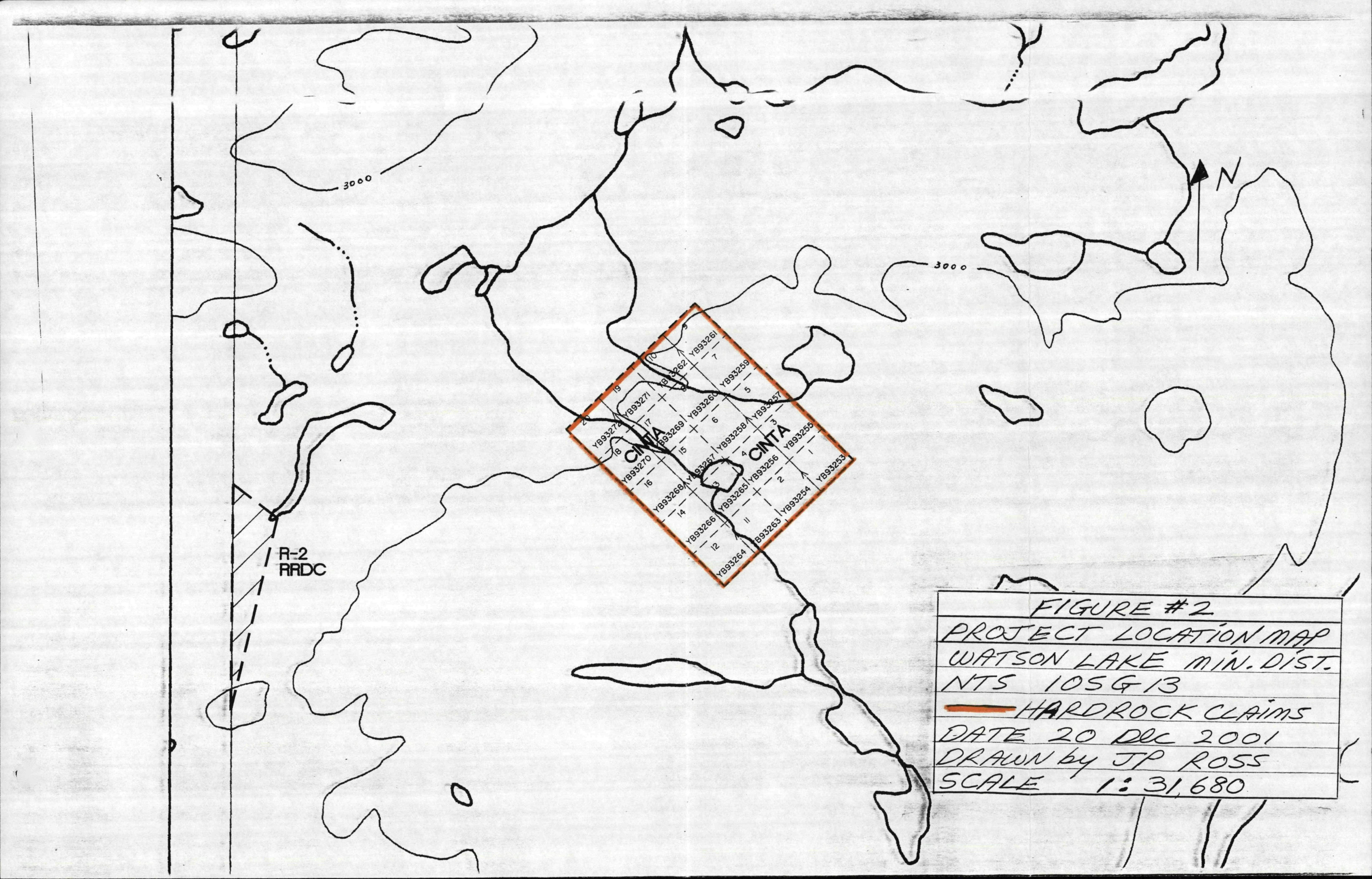
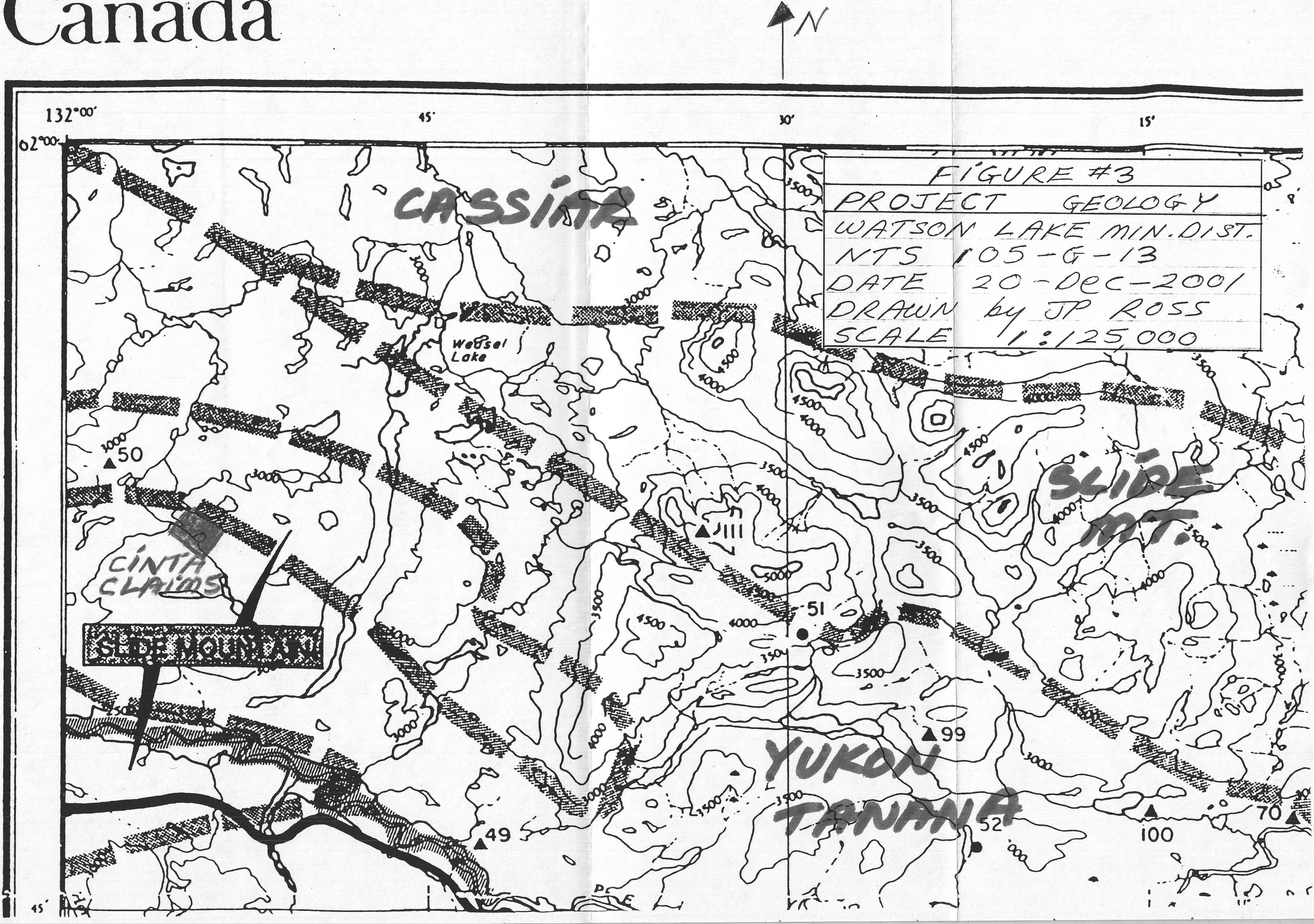



FIGURE #2
PROJECT LOCATION MAP
WATSON LAKE MIN. DIST.
NTS 105G13
—— HARDROCK CLAIMS
DATE 20 DEC 2001
DRAWN by JP ROSS
SCALE 1:31,680

Canada


N
132°00'
45'
30'
15'
62°00'
FIGURE #3
PROJECT GEOLOGY
WATSON LAKE MIN. DIST.
NTS 105-G-13
DATE 20-DEC-2001
DRAWN by JP ROSS
SCALE 1:125,000
CASSIAR
Weasel Lake
SLIDE MT.
CINTA CLAIMS
SLIDE MOUNTAIN
YUKON TANANA
50
111
51
99
49
52
100
70
3000
3500
4000
4500
5000
45'

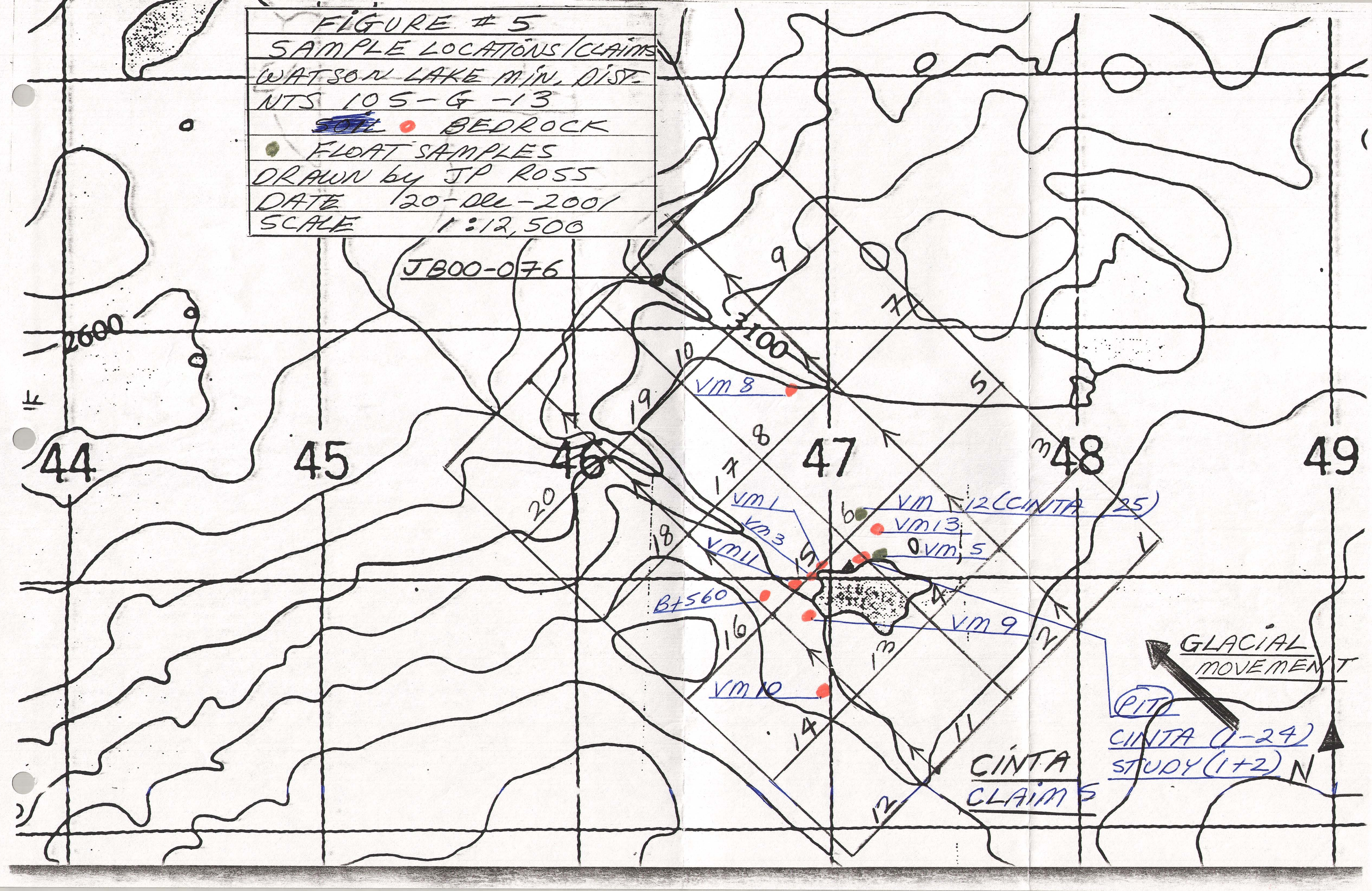
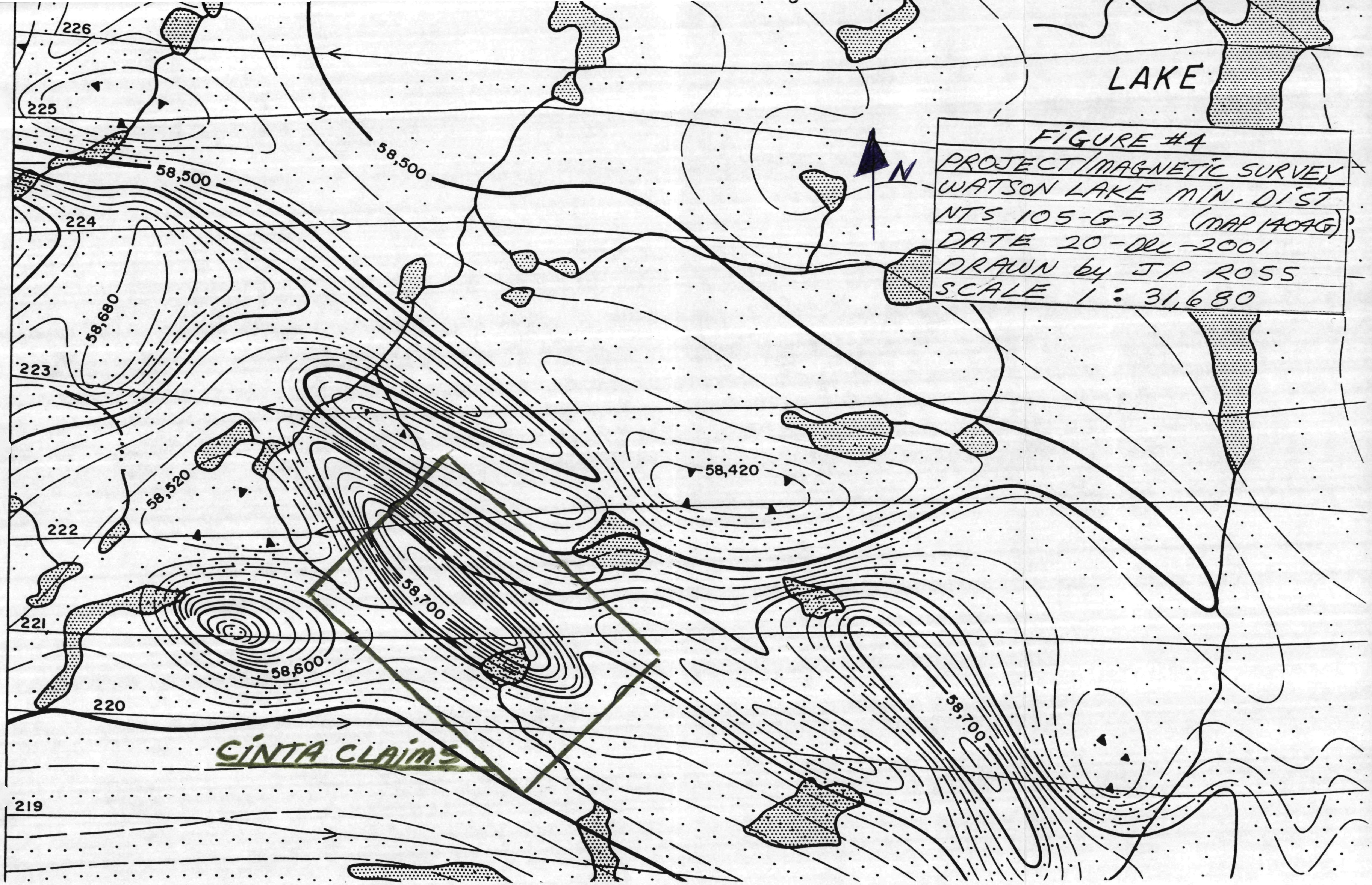


FIGURE #5
SAMPLE LOCATIONS/CLAIMS
WATSON LAKE MIN. DIST.
NTS 105-G-13
BEDROCK
FLOAT SAMPLES
DRAWN by JP ROSS
DATE 20-Dec-2001
SCALE 1:12,500
JB00-076
2600
3100
44
45
46
47
48
49
VM 8
VM 1
VM 3
VM 11
VM 12 (CINTA 25)
VM 13
VM 5
B+560
VM 9
VM 10
PIT
CINTA (1-24)
STUDY (1+2)
CINTA CLAIMS
GLACIAL MOVEMENT
N


LAKE
FIGURE #4
PROJECT/MAGNETIC SURVEY
WATSON LAKE MIN. DIST
NTS 105-G-13 (MAP 1404G)
DATE 20-DEC-2001
DRAWN by J P ROSS
SCALE 1 : 31,680
N
226
225
224
223
222
221
220
219
58,500
58,500
58,680
58,520
58,420
58,700
58,600
58,700
CINTA CLAIMS

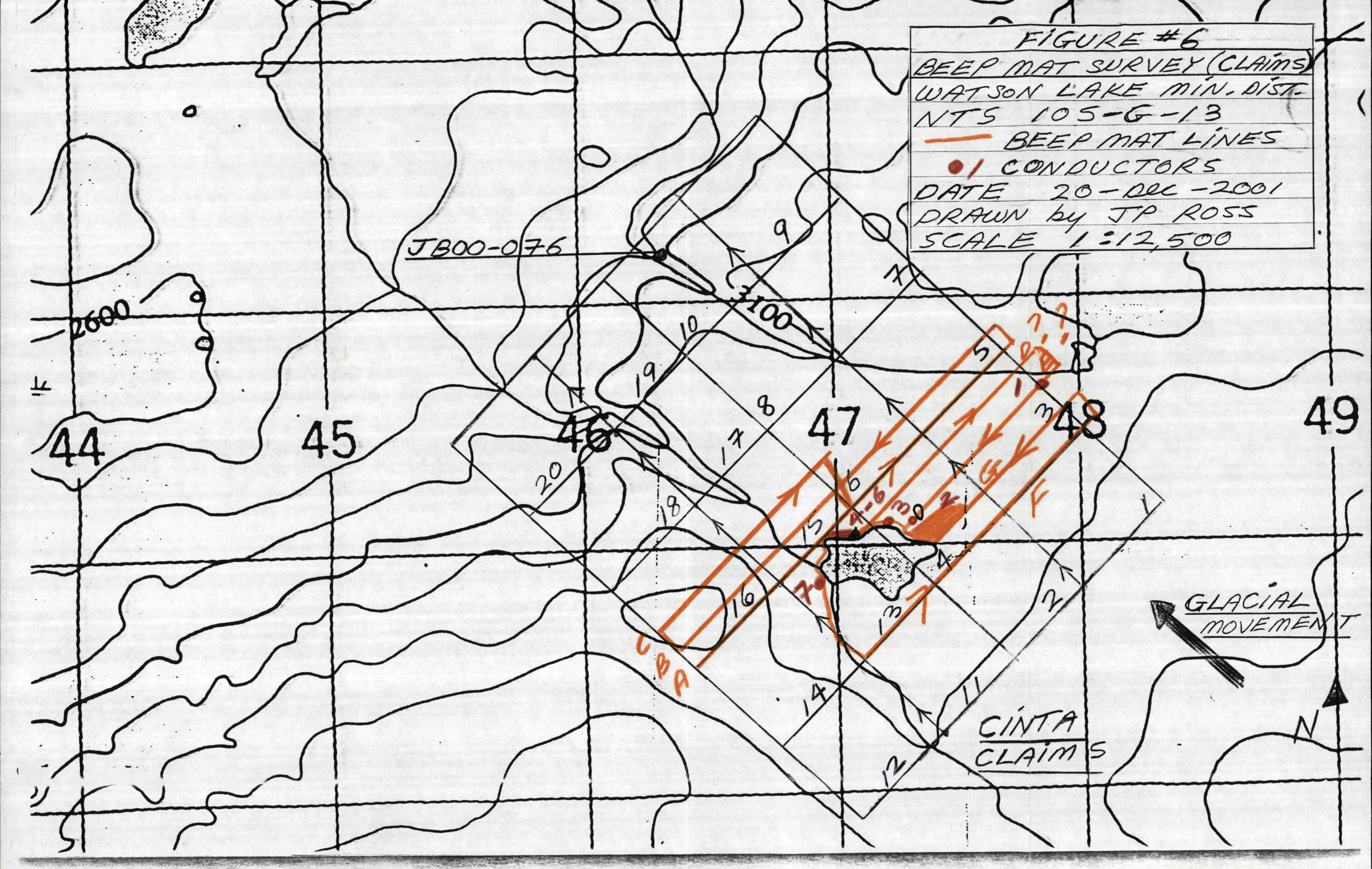
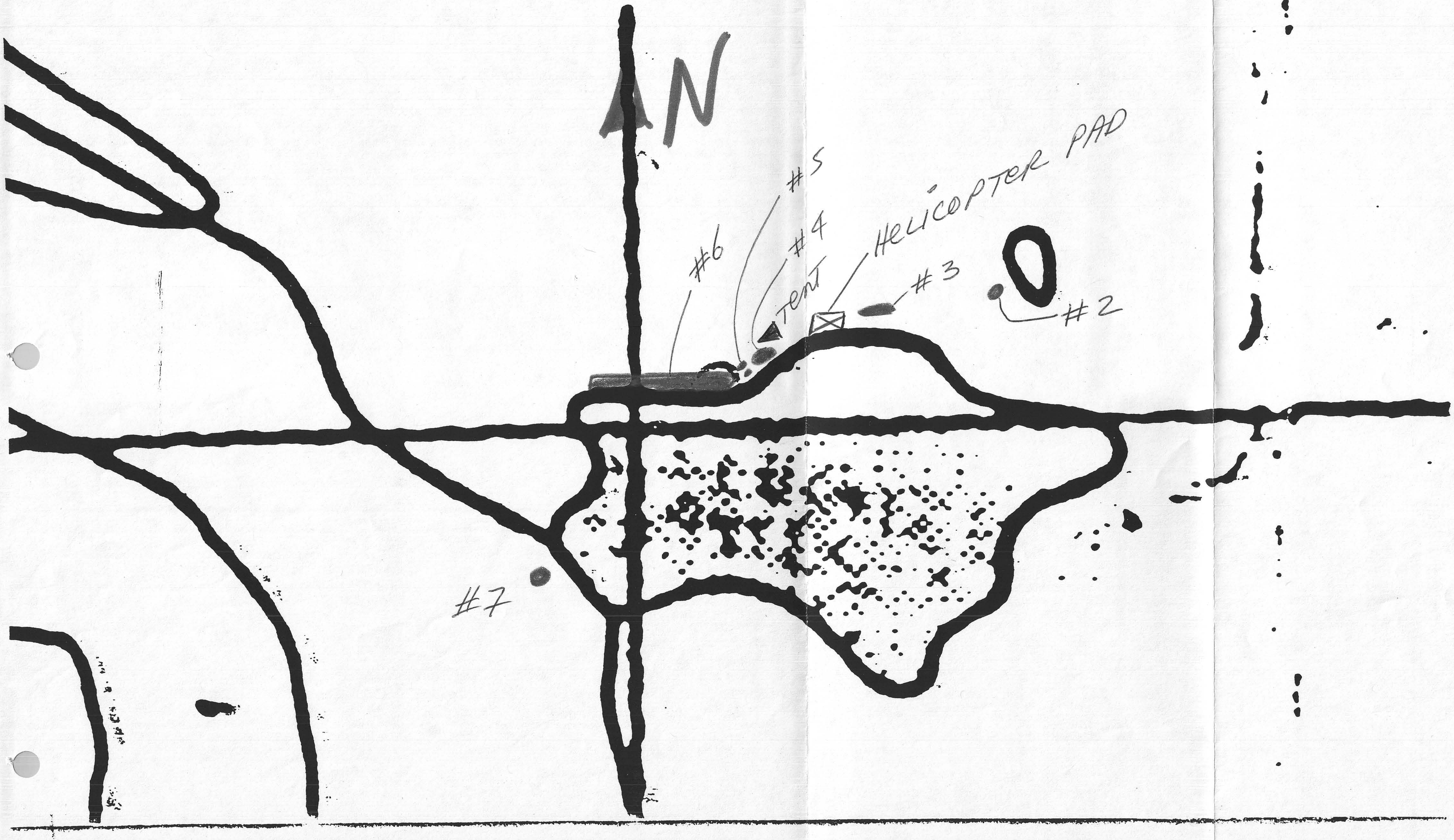


FIGURE #6
BEEP MAT SURVEY (CLAIMS)
WATSON LAKE MIN. DIST.
NTS 105-G-13
BEEP MAT LINES
CONDUCTORS
DATE 20-DEC-2001
DRAWN by JP ROSS
SCALE 1:12,500
JB00-076
2600
3100
44
45
46
47
48
49
GLACIAL MOVEMENT
CINTA CLAIMS
N

CONDUCTERS #2-#7



## Description of Beep Mat Conductors

| | |
|---|---|
| Conductor 1 | 60' x 15', open-ended? Up to 55 units on the Beep Mat A dry wedge of land in a swamp, about 16 yards (48' wide and about 5' high) It could be trenched in August or September |
| Conductor 2 | 6' x 9' Up high, up to 7 units on the Beep Mat |
| Conductor 3 | 36' x 36' About 3-4 feet up off the lake, up to +20 units on the Beep Mat in the middle |
| Conductor 4 | 53' x 75' About 2' up off the lake, up to 25/30 units on the Beep Mat Too low to trench |
| Conductor 5 | a) 3' x 3' Up to 6 units on the Beep Mat<br>b) 3' x 15' Up to 14 units on the Beep Mat |
| Conductor 6 | 144' x 15' Up to 70 units on the Beep Mat From 0-70 (erratic) along the trail on a bend of the lake Too wet to trench |
| Conductor 7 | 6 feet in diameter Up to about 5/6 units on the Beep Mat Too wet to trench |

## Chapter Two: SUMMARY

1) J Peter Ross took no soil or silt samples
2) J Peter Ross took 2 float samples and 7 bedrock samples on the first trip and 1 float and 1 bedrock sample on the second trip
3) J Peter Ross dug up the #3 conductor to a depth of ~106" (2 7 m) and took 24 pit samples on the second trip The samples were tested for Au (30g) fire assay and 30 element ICP Three samples were tested for Pt and Pd

The best rock sample returned 107 ppb Pd

Dates worked

J Peter Ross - May 24-31, June 1-7, August 24-31, September 1-15, 2001

## Chapter Three: GEOCHEMICAL SURVEY and PROSPECTING

### 3 1 Float Sample Geochemistry

Three (3) float samples were taken The sample locations were marked with orange flagging tape Samples were tested for Au (30g) FAA and 30 element ICP CINTA 25 is a larger sample of VM12 Both were tested again for Au Pt Pd (FA/AAS-30g)

### 3 2 Bedrock / Pit Sample Geochemistry

Eight (8) bedrock samples were taken The sample locations were marked with orange flagging tape Samples were tested for Au (30g) FAA and 30 element ICP VM9 was also tested for Au Pt Pd (FA/AAS-30g)

Twenty-four (24) pit/bedrock samples were taken a various depths in the pit (Conductor #3) and tested for Au (30g) FAA and 30 element ICP

### 3 3 Interpretation

I took samples at all outcrops I saw and recorded descriptions of the rock

VM9 was an outcrop elevated in Ni, Cr, Mg (Sb) Mg an ultramafic rock, tested for Pt and Pd

VM12 was a rough angular float (very hard to break) elevated in As, Sb, Ni, Cr and Mg, an ultramafic rock, tested for Pt and Pd

CINTA 25 was a larger sample of VM12 and ran 107 ppb Pd

J P Ross used a Beep Mat for the first time It can detect sulphides, graphite, and conductors to a depth of 3m Seven conductors were located and mapped #3 Conductor was chosen for trenching because it was large, close to the lake, had no water problems, close to the tent and I wanted to see if the Beep Mat worked

At 85" (216 cm) I hit decomposed bedrock?

From top to bottom every day I placed the day's excavation in a distinct pile "outside the conductor anomaly" and tested it the same night and next morning with the Beep Mat

Readings on the Beep Mat slowly rose (except for 1 day) as the depth increased

J P Ross took samples of the bedrock? At regular intervals

Finally at ~106" (270 cm) the excavated material produced a reading of 11-12 units when placed outside the conductor anomaly The bedrock read ~500 units on the Beep Mat, also it was getting very hard to dig

I knew graphite was conductive, the bedrock was a black sticky goo, I thought it was graphite But it was not conductive when placed on the ground and tested with the Beep Mat Perhaps the graphite was not dense enough to read as a conductor on the Beep Mat

Numerous needle crystals (sim quartz) were seen and identified by Don Murphy as gypsum crystals Gypsum is a sulphate An alteration process changes sulphides to sulphates Numerous crystals resembled sphalerite but zinc, lead and copper values were low

The numerous (common all over the bedrock) gypsum crystals suggest sulphides "were" present, but what kind? Is this a fault zone that I dug up? (graphite?)

## 3 4 Prospecting

The project still has promise

Conductor #1 should be dug up Till sample JB00-076 still has no source A VMS under the lake has not been disproved or proven A till sample line at 50' intervals should be done along the claim line on Beep Mat survey line A and B About 1000' of terrain is dry and covers a cross section of the magnetic anomaly A strong VMS anomaly (Pb Zn Cu Ag Sb Hg As) in till would be encouraging enough for more exploration

## Appendix 1

References


Surficial Geology and Till Geochemistry of Weasel Lake (105 G/13) Yukon by Jeff Bond 2000

Kelly, K D 1990 Interpretation of Data from Admiralty Island, Alaska US Geological Survey Bulletin #1950 p A1-A9

Geology of Canadian Mineral Deposit Types, Geological Survey of Canada, 1955

105 G Finlayson Lake Minfile and Minfiles 105G 049, 105G 050, 105G 051, 105G 099, 105G 111

105 J Minfiles (northwest of the project area) 105J 018, 105J 027, 105J 028

105 K Minfiles (north of the project area) 105K 097, 105K 098

Open File 1648, 1987 Geochemistry/silts 105 G Finlayson Lake

Open File 468, 1977 105 G Finlayson Lake D J Tempelman Kluit

Geophysical Paper, Map 1404G, Weasel Lake Yukon Territory

Beep Mat Instrumentation GDD Inc , 3700 Boul de la Chaudière, St Foy, PQ G1X 4B4


Personal Communication

Jeff Bond, Surficial Geologist, Yukon Geology Program
Don Murphy, Senior Project Geologist, Yukon Geology Program
Ken Galambos, Mineral Development Geologist, Yukon Geology Program
J P Loiselle - prospector who owns and uses a Beep Mat

survey area. This level of sample density provides a high level of regional information for future exploration

The samples taken for geochemical analysis were representative of either basal till or colluviated basal till. ICP MS instrumentation combined with an aqua-regia digestion were used to analyse the -230 mesh fraction of the till samples The geochemical results indicated numerous anomalies in base metals, gold and platinum group pathfinders They include

- Potential epithermal gold mineralization in the northwest corner of the map area. This is supported by a multi-element anomaly in Hg, Sb, Ag, As, Au and Tl at station JB00-155 This may be related to the Finlayson Lake fault zone and Tertiary mafic volcanics in the area
- Base metal anomalies in zinc and copper in the western part of the map area Anomalies occur both within Yukon-Tanana Terrane and in ancient North American rocks of the Cassiar Platform Most anomalies are not associated with current claim holdings in the area
- Clusters of platinum group element pathfinders in the northeast part of the map area These coincide with mafic basalts

## ACKNOWLEDGEMENTS

Funding for this project was provided by the Yukon Geology Program, consisting of Yukon Economic Development and Indian and Northern Affairs Canada, Exploration and Geological Services Division Many thanks are owed to Jeffrey Boyce for assisting with the field program and for contributing to its success Much appreciated assistance was also provided by Cheryl Peters, Victor Bond, Lara Melnik and Darren Holcombe Exceptional transportation services were provided by Brian and Warren at Inconnu Lodge/Kluane Airways Thanks also to Inconnu Lodge for their hospitality and expediting service Much appreciated assistance was gained from Gordon Nevin and Gary Stronghill at the Yukon Geology Program for pulling together the geochemical figures and surficial geology map Thanks to Leyla Weston and Bill LeBarge for editing this paper

## REFERENCES

Bobrowsky, PT, Paulen, R, Little, E, Prebble, A, Ledwon, A and Lett, R, 1998 Till geochemistry of the Louis Creek-Chu Chua Creek area (NTS 92P/1E and 92P/8E) British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File 1998-6

Bond, J D, 2000 Surficial geology and till geochemistry of Weasel Lake (105G/13), central Yukon (1 50 000 scale) Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 2000-9

Eyles, N, 1983 Glacial Geology A Landsystems Approach *In* Glacial Geology – An Introduction for Engineers and Earth Scientists, N Eyles (ed ), Pergamon Press, Britain, p 1-18

Gordey, S P and Makepeace, A J, 1999 Yukon Digital Geology S P Gordey and A J Makepeace (comp ), Geological Survey of Canada, Open File D3826, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1999-1(D)

Hoffman, S J, 1986 Geothermal Exploration - The Soil Survey *In* Exploration Geochemistry Design and Interpretation of Soil Surveys, J M Robertson (ed ), Society of Economic Geologists, Reviews in Economic Geology, vol 3, p 19-38

Hornebrook, E H W and Friske, PW B, 1988 Regional Stream and Water Geochemical Data, Southeastern Yukon (105G) Geological Survey of Canada, Open File 1648

Jackson, L E Jr, 1994 Terrain inventory and Quaternary history of Pelly River area, Yukon Territory Geological Survey of Canada, Memoir 437, 41 p

Yukon MINFILE, 1997 Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada

# Geophysics

## Beep Mat BM-IV

A powerful, miniaturized survey instrument that efficiently and inexpensively detects conductive and magnetic outcrops or boulders hidden down to 1 5 metres of overburden Its size, shape and weight allow it to be easily pulled through the bush

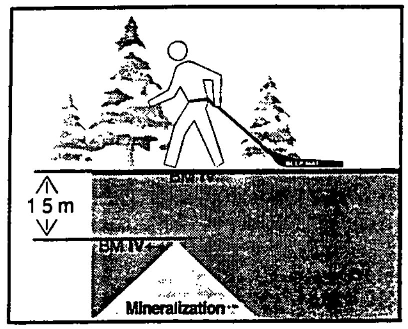
When it beeps, you know that the conductor causing the anomaly is right under the Beep Mat You can then immediately trench and take a sample for assay to determine if it is a valuable showing or a barren sulphide/graphite conductor

**Features**

- Magnetites and conductive materials each have a different audio signal and their relative value is displayed to help pin-point the high sulphide Adjustable threshold audio alarm to signal conductors and/or magnetites
- Sensor consists of a rugged waterproof unicoil inserted in a polyethylene shell
- Large, bright dot matrix LCD displays clear, readable, simultaneous measurements of the conductivity and susceptibility (magnetites content) of the underlying material
- Detects sulphide conductors such as pyrite, pyrrhotite, chalcopyrite (Cu), graphite, pentlandite (Ni), galena (Pb), and even silver (Ag) or gold (Au) nugget's and veinlets
- Continuous ground coverage (1o readings/second) detects even small near-surface sulphide veinlets

**Physical Description**

**Readout Meter** Size 18 x 20 x 6 4 cm (7" x 8" x 2 5")
**Weight** 1 9 kg (4 2 lb)
**Case** Plastic with leather casing waterproof
**Probe Size** 30 x 91 x 7 6 cm (12" x 36" x 3")
**Weight** 3 8 kg (8 4 lb)
**Case** Shockproof, waterproof
**Environmental**
**Operating Temp** -10 C to 40 C (15 F to 104 F)




**Humidity** Operates on all rainy, foggy or snowy days

710-00082 **Each $9,000.00**
**Rental/week** 190-00004 **$490 00**
**Yearly Maintenance Contract** **$950 00**

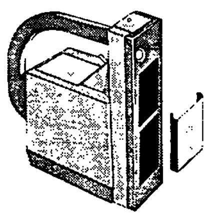
## Beep Mat BM-IV+

Faster and more sensitive, this improved unit can detect conductors up to 3 metres deep It has been wintersed for cold weather use

**Each $10,000.00 Rental / day** **$80 00**
*One week minimum*

# Ultra Violet Lamps

## Portable UV Lamps



Uses 2 6 volt batteries Wt 4 lb (1 8 kg) with batteries
Size 9 5" x 2 8" x 9 4" (241 mm x 71 mm x 238 mm)

**UVG47** 6W Short Wave (1350*)
137-00090 **$269 95**
**UVGL48** 6W Long and Short Wave (930/710*) 137-00051 **$284 95**
**6v** Alkaline Heavy Duty 103-00001 **$11 45**

## Compact UV Lamps

**Uses 115 volt Wt 1 lb ( 45 kg) Size 7 8" x 2 8" x 2 1" (198 mm x 71 mm x 53 mm)**

**UVG11** 4W Short Wave (1120*) 137-00039 **$209 95**
**UVGL15** 4W Long and Short Wave (650/500*)
137-00041 **$199 95**
*Relative intensities @ 3" (Om/cm2)*

## Mini UV Lamps

Great for occasional use Have the same tube wattage as most of the larger ones but have significantly lower intensities Uses 4 AA Batteries Wt 8 oz ( 23 kg) Size 6 5" x 1 25" x 1 75" (165 mm x 32 mm x 45 mm)

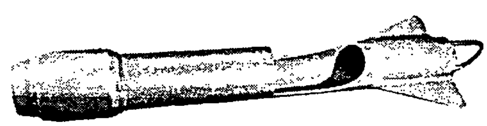
**UVL4** 4W Long Wave (230*) 137-00038 **$39 95**
**UVG4** 4W Short Wave (170*) 137-00052 **$59 95**
**UVSL14P** 4W Long and Short Wave (113/68*)
137-90500 **$89 95**

## Fluorescent Mineral Samples

3 Samples in display case **Set** 137-00194 **$19 95**

# Lake Bottom Sampler

Two fin style with stainless butterfly valve in weight tube bottom sampler The valve has a protective crossbar and is designed to auto close on retrieval Red plastic coated steel body allows for little cross contamination These units have been used for thousands of samples Tip can be resharpened



**Lake Bottom Sampler** 126-00213 **$449 95**

# Self-Potential Kit

Self-potential kits offer an inexpensive means to evaluate some sulphide deposits, including those containing pyrite, chalcopyrite and pyrrhotite It will also identify bodies of graphite

The kit includes 2 electrodes (pots), one spool with 300 metres of wire, millivolt meter and instructions

These electrodes use a super-saturated solution of water and copper sulphate Copper sulphate can be ordered from pharmacies, chemical companies and garden supply firms

**Kit** 126-00401 **$595 00**
**Spare Electrodes** 126-90010 **$65 00**
**3/4 size Electrode** 126-90403 **$65 00**

# VOLCANIC-ASSOCIATED MASSIVE SULFIDE DEPOSITS (MODELS 24a-b, 28a, Singer, 1986a,b; Cox, 1986)

by Cliff D Taylor, Robert A Zierenberg, Richard J Goldfarb,
James E Kilburn, Robert R Seal II, and M Dean Kleinkopf

## SUMMARY OF RELEVANT GEOLOGIC, GEOENVIRONMENTAL, AND GEOPHYSICAL INFORMATION

### Deposit geology

Volcanic-associated massive sulfide (VMS) deposits range from lens shaped to sheet-like bodies of sulfide-mineral-rich rock spatially associated with volcanic rocks ranging in composition from basalt to rhyolite (fig 1) VMS deposits can be divided into three general categories Cyprus-type deposits (Model 24a, Singer, 1986a) tend to be small, medium-grade deposits rich in copper and zinc They are generally lens or mound shaped accumulations of massive pyrite developed in ophiolite-related, extrusive basalt sequences They are typically underlain by copper-rich "stringer-zones" composed of anastomosing quartz-sulfide mineral veins in extensively chloritized basalt Kuroko deposits (Model 28a, Singer, 1986b) are typically developed in intermediate to felsic volcanic rock and are generally interpreted to have formed in extensional environments associated with arc volcanism They are commonly high grade and can be very large Relative to Cyprus-type deposits, they generally have much higher contents of zinc, lead, silver, and antimony, which reflects the composition of their felsic volcanic host rocks They also have mound-like morphology and the abundance of coarse clastic sulfide minerals within many of these deposits attests to a moderately high energy, seafloor depositional setting Kuroko-type deposits also tend to be underlain by copper-rich stringer zones and commonly have well developed geochemical zonation with progressive zinc, lead, and silver enrichment both vertically and laterally away from vent centers Besshi-type deposits (Model 24b, Cox, 1986) are present in mixed volcanic-sedimentary environments Deposits of this type are commonly hosted by turbidites that have been intruded by basaltic sills These deposits are typically copper-rich and contain small abundances of lead and other lithophile elements In contrast to other volcanic-hosted deposits, many Besshi-type deposits form thin, laterally extensive sheets of pyrrhotite- and (or) pyrite-rich massive sulfide rock, however, the characteristics of Besshi-type deposits vary considerably Slack (1993) presents an expanded definition of Besshi-type deposits that includes deposits such as those in the Ducktown, Tenn , district and the large Windy Craggy deposit in British Columbia.

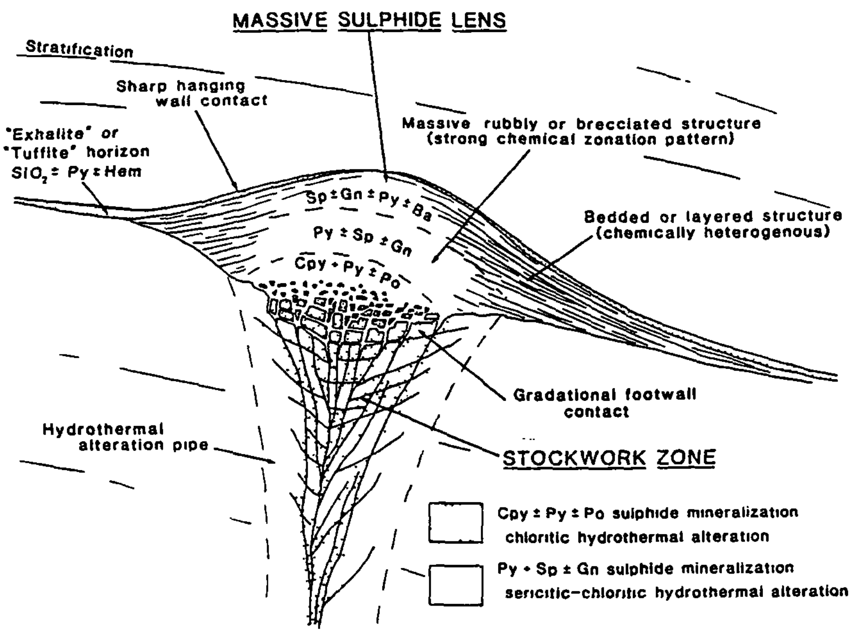



**Figure 1** Essential characteristics of an idealized volcanogenic massive sulfide deposit (modified from Lydon, 1984) Mineral abbreviations as follows Sp, sphalerite, Gn, galena, Py, pyrite, Ba, barite, Cpy, chalcopyrite, Po, pyrrhotite, and Hem, hematite

### Metal mobility from solid mine wastes

Soluble sulfate salt minerals derived from weathering and oxidation of sulfide minerals in mine dumps and tailings piles represent a potential source of metal contamination and acid generation As percolating surface and ground water evaporates during dry periods, efflorescent metal-sulfate salt minerals form encrustations around and below the base of the piles, which effectively stores acidity and metals released during sulfide mineral breakdown Subsequent rainfall or snowmelt following a dry period is likely to release a highly concentrated pulse of acid mine water Mine dumps associated with lead-rich VMS deposits (Kuroko-type) may be a source of lead contamination due to high concentrations of soluble secondary lead minerals

Secondary minerals in tailings impoundments include a variety of iron oxyhydroxides (goethite, lepidocrocite, akaganeite, maghemite, and ferrihydrite), sulfates (gypsum, bassanite, jarosite, hydronium jarosite, melanterite, goslarite, ferrohexahydrite, epsomite, hexahydrite, siderotil, rozenite, anglesite, alunogen, and copiapite), and minerals such as marcasite, covellite, and native sulfur (Jambor, 1994) Pore water from tailings impoundments associated with the Heath Steele, New Brunswick, deposit are acidic (pH 1 8 to 5 2), have Eh of 280 to 580 mV, and contain significant dissolved metal abundances, including 0 3 to 600 mg/l copper, 0 8 to 11 mg/l lead, 23 to 4,880 mg/l zinc, 1,200 to 36,000 mg/l iron, and 600 to 67,600 mg/l sulfate (Boorman and Watson, 1976) Similarly, pore water from tailings impoundments associated with the Waite Amulet, Quebec, deposit are acidic (pH 2 5 to 6 0), have Eh of 200 to 700 mV, and contain significant dissolved metal abundances, including as much as 65 mg/l copper, as much as 5 mg/l lead, as much as 250 mg/l zinc, as much as 8,000 mg/l iron, and as much as 20,000 mg/l sulfate (Blowes and Jambor, 1990) Finally, pore water from tailings impoundments associated with the Kidd Creek, Ontario, deposit are acidic (pH 3 5 to 7 5), have Eh of 50-500 mV, and contain significant dissolved metal abundances, including 0 to 38 mg/l copper, 0 to 2 mg/l lead, 0 to 6,200 mg/l zinc, 0 to 350 $\mu$g/l arsenic, 1 to 990 mg/l iron, and 1,860 to 27,000 mg/l sulfate (Al and others, 1994)

Extremely fine grinding required for beneficiation of VMS ore may enhance airborne transport of lead-arsenic-cadmium-antimony-bearing dust This phenomenon is most probable in semi-arid to arid regions in which strong winds prevail

### Soil, sediment signatures prior to mining

The elemental suite and magnitude of geochemical anomalies in soil and sediment collected from undisturbed VMS deposits depend upon a number of factors, including VMS deposit type, extent of ore outcrop or overburden, climate, topography, etc Stream sediment samples collected below Kuroko-type deposits in temperate rain forest on Admiralty Island, Alaska, contain 5 to 10 weight percent iron, as much as 10,000 ppm barium, hundreds to several thousand ppm zinc, hundreds of ppm lead, tens to hundreds of ppm arsenic, copper, and nickel, as well as 0 to 20 ppm silver, bismuth, cadmium, mercury, molybdenum, and antimony (Kelley, 1990, Rowan and others, 1990, Taylor and others, 1992, C D Taylor, unpub data, 1995)

Stream sediment geochemical signatures associated with undisturbed to variably disturbed Cyprus and Besshi VMS deposits in the Prince William Sound, Alaska, are similar to those just described They contain 10 to 40 weight percent iron, several hundred ppm barium, hundreds of ppm arsenic and zinc, tens to hundreds of ppm lead, hundreds to thousands of ppm copper, and 0 to 20 ppm silver, bismuth, mercury, molybdenum, and antimony (R J Goldfarb, unpub data, 1995)

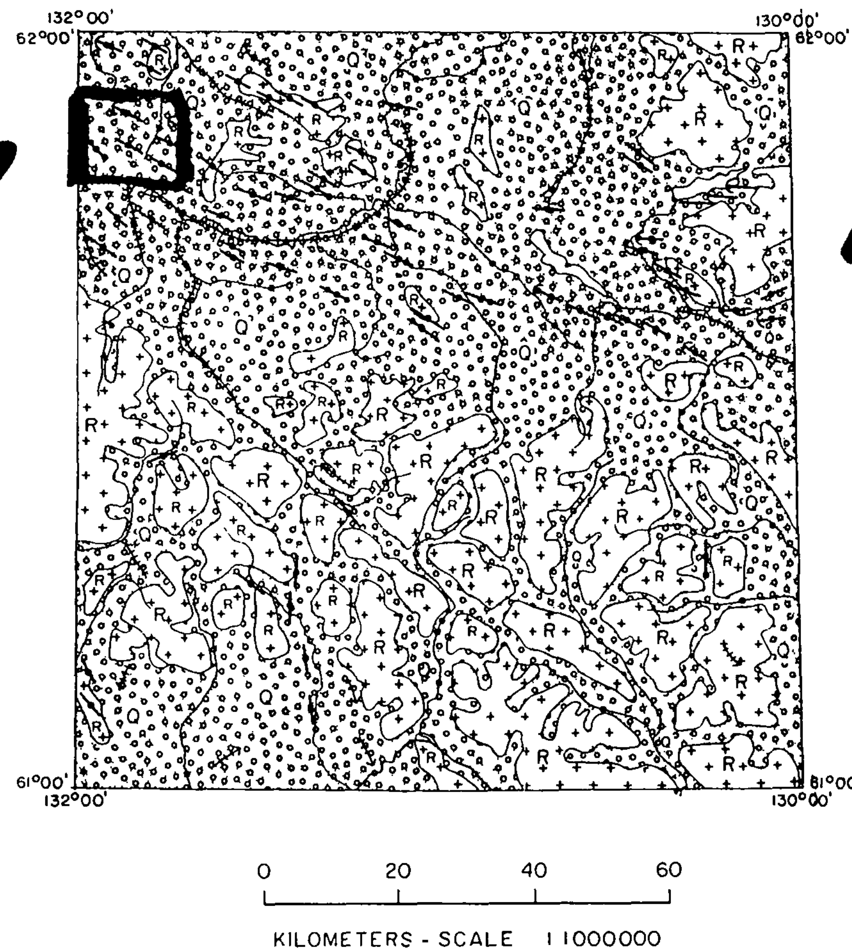
### Potential environmental concerns associated with mineral processing

Tailings ponds below mills are likely to contain high abundances of lead, zinc, cadmium, bismuth, antimony, and cyanide and other reactants used in flotation and recovery circuits Highly pyritic-pyrrhotitic orebodies that are exposed to oxidation by air circulating through open adits, manways, and exploration drill holes may evolve $SO_2$ gas, in some cases, spontaneous combustion can cause sulfide ore to burn Tailings that contain high percentages of non-ore iron sulfide minerals have extremely high acid-generating capacity Surficial stockpiles of high-sulfide mineral ore are also potential sources of metal-rich mine water

### Smelter signatures

Most base-metal rich ore concentrates are smelted In most cases, concentrates are shipped to custom smelters, and therefore do not contribute to the environmental impact in the immediate mine vicinity Larger districts are often served by a smelter co-located in the district Data compiled by Gulson and others (1994) document the relationship between lead in soil near smelters and blood lead in children, similar data for the Leadville, Colo , area indicate similar trends Additional data may be available for the Trail, British Columbia and El Paso, Tex smelters

WEASEL LAKE PROJECT →




N

**SURFICIAL GEOLOGY**

Q — Unconsolidated surficial deposits.

R — Bedrock exposures; includes discontinuous veneer of undivided glacial drift.

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

NAME(S): Cow
MINFILE #: 105G 049
MAJOR COMMODITIES: -
MINOR COMMODITIES: -
TECTONIC ELEMENT: Yukon Tanana Terrane

NTS MAP SHEET: 105 G 13
LATITUDE: 61°46'14"N
LONGITUDE: 131°42'53"W
DEPOSIT TYPE: Unknown
STATUS: Anomaly

**CLAIMS (PREVIOUS AND CURRENT)**

COW, BEAVER, EM

**WORK HISTORY**

Staked as Cow cl (88173) by Newmont in Apr/63 Restaked as Cow cl (Y7728) in May/66 by Quatsino Copper-Gold Mines L, New Privateer ML and Buchanan ML, which performed a ground mag and EM survey in Jul/67 and a small gravity survey in 1968. The Beaver cl (Y42977) were staked immediately to the west in Aug/70 by P Anderson and were transferred to J M Veinott in 1970 and to P Sotrer in Jan/72. Restaked as EM cl (YA12357) in Jan/77 by M. Sherman.

**GEOLOGY**

Staking was probably prompted by GSC aeromagnetic maps, which show a complex pattern in this area. Outcrops of Tertiary gabbro or basalt were found during the geophysical survey, together with limestone and schist Further work was recommended on one EM conductor

**REFERENCES**

QUATSINO COPPER-GOLD MINES LTD, Aug/67 Assessment Report #060587 by John Lloyd

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Elk
**MINFILE #:** 105G 050
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Slide Mountain Terrane

**NTS MAP SHEET:** 105 G 13
**LATITUDE:** 61°53'42"N
**LONGITUDE:** 131°58'18"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

ELK, CUP

## WORK HISTORY

Staked as Elk cl (86617) by Newment in Oct/63 More staking (Cup cl 89718) was done in Dec/65 to the east by individuals. This activity was based on aeromagnetic data and did not lead to any significant follow up work

## GEOLOGY

The claims cover an area of extensive overburden with allochthonous Permian or older basalt and quartz-carbonate rock capping hilltops

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Chow
**MINFILE #:** 105G 051
**MAJOR COMMODITIES:** Zn
**MINOR COMMODITIES:** Pb,Cu
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 G 14
**LATITUDE:** 61°50'29"N
**LONGITUDE:** 131°29'20"W
**DEPOSIT TYPE:** Volcanogenic?
**STATUS:** Drilled Prospect

## CLAIMS (PREVIOUS AND CURRENT)

KAY, PALO, GAY, GEM, BB, POLO, JIM, ISKUT, WIT, MY, FRET, DOT, PLAY

## WORK HISTORY

Staked as Kay cl (Y16398) in Sep/66 by Kerr Addison ML following regional geochem surveys. Restaked as Palo cl (Y73482) in Jun/73 by A Harmon and as Gay cl (Y83797) in Oct/74 by A Carlos. Restaked as Gem cl (YA156) in Jul/76 by A Carlos and optioned to Yukon Revenue ML which added BB, etc cl (YA889) in Sep/76-Jan/77 and performed mapping and soil sampling in 1976 and 1977 and drilled several holes in 1977 The property was transferred in Dec/80 to Harjay EL.

Fringe staking between Nov 76 and Oct/77 included Polo cl (YA11972) by Welcome North ML and Jim cl (YA12042) by P S. White to the southwest; Iskut cl (YA12834) by Iskut Silver ML to the northwest, Wit cl (YA12026) by E Wedekind to the south; and MY cl (YA12212) by Marge Enterprises L.

In June/94 Cominco restaked the property as the Fret cl 1-51 (YB50023) In the same month Cominco staked the Dot cl 1-76 (YB49847) 5 km to the southwest. In Mar/95 Expatriate Resources Ltd staked Play cl 1-64 (YB59231) on the northwest boundary of the Fret claims. In Aug/95 Expatriate staked Play cl 77-88 (YB60923) on the western end of their claim block.

## GEOLOGY

Pyritic siderite veinlets and breccia fillings carrying minor amounts of galena, sphalerite and chalcopyrite have been found as float near a small diorite body in an area underlain by phyllite, schist, dolomite and schistose volcanic rocks mapped as Klondike Schist (Permian).

Yukon Revenue located a copper-zinc anomaly over a strongly leached area from which selected specimens of phyllite assayed up to 2 2% Zn and 0 5% Pb The drilling intersected pyritic schist with traces of galena, chalcopyrite and sphalerite The best core assays returned 0 5% Zn, 0 1% Pb and 0 03% Cu over 1 5 m.

## REFERENCES

BRENDEX RESOURCES LTD, Feb/77 Assessment Report #0602083 by C L. Smith

MARGE ENTERPRISES LTD, Feb/77 Assessment Report #0602084 by D W Goodbrand & A E Nevin

MINERAL INDUSTRY REPORT 1976, p. 206; 1977, p 80.

YUKON REVENUE MINES LTD, Sep/76 Vancouver Stock Exchange Open File by J J Crowhurst

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Brendex
**MINFILE #:** 105G 099
**MAJOR COMMODITIES:** Zn
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 G 14
**LATITUDE:** 61°48'29"N
**LONGITUDE:** 131°24'07"W
**DEPOSIT TYPE:** Sedex
**STATUS:** Drilled Prospect

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**CLAIMS (PREVIOUS AND CURRENT)**

LEACH, FAULT, PATCHES, RAB, EAGLE

**WORK HISTORY**

The north side was staked as Leach & Fault cl (YA12058) in Dec/76 by Brendex Res L, which carried out mapping and a geochem survey in 1977 During 1978, Tenas JV (DuPont & Western ML) conducted airborne and ground mag/EM surveys, mapping and a gravity survey and drilled 5 holes (305 m) under a brief option

G. Harris tied on Patches cl (YA28476) to the east in Apr/78 and performed linecutting in 1981. The south side was restaked as RAB cl (YA67577) in Feb/82 by Hudson's Bay Mg, which explored with mapping and MaxMin and mag surveys later in the year

B. Harris staked the Eagle 1-6 cl (YB35383) 2 5 km to the northeast in Jun/93

**GEOLOGY**

The claims are underlain by phyllite and schist of the Cambrian Mt Mye Formation. The holes were drilled on soil geochemical anomalies associated with sulphide-bearing quartzite, phyllite and graphitic phyllite with minor breccia and quartz veining Analyses up to 2 5% Zn over 1 5 m were obtained.

The Rab claims were staked on an airborne mag and EM anomaly

REFERENCES

BRENDEX RESOURCES LTD, Feb/77 Prospectus Report by C L. Smith

BRENDEX RESOURCES LTD, Oct/77 Assessment Report #090250 by C.K Ikona

HUDSON BAY MINING AND SMELTING CO LTD, Feb/83 Assessment Report #091426 by R Stroshein.

MINERAL INDUSTRY REPORT 1977, p 89, 1978, p 67

YUKON EXPLORATION AND GEOLOGY 1982, p 128-129

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

NAME(S): Tor
MINFILE #: 105G 111
MAJOR COMMODITIES: -
MINOR COMMODITIES: -
TECTONIC ELEMENT: Slide Mountain Terrane

NTS MAP SHEET: 105 G 13
LATITUDE: 61°52'28"N
LONGITUDE: 131°33'36"W
DEPOSIT TYPE: Unknown
STATUS: Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

TOR, NECK, PIN

## WORK HISTORY

Staked as Tor cl (YB15155) in Jul/88 by Welcome North ML, which carried out prospecting and soil sampling later in the year.

In Jun/94 Cominco Ltd. staked the Pin cl 1-29 (YB49923) 10 km to the northwest and the Neck cl 1-71 (YB49952) 12 km to the northwest

## GEOLOGY

The claims are cover zones of quartz-carbonate alteration in serpentinized units of the Permo-Carboniferous Anvil-Campbell Allochthon Geochemical response was flat.

## REFERENCES

YUKON MINING AND EXPLORATION OVERVIEW 1988, p 26-27

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Carolyn
**MINFILE #:** 105J 018
**MAJOR COMMODITIES:** Coal
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°02'02"N
**LONGITUDE:** 131°47'36"W
**DEPOSIT TYPE:** Coal
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

COAL LEASES (4815)

## WORK HISTORY

Staked as three coal leases (4815) in Jun/02 by D. McIntyre

## GEOLOGY

The location is given as 40 km above the mouth of Ross River, 1 6 km from the left limit. Outcrop is scarce and consists mainly of Tertiary volcanic flows and pyroclastic rocks. Paleocene coal-bearing sedimentary rocks are sometimes interbedded with the volcanics and it is possible that the staking was based on coal float found in a creek.

## REFERENCES

AURUM GEOLOGICAL CONSULTANTS INC , 1994 Yukon Coal Inventory 1994 Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Marilyn
**MINFILE #:** 105J 027
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°03'29"N
**LONGITUDE:** 131°49'58"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

AJ

## WORK HISTORY

Staked as AJ cl (YA12822) in March/77 by M D Wood.

## GEOLOGY

The claims are underlain by Cambro-Ordovician siltstone and chert near the margin of a mid-Cretaceous granodiorite stock

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Bojo
**MINFILE #:** 105J 028
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°00'22"N
**LONGITUDE:** 131°45'56"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Anomaly

## CLAIMS (PREVIOUS AND CURRENT)

BOJO, PIN, NECK

## WORK HISTORY

Staked as 174 Bojo cl (YA20239) in Jun/77 by Cyprus Anvil and Hudson's Bay O & GL, which explored with airborne mag and EM survey sand grid soil sampling and mapping in 1977 and ground mag and EM surveys in 1978

In Jun/94 Cominco Ltd staked the Pin cl 1-29 (YB49923) 8 km south and the Neck cl 1-71 (YB49923) 6 5 km southwest of the anomaly

## GEOLOGY

The claims were staked in a totally overburden-covered area to cover three coincident airborne EM-magnetic anomalies outlined by an Input survey and covering an area of projected Anvil-type stratigraphy Rocks to the north consist of limestone and black calcareous shale of Paleozoic age while to the south, two-mica schist, calc-silicate and black to grey phyllite with metabasite interbeds were noted. The ground surveys outlined two coincident mag-EM targets

## REFERENCES

CYPRUS ANVIL MINING CORP , May/78 Assessment Report by W Roberts

MINERAL INDUSTRY REPORT 1978, p 71

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

NAME(S): Petancic
MINFILE #: 105K 097
MAJOR COMMODITIES: -
MINOR COMMODITIES: -
TECTONIC ELEMENT: Yukon Tanana Terrane

NTS MAP SHEET: 105 K 1
LATITUDE: 62°02'54"N
LONGITUDE: 132°05'01"W
DEPOSIT TYPE: Unknown
STATUS: Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

RAT, FEX, HOT, AXBO, SHALE

## WORK HISTORY

Staked as Rat cl (Y83133) in Jul/74 by J Acklack and as FEX cl (Y80613) in Sep/74 by R. Blusson and associates B. Goodwin added the Hot cl (YA3138) in Aug/74 and R. Davies added Shale cl (YA3793) in Oct/74 to the east.

Restaked as AXBO cl (YA18574) in Jun/77 by Cyprus Anvil Mg Corp following an airborne mag-EM survey

## GEOLOGY

The claims were staked in an overburden-covered area near the margin of a mid-Cretaceous granodiorite batholith. They are probably underlain by mid-Cretaceous crystal tuff or Carboniferous to Triassic quartzite and schist of the Nisutlin Allochthonous Assemblage

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Chaplin
**MINFILE #:** 105K 098
**MAJOR COMMODITIES:** Pb,Zn,Ag
**MINOR COMMODITIES:** Ba,Cu
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 K 1
**LATITUDE:** 62°00'28"N
**LONGITUDE:** 132°07'59"W
**DEPOSIT TYPE:** Vein
**STATUS:** Drilled prospect

## CLAIMS (PREVIOUS AND CURRENT)

ARO, COJ, NWC, GEOX, T, TENAS, SKATE

## WORK HISTORY

Staked as ARO cl (Y83128) in Aug/74 by AEX Mls Corp L and Anvil Range Synd (Teck & DuPont), which carried out recce mag and geochem surveys and prospecting. The adjoining COJ and NWC groups (Y83435) and the nearby GEOX cl (Y80637) to the north were recorded in September by R. Blusson and associates.

Restaked as T cl (YA11590) in Oct/76 by Tenas JV (DuPont and Western ML), which added more T and Tenas claims as part of a 728 claim belt 45 km long and explored with mapping, geochem sampling, gravity surveys and two holes (455 m) in 1977, gravity and airborne mag and EM surveys in 1978; and wide spaced drilling on the T group in 1979.

The Tenas JV claims were optioned in 1980 by Cyprus Anvil The DuPont interest was transferred to CSA Mls Inc in 1984 and to Goldsearch Inc in 1985

Restaked as Skate cl 1-44 (YB68969) by Expatriate Resources Ltd in Oct/95 Claim block extends south into map sheet 105F 16.

## GEOLOGY

The ARO group was staked on a weak gossan and aeromagnetic anomaly underlain by phyllite and altered volcanic rocks which have been assigned to the Carboniferous-Triassic Nisutlin Allochthonous Assemblage One hole intersected massive sulphides with some sections of 6% combined Zn + Pb.

The only mineralization seen on surface is a vein of massive sulphides south of the deposit which was found in 1974 and further investigated in 1977 The mineralization consists of pyrrhotite and pyrite with galena, sphalerite and barite and a trace of chalcopyrite and arsenopyrite. It ranges from 15 to 60 cm wide and has been traced for well over 60 m along strike. No mineralization was encountered in the 1979 drilling

## REFERENCES

DUPONT OF CANADA EXPLORATION LTD, Aug/78 Assessment Report #090335 by C A Ager.

GEOLOGICAL SURVEY OF CANADA Map 13-1961.

MINERAL INDUSTRY REPORT 1974, p 137, 1977, p 62-63, 1978, p 40.

## Appendix 2

STATEMENT OF QUALIFICATIONS

I, John Peter Ross, do hereby certify that I

1 am a qualified prospector with mailing address,

B1-2002 Centennial Street
Whitehorse, Yukon
Canada Y1A 3Z7

2 graduated from McGill University in 1970 with a B Sc General Science

3 have attended and finished completely the following courses,

1974 - BC & Yukon Chamber of Mines, Prospecting Course
1978 - United Keno Hill Mines Limited, Elsa, Yukon, Prospecting Course
1987 - Yukon Chamber of Mines, Advanced Prospecting Course
1991 - Exploration Geochemistry Workshop, GSC Canada
1994 - Diamond Exploration Short Course, Yukon Geoscience Forum
1994 - Yukon Chamber of Mines, Alteration and Petrology for Prospectors
1994 - Applications of Multi-Parameter Surveys (Whitehorse), Ron Shives, GSC
1994 - Drift Exploration in Glaciated and Mountainous Terrain, BCGS
1995 - Applications of Multi-Parameter Surveys, (Vancouver) Ron Shives, GSC
1995 - Diamond Theory and Exploration, Short Course # 20, GSC Canada
1996 - New Mineral Deposit Models of the Cordillera, MDRU
1997 - Geochemical Exploration in Tropical Environments, MDRU
1998 - Metallogeny of Volcanic Arcs, Cordilleran Roundup Short Course
1999 - Volcanic Massive Sulphide Deposits, Cordilleran Roundup Short Course
1999 - Pluton-Related (Thermal Aureole) Gold, Yukon Geoscience Forum
2000 - Sediment Hosted Gold Deposits, MDRU
2001 - Volcanic Processes, MDRU

4 did all the work and the writing of this report

5 have been on the Yukon Prospectors Assistance and Yukon Mining Incentive Program 1986 - 2001

6 have been on the British Columbia Prospectors' Assistance Program 1989 - 1990, 2001

7 have a 100% interest in the claims described in this report at the present time

14 Jan 2002
John Peter Ross

## Appendix 3

Float / Bedrock Sample Geochemistry - Assay Results

Northern Analytical Laboratories ltd

105 Copper Road
Whitehorse, Yukon
Y1A 2Z7
Ph (867) 668-4968
Fax (867) 668-4890
E-mail NAL@yknet yk ca

30/07/2001

# Certificate of Analysis

# of pages (not including this page) 1

Peter Ross

WO# 00183

Certified by
Justin Lemphers (Senior Assayer)

Date Received 12/07/01

SAMPLE PREPARATION

| Code | # of Samples | Type | Preparation Description (All wet samples are dried first ) |
|---|---|---|---|
| r | 9 | rock | Crush to -10 mesh, riffle split 200g, pulverize to -100 mesh |

ANALYTICAL METHODS SUMMARY

| Symbol | Units | Element | Method (A assay) (G geochem) | Fusion/Digestion | Lower Limit | Upper Limit |
|---|---|---|---|---|---|---|
| Au 30g | ppb | Gold | G FA/AAS | 30g FA / aqua regia | 5 | 7000 |

AAS = atomic absorption spectrophotometry
FA = fire assay

1000ppb = 1ppm = 1g/mt = 0 0001% = 0 029166oz/ton

Northern Analytical Laboratories ltd

105 Copper Road
Whitehorse, Yukon
Y1A 2Z7
Ph (867) 668-4968
Fax (867) 668-4890
E-mail NAL@yknet yk ca

30/07/2001 Certificate of Analysis 

Peter Ross WO# 00183

Certified by

| | Sample # | Au 30g ppb |
|---|---|---|
| r | VM 1 BEDROCK | 2 |
| r | VM 3 B | 2 |
| r | VM 5 FLOAT | 0 |
| r | VM 8 B | 1 |
| r | VM 9 B | 0 |
| r | VM 10 B | 2 |
| r | VM 11 B | 5 |
| r | VM 12 F | 3 |
| r | VM 13 B | 1 |

INTERNATIONAL PLASMA LABORATORY LTD

# CERTIFICATE OF ANALYSIS
# iPL 01G0763

2036 Columbia Street
Vancouver B C
Canada V5Y 3E1
Phone (604) 879-7878
Fax (604) 879 7898
Email ipl@direct ca

ISO 9002 KPMG

**Northern Analytical Laboratories**
Project WO#00183
Shipper Norm Smith
Shipment PO# 568118
**Analysis.**
ICP(AqR)30

**Comment**

**9 Samples** Out Jul 26 2001 In Jul 20, 2001 [076315 53 24 10072601]

| CODE | AMOUNT | TYPE | PREPARATION DESCRIPTION | PULP | REJECT |
|---|---|---|---|---|---|
| B31100 | 9 | Pulp | Pulp received as it is no sample prep | 12M/Dis | 00M/Dis |

NS=No Sample Rep=Replicate M=Month Dis=Discard

## Document Distribution

1 Northern Analytical Laboratories
105 Copper Road
Whitehorse
YT Y1A 2Z7
Canada
Att Norm Smith

| EN | RT | CC | IN | FX |
|---|---|---|---|---|
| 1 | 2 | 1 | 1 | 0 |
| DL | 3D | EM | BT | BL |
| 0 | 0 | 0 | 0 | 0 |

Ph 867/668 4968
Fx 867/668 4890
Em nal@yknet yk ca

## Analytical Summary

| ## | Code | Method | Units | Description | Element | Limit Low | Limit High |
|---|---|---|---|---|---|---|---|
| 01 | 0721 | ICP | ppm | Ag ICP | Silver | 0.1 | 99.9 |
| 02 | 0711 | ICP | ppm | Cu ICP | Copper | 1 | 20000 |
| 03 | 0714 | ICP | ppm | Pb ICP | Lead | 2 | 20000 |
| 04 | 0730 | ICP | ppm | Zn ICP | Zinc | 1 | 20000 |
| 05 | 0703 | ICP | ppm | As ICP | Arsenic | 5 | 9999 |
| 06 | 0702 | ICP | ppm | Sb ICP | Antimony | 5 | 999 |
| 07 | 0732 | ICP | ppm | Hg ICP | Mercury | 3 | 9999 |
| 08 | 0717 | ICP | ppm | Mo ICP | Molydenum | 1 | 999 |
| 09 | 0747 | ICP | ppm | Tl ICP (Incomplete Digestion) | Thallium | 10 | 999 |
| 10 | 0705 | ICP | ppm | Bi ICP | Bismuth | 2 | 9999 |
| 11 | 0707 | ICP | ppm | Cd ICP | Cadmium | 0.1 | 99.9 |
| 12 | 0710 | ICP | ppm | Co ICP | Cobalt | 1 | 9999 |
| 13 | 0718 | ICP | ppm | Ni ICP | Nickel | 1 | 9999 |
| 14 | 0704 | ICP | ppm | Ba ICP (Incomplete Digestion) | Barium | 2 | 9999 |
| 15 | 0727 | ICP | ppm | W ICP (Incomplete Digestion) | Tungsten | 5 | 999 |
| 16 | 0709 | ICP | ppm | Cr ICP (Incomplete Digestion) | Chromium | 1 | 9999 |
| 17 | 0729 | ICP | ppm | V ICP | Vanadium | 2 | 9999 |
| 18 | 0716 | ICP | ppm | Mn ICP | Manganese | 1 | 9999 |
| 19 | 0713 | ICP | ppm | La ICP (Incomplete Digestion) | Lanthanum | 2 | 9999 |
| 20 | 0723 | ICP | ppm | Sr ICP (Incomplete Digestion) | Strontium | 1 | 9999 |
| 21 | 0731 | ICP | ppm | Zr ICP | Zirconium | 1 | 9999 |
| 22 | 0736 | ICP | ppm | Sc ICP | Scandium | 1 | 9999 |
| 23 | 0726 | ICP | % | Ti ICP (Incomplete Digestion) | Titanium | 0.01 | 1.00 |
| 24 | 0701 | ICP | % | Al ICP (Incomplete Digestion) | Aluminum | 0.01 | 9.99 |
| 25 | 0708 | ICP | % | Ca ICP (Incomplete Digestion) | Calcium | 0.01 | 9.99 |
| 26 | 0712 | ICP | % | Fe ICP | Iron | 0.01 | 9.99 |
| 27 | 0715 | ICP | % | Mg ICP (Incomplete Digestion) | Magnesium | 0.01 | 9.99 |
| 28 | 0720 | ICP | % | K ICP (Incomplete Digestion) | Potassium | 0.01 | 9.99 |
| 29 | 0722 | ICP | % | Na ICP (Incomplete Digestion) | Sodium | 0.01 | 5.00 |
| 30 | 0719 | ICP | % | P ICP | Phosphorus | 0.01 | 5.00 |

EN=Envelope # RT=Report Style CC=Copies IN=Invoices Fx=Fax(1=Yes 0=No) Totals 1=Copy 1=Invoice 0=3½ Disk
DL=Download 3D=3½ Disk EM=E-Mail BT=BBS Type BL=BBS(1=Yes 0=No) ID=C030901
* Our liability is limited solely to the analytical cost of these analyses

BC Certified Assayer David Chiu

INTERNATIONAL PLASMA LABORATORY LTD

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Canada V5Y 3E1
Phone (604) 879 7878
Fax (604) 879-7898
Email ipl@direct ca

# CERTIFICATE OF ANALYSIS
## iPL 01G0763

ISO 9002 KPMG

Client Northern Analytical Laboratories
Project WO#00183

**9 Samples**
9=Pulp

[076315 53 24 10072601]

Out Jul 26 2001
In Jul 20 2001



| Sample Name | | Ag ppm | Cu ppm | Pb ppm | Zn ppm | As ppm | Sb ppm | Hg ppm | Mo ppm | Tl ppm | Bi ppm | Cd ppm | Co ppm | Ni ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VM 1 | P | < | 30 | 6 | 91 | < | < | < | 2 | < | < | < | 8 | 28 |
| VM 3 | P | < | 15 | 11 | 61 | < | < | < | 2 | < | < | < | 12 | 25 |
| VM 5 | P | 0 2 | 13 | 9 | 62 | < | < | < | 2 | < | < | < | 3 | 15 |
| VM 8 | P | < | 55 | 8 | 77 | < | < | < | 2 | < | < | < | 29 | 29 |
| VM 9 | P | < | 7 | < | 14 | < | 9 | < | 4 | < | < | < | 65 | 1319 |
| VM 10 | P | < | 19 | 2 | 12 | < | < | < | < | < | < | < | 2 | 9 |
| VM 11 | P | < | 15 | 9 | 79 | < | < | < | 4 | < | < | < | 27 | 35 |
| VM 12 | P | 0 3 | 5 | 4 | 9 | 601 | 492 | < | 3 | < | < | < | 78 | 1392 |
| VM 13 | P | < | 26 | 162 | 91 | < | 28 | < | 3 | < | < | < | 7 | 39 |
| Min Limit | | 0 1 | 1 | 2 | 1 | 5 | 5 | 3 | 1 | 10 | 2 | 0 1 | 1 | 1 |
| Max Reported* | | 99 9 | 20000 | 20000 | 20000 | 9999 | 999 | 9999 | 999 | 999 | 9999 | 99 9 | 9999 | 9999 |
| Method | | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP |

| Sample Name | Ba ppm | W ppm | Cr ppm | V ppm | Mn ppm | La ppm | Sr ppm | Zr ppm | Sc ppm | Ti % | Al % | Ca % | Fe % | Mg % | K % | Na % | P % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VM 1 | 88 | < | 49 | 16 | 557 | 2 | 64 | 5 | 3 | < | 1 40 | 1 58 | 2 66 | 1 04 | 0 09 | 0 02 | 0 05 |
| VM 3 | 119 | < | 41 | 11 | 593 | 32 | 34 | 3 | 2 | < | 1 38 | 0 67 | 2 96 | 0 59 | 0 23 | 0 02 | 0 06 |
| VM 5 | 120 | < | 33 | 13 | 1751 | 6 | 942 | 1 | 6 | < | 0 59 | 19% | 1 94 | 0 36 | 0 07 | 0 01 | 0 05 |
| VM 8 | 163 | < | 59 | 118 | 713 | < | 22 | 11 | 5 | 0 28 | 2 49 | 1 63 | 4 04 | 1 75 | 0 04 | 0 03 | 0 05 |
| VM 9 | 110 | < | 504 | 12 | 547 | < | 93 | 1 | 5 | < | 0 13 | 1 46 | 3 40 | 15% | 0 02 | 0 01 | < |
| VM 10 | 8 | < | 92 | 7 | 96 | < | 2 | 1 | 1 | < | 0 16 | 0 03 | 0 62 | 0 13 | 0 01 | 0 01 | 0.01 |
| VM 11 | 108 | < | 55 | 103 | 1319 | 8 | 215 | 2 | 14 | < | 2 73 | 4 04 | 5 12 | 2 49 | 0 08 | 0 02 | 0 06 |
| VM 12 | 46 | < | 274 | 5 | 395 | < | 79 | 1 | 3 | < | 0 03 | 2 54 | 3 13 | 16% | < | 0 01 | < |
| VM 13 | 361 | < | 31 | 8 | 918 | 2 | 227 | 7 | 3 | < | 0 37 | 7 12 | 2 79 | 3 95 | 0 08 | 0 02 | 0.03 |
| Min Limit | 2 | 5 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 |
| Max Reported* | 9999 | 999 | 9999 | 9999 | 9999 | 9999 | 9999 | 9999 | 9999 | 1 00 | 9 99 | 9 99 | 9 99 | 9 99 | 9 99 | 5 00 | 5 00 |
| Method | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP |

—=No Test Ins=Insufficient Sample Del=Delay Max=No Estimate Rec=ReCheck m=x1000 %=Estimate % NS=No Sample P=Pulp

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19/10/2001

# Certificate of Analysis

# of pages (not including this page) 1

Peter Ross

WO# 00229

Certified by
Justin Lemphers (Senior Assayer)

Date Received 19/09/01

SAMPLE PREPARATION

| Code | # of Samples | Type | Preparation Description (All wet samples are dried first ) |
|---|---|---|---|
| r | 27 | rock | Crush to -10 mesh, riffle split 200g, pulverize to -100 mesh |

ANALYTICAL METHODS SUMMARY

| Symbol | Units | Element | Method (A assay) (G geochem) | Fusion/Digestion | Lower Limit | Upper Limit |
|---|---|---|---|---|---|---|
| Au 30g | ppb | Gold | G FA/AAS | 30g FA / aqua regia | 5 | 7000 |

AAS = atomic absorption spectrophotometry
FA = fire assay

1 oz/ton = 34 286 g/mt
1000ppb = 1ppm = 1g/mt = 0 0001% = 0 029166oz/ton

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E-mail NAL@yknet yk ca

19/10/2001

Certificate of Analysis



Peter Ross

WO# 00229

Certified by [signature]

| | Sample # | | Au 30g ppb |
|---|---|---|---|
| r | B+560 | BEDROCK | 10 |
| r | CINTA-1 | PIT | 16 |
| r | CINTA-2 | " | 13 |
| r | CINTA-3 | " | 13 |
| r | CINTA-4 | " | 17 |
| r | CINTA-5 | " | 16 |
| r | CINTA-6 | " | 10 |
| r | CINTA-7 | " | 14 |
| r | CINTA-8 | " | 12 |
| r | CINTA-9 | " | 13 |
| r | CINTA-10 | " | 13 |
| r | CINTA-11 | " | 12 |
| r | CINTA-12 | " | 12 |
| r | CINTA-13 | " | 5 |
| r | CINTA-14 | " | 5 |
| r | CINTA-15 | " | 5 |
| r | CINTA-16 | " | <5 |
| r | CINTA-17 | " | <5 |
| r | CINTA-18 | " | 6 |
| r | CINTA-19 | " | 7 |
| r | CINTA-20 | " | 8 |
| r | CINTA-21 | " | 9 |
| r | CINTA-22 | " | 9 |
| r | CINTA-23 | " | 11 |
| r | CINTA-24 | FLOAT | 8 |
| r | STUDY-1 | PIT | 9 |
| r | STUDY-2 | " | 13 |

INTERNATIONAL PLASMA LABORATORY LTD

# CERTIFICATE OF ANALYSIS
## iPL 01J1199

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Fax (604) 879 7898
Email ipl@direct ca

**Northern Analytical Laboratories**

**30 Samples** Out Oct 31 2001 In Oct 24 2001 [119916 19 57 10103101]

Project WO#00229
Shipper Norm Smith
Shipment PO# 568139

**Analysis**
Au/Pt/Pd(FA/AAS 30)
ICP(AqR)30

**Comment**

| CODE | AMOUNT | TYPE | PREPARATION DESCRIPTION | PULP | REJECT |
|---|---|---|---|---|---|
| B31100 | 30 | Pulp | Pulp received as it is no sample prep | 12M/Dis | 00M/Dis |
| B82100 | 1 | Std iPL | Standard iPL no charge | 00M/Dis | 00M/Dis |

NS=No Sample Rep=Replicate M=Month Dis=Discard

**Document Distribution**

1 Northern Analytical Laboratories
105 Copper Road
Whitehorse
YT Y1A 2Z7
Canada
Att Norm Smith
Ph 867/668 4968
Fx 867/668 4890
Em nal@yknet yk ca

| EN | RT | CC | IN | FX |
|---|---|---|---|---|
| 1 | 2 | 1 | 1 | 0 |
| DL | 3D | EM | BT | BL |
| 0 | 0 | 0 | 0 | 0 |

**Analytical Summary**

| ## | Code | Method | Units | Description | Element | Limit Low | Limit High |
|---|---|---|---|---|---|---|---|
| 01 | 0313 | FA/AAS | ppb | Au FA/AAS finish 30g | Gold | 2 | 10000 |
| 02 | 0331 | FA/AAS | ppb | Pt FA/AAS finish 30g in ppb | Platinum | 15 | 10000 |
| 03 | 0341 | FA/AAS | ppb | Pd FA/AAS finish 30g in ppb | Palladium | 1 | 10000 |
| 04 | 0721 | ICP | ppm | Ag ICP | Silver | 0 1 | 100 0 |
| 05 | 0711 | ICP | ppm | Cu ICP | Copper | 1 | 20000 |
| 06 | 0714 | ICP | ppm | Pb ICP | Lead | 2 | 20000 |
| 07 | 0730 | ICP | ppm | Zn ICP | Zinc | 1 | 20000 |
| 08 | 0703 | ICP | ppm | As ICP | Arsenic | 5 | 10000 |
| 09 | 0702 | ICP | ppm | Sb ICP | Antimony | 5 | 1000 |
| 10 | 0732 | ICP | ppm | Hg ICP | Mercury | 3 | 10000 |
| 11 | 0717 | ICP | ppm | Mo ICP | Molydenum | 1 | 1000 |
| 12 | 0747 | ICP | ppm | Tl ICP (Incomplete Digestion) | Thallium | 10 | 1000 |
| 13 | 0705 | ICP | ppm | Bi ICP | Bismuth | 2 | 10000 |
| 14 | 0707 | ICP | ppm | Cd ICP | Cadmium | 0 1 | 100 0 |
| 15 | 0710 | ICP | ppm | Co ICP | Cobalt | 1 | 10000 |
| 16 | 0718 | ICP | ppm | Ni ICP | Nickel | 1 | 10000 |
| 17 | 0704 | ICP | ppm | Ba ICP (Incomplete Digestion) | Barium | 2 | 10000 |
| 18 | 0727 | ICP | ppm | W ICP (Incomplete Digestion) | Tungsten | 5 | 1000 |
| 19 | 0709 | ICP | ppm | Cr ICP (Incomplete Digestion) | Chromium | 1 | 10000 |
| 20 | 0729 | ICP | ppm | V ICP | Vanadium | 2 | 10000 |
| 21 | 0716 | ICP | ppm | Mn ICP | Manganese | 1 | 10000 |
| 22 | 0713 | ICP | ppm | La ICP (Incomplete Digestion) | Lanthanum | 2 | 10000 |
| 23 | 0723 | ICP | ppm | Sr ICP (Incomplete Digestion) | Strontium | 1 | 10000 |
| 24 | 0731 | ICP | ppm | Zr ICP | Zirconium | 1 | 10000 |
| 25 | 0736 | ICP | ppm | Sc ICP | Scandium | 1 | 10000 |
| 26 | 0726 | ICP | % | Ti ICP (Incomplete Digestion) | Titanium | 0 01 | 1 00 |
| 27 | 0701 | ICP | % | Al ICP (Incomplete Digestion) | Aluminum | 0 01 | 10 00 |
| 28 | 0708 | ICP | % | Ca ICP (Incomplete Digestion) | Calcium | 0 01 | 10 00 |
| 29 | 0712 | ICP | % | Fe ICP | Iron | 0 01 | 10 00 |
| 30 | 0715 | ICP | % | Mg ICP (Incomplete Digestion) | Magnesium | 0 01 | 10 00 |
| 31 | 0720 | ICP | % | K ICP (Incomplete Digestion) | Potassium | 0 01 | 10 00 |
| 32 | 0722 | ICP | % | Na ICP (Incomplete Digestion) | Sodium | 0 01 | 5 00 |
| 33 | 0719 | ICP | % | P ICP | Phosphorus | 0 01 | 5 00 |

EN=Envelope # RT=Report Style CC=Copies IN=Invoices Fx=Fax(1=Yes 0=No) Totals 1=Copy 1=Invoice 0=3½ Disk
DL=Download 3D=3½ Disk EM=E Mail BT=BBS Type BI=BBS(1=Yes 0=No) ID=C030901
* Our liability is limited solely to the analytical cost of these analyses

BC Certified Assayer David Chiu

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# CERTIFICATE OF ANALYSIS
## iPL 01J1199

ISO 9002 KPMG

Client Northern Analytical Laboratories
Project WO#00229

**30 Samples**
30=Pulp 1=Std iPL

[119916 19 57 10103101]

Out Oct 31 2001
In Oct 24 2001



| Sample Name | Type | Au ppb | Pt ppb | Pd ppb | Ag ppm | Cu ppm | Pb ppm | Zn ppm | As ppm | Sb ppm | Hg ppm | Mo ppm | Tl ppm | Bi ppm | Cd ppm | Co ppm | Ni ppm | Ba ppm | W ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CINTA 1 | Pulp | — | — | — | 0 7 | 75 | 24 | 465 | <5 | <5 | <3 | 27 | <10 | <2 | 1 7 | 19 | 87 | 56 | <5 |
| CINTA 2 | Pulp | — | — | — | 0 7 | 73 | 19 | 497 | <5 | <5 | <3 | 25 | <10 | <2 | 3 0 | 17 | 94 | 55 | <5 |
| CINTA 3 | Pulp | — | — | — | 0 6 | 64 | 15 | 597 | <5 | 5 | <3 | 30 | <10 | <2 | 12 3 | 13 | 63 | 81 | <5 |
| CINTA 4 | Pulp | — | — | — | 0 7 | 69 | 25 | 318 | <5 | <5 | <3 | 19 | <10 | <2 | <0 1 | 18 | 68 | 46 | <5 |
| CINTA 5 | Pulp | — | — | — | 0 9 | 108 | 24 | 595 | 8 | 5 | 4 | 35 | <10 | <2 | 7 2 | 19 | 98 | 72 | <5 |
| CINTA 6 | Pulp | — | — | — | 0 7 | 93 | 18 | 572 | <5 | 5 | <3 | 34 | <10 | <2 | 3 1 | 8 | 51 | 86 | <5 |
| CINTA 7 | Pulp | — | — | — | 0 7 | 74 | 24 | 361 | <5 | <5 | <3 | 25 | <10 | <2 | <0 1 | 18 | 74 | 46 | <5 |
| CINTA 8 | Pulp | — | — | — | 0 8 | 97 | 19 | 545 | <5 | 5 | 3 | 34 | <10 | <2 | 8 4 | 20 | 103 | 58 | <5 |
| CINTA 9 | Pulp | — | — | — | 0 5 | 81 | 10 | 416 | <5 | <5 | <3 | 16 | <10 | <2 | 2 2 | 8 | 49 | 55 | <5 |
| CINTA 10 | Pulp | — | — | — | 0 8 | 76 | 16 | 585 | <5 | <5 | <3 | 34 | <10 | <2 | 6 5 | 16 | 87 | 55 | <5 |
| CINTA 11 | Pulp | — | — | — | 0 7 | 72 | 24 | 465 | <5 | <5 | <3 | 27 | <10 | <2 | 2 1 | 19 | 89 | 53 | <5 |
| CINTA 12 | Pulp | — | — | — | 1 0 | 33 | 34 | 368 | 20 | 5 | 4 | 73 | <10 | <2 | <0 1 | 4 | 32 | 59 | <5 |
| CINTA 13 | Pulp | — | — | — | 0 2 | 9 | <2 | 37 | <5 | <5 | <3 | 6 | <10 | <2 | <0 1 | 3 | 13 | 384 | <5 |
| CINTA 14 | Pulp | — | — | — | 0 1 | 15 | 6 | 56 | <5 | <5 | <3 | 4 | <10 | <2 | <0 1 | 5 | 17 | 40 | <5 |
| CINTA 15 | Pulp | — | — | — | 0 1 | 15 | 4 | 69 | <5 | <5 | <3 | 3 | <10 | <2 | <0 1 | 4 | 25 | 114 | <5 |
| CINTA 16 | Pulp | — | — | — | 0 2 | 18 | 5 | 64 | <5 | <5 | <3 | 3 | <10 | <2 | <0 1 | 8 | 22 | 100 | <5 |
| CINTA 17 | Pulp | — | — | — | <0 1 | 11 | 4 | 65 | <5 | <5 | <3 | 4 | <10 | <2 | <0 1 | 5 | 20 | 48 | <5 |
| CINTA 18 | Pulp | — | — | — | <0 1 | 16 | 5 | 61 | <5 | <5 | <3 | 3 | <10 | <2 | <0 1 | 5 | 18 | 142 | <5 |
| CINTA 19 | Pulp | — | — | — | 0 2 | 12 | 9 | 86 | <5 | <5 | <3 | 9 | <10 | <2 | <0 1 | 11 | 34 | 80 | 6 |
| CINTA 20 | Pulp | — | — | — | 0 2 | 11 | 3 | 61 | <5 | <5 | <3 | 3 | <10 | <2 | <0 1 | 4 | 18 | 122 | <5 |
| CINTA 21 | Pulp | — | — | — | 0 2 | 13 | 5 | 55 | <5 | <5 | <3 | 4 | <10 | <2 | <0 1 | 5 | 22 | 163 | <5 |
| CINTA 22 | Pulp | — | — | — | 0 1 | 17 | 11 | 84 | <5 | <5 | <3 | 4 | <10 | <2 | <0 1 | 3 | 18 | 49 | <5 |
| CINTA 23 | Pulp | — | — | — | <0 1 | 13 | 2 | 61 | <5 | <5 | <3 | 3 | <10 | <2 | <0 1 | 5 | 20 | 42 | <5 |
| CINTA 24 | Pulp | — | — | — | 0 2 | 16 | 12 | 202 | <5 | <5 | <3 | 5 | <10 | <2 | <0 1 | 9 | 47 | 34 | <5 |
| CINTA 25 | Pulp | 3 | <15 | 107 | 0 4 | 5 | 10 | 11 | 685 | 399 | <3 | 5 | <10 | <2 | <0 1 | 65 | 1214 | 33 | <5 |
| B+560 | Pulp | — | — | — | 0 4 | 52 | 18 | 35 | 5 | <5 | <3 | 4 | <10 | <2 | <0 1 | 8 | 60 | 75 | <5 |
| STUDY 1 | Pulp | — | — | — | 0 4 | 109 | 13 | 403 | <5 | <5 | <3 | 13 | <10 | <2 | 2 8 | 16 | 76 | 32 | <5 |
| STUDY 2 | Pulp | — | — | — | 0 6 | 76 | 19 | 376 | <5 | <5 | <3 | 19 | <10 | <2 | 2 7 | 15 | 70 | 42 | <5 |
| VM 9 | Pulp | <2 | <15 | <1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| VM 12 | Pulp | <2 | <15 | <1 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| iPL STD 101 70 | Std iPL | 68 | 250 | 520 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Minimum Detection | | 2 | 15 | 1 | 0 1 | 1 | 2 | 1 | 5 | 5 | 3 | 1 | 10 | 2 | 0 1 | 1 | 1 | 2 | 5 |
| Maximum Detection | | 10000 | 10000 | 10000 | 100 0 | 20000 | 20000 | 20000 | 10000 | 1000 | 10000 | 1000 | 1000 | 10000 | 100 0 | 10000 | 10000 | 10000 | 1000 |
| Method | | FA/AAS | FA/AAS | FA/AAS | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP |

—=No Test Ins=Insufficient Sample Del=Delay Max=No Estimate Rec=ReCheck m=x1000 %=Estimate % NS=No Sample

INTERNATIONAL PLASMA LABORATORY LTD

# CERTIFICATE OF ANALYSIS
## iPL 01J1199

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ISO 9002 KPMG

Client Northern Analytical Laboratories
Project WO#00229

**30 Samples**
30=Pulp 1=Std iPL

[119916 19 57 10103101]

Out Oct 31 2001
In Oct 24 2001



| Sample Name | Cr ppm | V ppm | Mn ppm | La ppm | Sr ppm | Zr ppm | Sc ppm | Ti % | Al % | Ca % | Fe % | Mg % | K % | Na % | P % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CINTA 1 | 14 | 34 | 488 | 2 | 102 | 10 | 6 | <0 01 | 0 28 | 1 84 | 5 37 | 0 47 | 0 08 | 0 03 | 0 08 |
| CINTA 2 | 21 | 40 | 744 | <2 | 137 | 11 | 6 | <0 01 | 0 39 | 3 06 | 4 16 | 0 91 | 0 12 | 0 02 | 0 06 |
| CINTA 3 | 34 | 41 | 1053 | 4 | 130 | 13 | 5 | <0 01 | 0 32 | 4 70 | 2 60 | 1 76 | 0 09 | 0 02 | 0 18 |
| CINTA 4 | 15 | 27 | 247 | 2 | 111 | 10 | 5 | <0 01 | 0 34 | 2 97 | 5 47 | 0 19 | 0 11 | 0 03 | 0 06 |
| CINTA 5 | 21 | 39 | 739 | 2 | 117 | 14 | 6 | <0 01 | 0 35 | 2 57 | 3 89 | 0 77 | 0 10 | 0 02 | 0 13 |
| CINTA 6 | 31 | 49 | 302 | 4 | 90 | 10 | 6 | <0 01 | 0 37 | 2 13 | 2 68 | 0 46 | 0 08 | 0 02 | 0 24 |
| CINTA 7 | 11 | 33 | 162 | 2 | 120 | 9 | 5 | <0 01 | 0 31 | 2 72 | 5 04 | 0 16 | 0 10 | 0 02 | 0 07 |
| CINTA 8 | 18 | 35 | 1226 | 4 | 130 | 13 | 6 | <0 01 | 0 42 | 4 04 | 3 75 | 1 30 | 0 12 | 0 02 | 0 18 |
| CINTA 9 | 23 | 35 | 97 | 2 | 84 | 7 | 5 | <0 01 | 0 36 | 1 72 | 2 74 | 0 15 | 0 10 | 0 02 | 0 10 |
| CINTA 10 | 16 | 33 | 551 | 3 | 105 | 13 | 5 | <0 01 | 0 36 | 2 59 | 3 38 | 0 66 | 0 09 | 0 02 | 0 14 |
| CINTA 11 | 13 | 31 | 477 | 2 | 98 | 11 | 5 | <0 01 | 0 28 | 2 11 | 4 58 | 0 49 | 0 09 | 0 02 | 0 07 |
| CINTA 12 | 21 | 47 | 39 | 2 | 124 | 7 | 6 | <0 01 | 0 24 | 1 86 | 2 65 | 0 10 | 0 07 | 0 02 | 0 16 |
| CINTA 13 | 36 | 4 | 679 | <2 | 64 | 3 | <1 | <0 01 | 0 08 | 12% | 0 97 | 7 31 | 0 01 | 0 01 | 0 02 |
| CINTA 14 | 33 | 14 | 506 | 2 | 326 | 5 | 4 | <0 01 | 0 19 | 4 36 | 3 02 | 1 40 | 0 04 | 0 02 | 0 03 |
| CINTA 15 | 40 | 11 | 679 | <2 | 145 | 5 | 3 | <0 01 | 0 17 | 3 65 | 2 78 | 1 18 | 0 04 | 0 02 | 0 04 |
| CINTA 16 | 43 | 10 | 456 | 2 | 127 | 6 | 3 | <0 01 | 0 20 | 1 73 | 3 03 | 0 63 | 0 05 | 0 02 | 0 05 |
| CINTA 17 | 35 | 9 | 915 | 3 | 135 | 5 | 3 | <0 01 | 0 18 | 3 53 | 3 04 | 1 21 | 0 05 | 0 02 | 0 03 |
| CINTA 18 | 67 | 9 | 317 | 2 | 83 | 5 | 2 | <0 01 | 0 22 | 1 22 | 2 66 | 0 45 | 0 06 | 0 02 | 0 04 |
| CINTA 19 | 20 | 17 | 678 | 3 | 1170 | 5 | 2 | <0 01 | 0 25 | 13% | 6 47 | 5 32 | 0 06 | 0 02 | 0 02 |
| CINTA 20 | 37 | 8 | 859 | 2 | 130 | 5 | 3 | <0 01 | 0 16 | 3 22 | 2 81 | 1 10 | 0 05 | 0 02 | 0 04 |
| CINTA 21 | 35 | 8 | 441 | 2 | 209 | 5 | 3 | <0 01 | 0 17 | 3 06 | 2 75 | 1 12 | 0 05 | 0 02 | 0 04 |
| CINTA 22 | 48 | 10 | 1191 | 2 | 145 | 8 | 4 | <0 01 | 0 23 | 4 66 | 3 01 | 1 76 | 0 07 | 0 02 | 0 04 |
| CINTA 23 | 34 | 10 | 708 | 2 | 133 | 6 | 3 | <0 01 | 0 17 | 3 44 | 2 85 | 1 16 | 0 04 | 0 02 | 0 04 |
| CINTA 24 | 48 | 22 | 857 | 2 | 101 | 4 | 3 | <0 01 | 2 41 | 2 88 | 5 17 | 1 24 | 0 05 | 0 02 | 0 04 |
| CINTA 25 | 286 | 5 | 556 | <2 | 163 | 1 | 2 | <0 01 | 0 04 | 5 68 | 2 95 | 15% | <0 01 | 0 01 | <0 01 |
| B+560 | 73 | 11 | 2021 | 6 | 75 | 8 | 6 | <0 01 | 0 42 | 2 03 | 2 25 | 0 63 | 0 08 | 0 02 | 0 16 |
| STUDY 1 | 31 | 29 | 570 | 2 | 215 | 8 | 6 | <0 01 | 0 26 | 5 33 | 5 35 | 0 91 | 0 06 | 0 02 | 0 06 |
| STUDY 2 | 35 | 28 | 408 | 2 | 135 | 9 | 5 | <0 01 | 0 30 | 3 44 | 4 63 | 0 55 | 0 09 | 0 02 | 0 06 |
| VM 9 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| VM 12 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| iPL STD 101 70 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Minimum Detection | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 | 0 01 |
| Maximum Detection | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 1 00 | 10 00 | 10 00 | 10 00 | 10 00 | 10 00 | 5 00 | 5 00 |
| Method | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP | ICP |

—=No Test Ins=Insufficient Sample Del=Delay Max=No Estimate Rec=ReCheck m=x1000 %=Estimate % NS=No Sample

## Appendix 4

Float / Bedrock Sample Descriptions

| Sample Number | Description |
|---|---|
| VM1 | Bedrock, erratic over 10' x 15', siltstone (sandstone) |
| VM3 | Bedrock, erratic over 30' - 40' long , phyllite |
| VM5 | Float, coarse grained / calcite veins? |
| VM8 | Bedrock, basalt |
| VM9 | Bedrock, quartz / mariposite altered ultramafic |
| VM10 | Bedrock, grey chert or quartzite |
| VM11 | Bedrock, quartz chlorite schist |
| VM12 | Float, ultramafic, orange-brown-white, carbonate vein? |
| VM13 | Bedrock, siltstone |
| B+560 | Bedrock (ridge), limonite soil, bag loose pieces, phyllite? |
| CINTA 1 | In pit (conductor 3), bedrock, soft black decomposed, rotten limonite zones, at 84" |
| CINTA 2 | In pit (conductor 3), bedrock, 12" under CINTA 1, similar, harder rock |
| CINTA 3 | In pit (conductor 3), bedrock, ~ 100", under best conductor (515-524), gypsum needles |
| CINTA 4 | In pit (conductor 3), bedrock, ~ 100" |
| CINTA 5 | In pit (conductor 3), bedrock, ~ 100" |
| CINTA 6 | In pit (conductor 3), bedrock, ~ 106" In conductor area, hammered shovel into ground under CINTA 3 |
| CINTA 7 | In pit (conductor 3), bedrock, ~ 106", 12" under CINTA 4 |
| CINTA 8 | In pit (conductor 3), bedrock, ~ 106", under CINTA 5 |
| CINTA 9 | Hard pieces from conductor pile (excavated) 12/13 reading on ground |
| CINTA 10 | Soft sticky material from conductor pile (excavated) 5/6 reading on ground |
| CINTA 11 | Non-conductive pile, looks the same as CINTA 10 |

Sample Descriptions (continued)

| Sample Number | Description |
|---|---|
| CINTA 12 | Deep in hole, large porous piece, porous weathered white-brown areas |
| CINTA 13-24 | Angular pieces, decomposed bedrock from upper +80" in pit (conductor 3) |
| CINTA 13 | Quartz rich rock, lots of orange quartz |
| CINTA 14 | Interesting quartz stockwork |
| CINTA 15 | Siltstone, stockwork of fine orange quartz |
| CINTA 16 | ? white quartz and limonite |
| CINTA 17 | Siltstone, interesting white-brown quartz stockwork |
| CINTA 18 | Siltstone and quartz stringers |
| CINTA 19 | Siltstone and quartz stringers |
| CINTA 20 | Siltstone and milky quartz and orange areas |
| CINTA 21 | Siltstones, quartz stringers and sulphides and limonite |
| CINTA 22 | Interesting quartz stockwork |
| CINTA 23 | Siltstone and lots of fine quartz stockworks |
| CINTA 24 | Limonite siltstone and quartz stringers |
| STUDY 1 | Hard pieces at bottom of pit (conductor 3) Opaque crystals, red-brown, colourless (gypsum) |
| STUDY 2 | Smaller pieces at bottom of pit (conductor 3) |
| CINTA 25 | 2-3 feet across, angular, limonite on edge brownish and white stringers, trace mariposite |

# WEASAL LAKE PROJECT

The project is about 22 miles (34 KM) south-east of ROSS RIVER. Also it is about 6 miles (8-9 KM) north of the Robert Campbell Highway (in between is the Pelly River). Access will be by helicopter from Ross River.

It is in Watson Lake Mining DISTRICT on map 105G-13.

My target is VMS (KUROKO STYLE) ZN Pb Ag Cu (Au) similar in style to the KUDZE KAYAH and WOLVERINE VMS deposits owned by EXPATRIATE Res.

I have discussed this project with DON MURPHY, JEFF BOND (EDA geol.) and KEN GALAMBOS (YMIP GEOL.)

PROJECT BOUNDARIES

## REASONS for project

1. I want to diversify my claims groups (mostly GOLD)
2. VMS are 5 elements, a good diversification and in demand by many companies involved in MINERAL EXPLORATION.
3. Don Murphy is high on this area; he says the KUDZE KAYAH and WOLVERINE VMS deposits are only 60 KM away in YUKON TANANA Terrane and overlain by Slide Mountain Terrane

① 2

which contains ~~some~~ many basalts. He says the same geology is in my project area.

[4] In past area has been poorly explored because of lack of outcrop, low topography, and low values in stream geochemistry.

[5] SURFICIAL GEOL. + TILL GEOCHEMISTRY of WEASEL LAKE (105 G/13) YUKON by JEFF BOND. 2000

-230 mesh till samples suggest unknown mineral occurrences are present.

[6] JB00-076 is a clue to an unknown VMS occurrence.

KUROKO VMS geochem. signature!

| element | PPM | PERCENTILE % |
|---|---|---|
| Mo | 5.10 | +97 |
| Cu | 61.96 | +75 |
| Pb | 24.29 | +97 |
| Zn | 171.6 | +97 |
| Ag | 1153 | +97 |
| As | 21.8 | +75 |
| Sb | 4.32 | +95 |
| S | .48 | HIGHEST VALUE |
| Hg | 988 | +97 |
| Se | 3.5 | +99 |
| Tl (?) | .27 | +99 |

[7] A 2½ ~~3~~ mile long magnetic anomaly lies under JB00-076 and up glacial till movement and || to it (till movement).

JB00-083, 084, 085 are up till movement from JB00-076 and do not have a KUROKO VMS geoch. sig-

① 3

nature. Possibly the source of the JB00-076 till anomoly may be the mag. anomoly. (ie VMS are recessive + may form a depression → a lake)

[8] Ron Murphy says the KUDZE KAYAH VMS deposit is a stream silt geochem. anomoly and sits under a lake. The Wolverine VMS deposit was found by its "KILL ZONE." (caused by base metals killing the vegetation)! * a VMS occurrence may be under the LAKE which is up TILL movement from JB00-076.

[9] The area is close to a highway and so would be cheap to explore +/or develop.

GEOLOGY

Outcrops are quite rare. The project area is YUKON TANANA TERRANE.

CARBONIFEROUS + PERMIAN Age
anvil range group
andesite, basalt, slate, chert, limestone

(VMS = KUROKO type = Zn Pb Ag (Cu Au))

SLIDE MOUNTAIN TERRAIN is to the north and has more basalts (which are elevated on hills - resistant to weathering). It is younger and sits on top of YUKON TANANA terrane.

(VMS = Cu (Co Au) CYPRUS TYPE)

* Exact or approximate boundaries can not be easily marked because of extensive till, and lack of outcrop. Geology here is not fully understood here!

① 4

GOV'T GEOCHEMICAL SURVEY

No anomolies in area (streams) because of flat terrane and heavy till cover.

TILL GEOLOGY + SAMPLING

Not all till samples were uniform because of different till depths + forms. (Bond comm.)

Bond p. 83

till sample JB00-076

2.5 m ablation till

1.5 m Basal till

stream

Till depth at the lake is quite shallow and bedrock may be found NORTH and NORTHWEST of the lake.

Permafrost is strong south east of the lake.

MINERALIZATION

Numerous archer-cathro company claim groups are present. VMS targets???

NE corner of 105 F 16 SKATE claims, SE corner of 105 K 1 Breakaway claims, SW corner of 105 J 4 has none. To E + SE are the ASSIST, ICE, PLAY, DOT, REPLAY. On 105 F 14 is the ~~B~~ CYPRUS VMS Deposit (has reserves) Cu (Co Au). In Slide Mt TERRANE. In references are minfiles that are close by.

① 5

2001 PLANS (9-10 days)

I will go to project area by helicopter as soon as weather + snow allows. I will stake + record 24-28 claims over the magnetic anomaly.

The best place for a camp is north of the lake but I can not land by helicopter. (Bond comm.) I will drop my gear by sling + Net and land at a nearby swamp, walk over and cut out la helicopter landing pad.

*CAMPING ON TOP OF A PERSON'S WORK is VERY EFFICIENT - CUTS Down on WASTED TRAVEL TIME!*

Later I will return and prospect the area for about ~~20~~ 30 Odays!

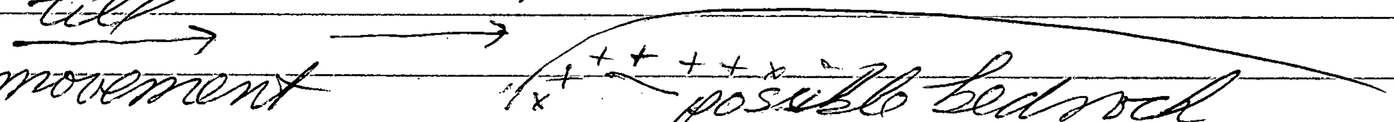
- I will use a BEEP MAT-N4
  - it is pulled along the ground
  - it can detect magnetite
    (+ conductive min.
    ((+sulphide conductors
    → (VMS mineralization)
  - It can detect conductors up to 3 meters deep
  - NB I plan to try the Beep Mat out in WHITEHORSE in the Cu-Au SKARNS, and become proficient at its operation
  - an appropiate grid will be done, flagged by tape, mapped

① 6

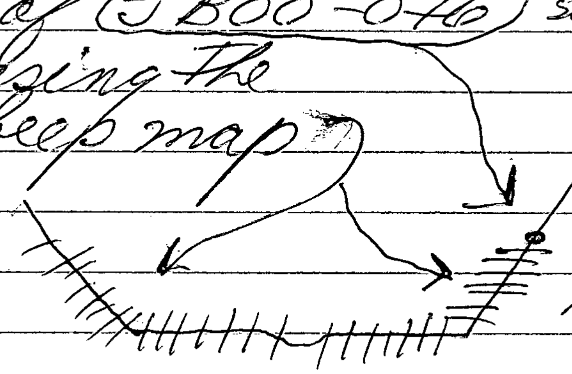
and plotted on the 24-28 claims -
- the better conductors/mag. areas will be done at a tighter grid and HAND TRENCHING will done + Samples taken and tested - Au + 30el ICP.

* N.B. it is possible mineralized boulders-rocks will be found in till · or min. bedrock itself

- Ridges will be prospected (Bond)




- Edges of Lakes - can be closer to bedrock because water/waves takes off some of the top till
- Check for mineralized clasts in area of (JB00-076) suggestion (BOND/MURPHY) using the beep map




- Streams silts will be done at 200 yard intervals + tested for Au + 30el ICP.

① 7

Upon completion of the project and season I will give to the YMIP a journal will all data, assays conclusions, maps, receipts etc and a TECHNICAL REPORT. All work will be done to "INDUSTRY STANDARDS" and all bills will be paid.

Reclamation and environmental WORK (PITS, CAMPS, TRENCHES, ACCESS, etc) will be done to "INDUSTRY STANDARDS" and as regulations are stated. Campsites will be cleaned up, all garbage will be removed and taken out.

① 8

## References


- SURFICIAL GEOLOGY + TILL GEOCHEM. OF WEASAL LAKE (105G/13) YUKON by JEFF BOND 2000.
- KELLY KD 1990
  INTERPRETATION OF DATA from ADMIRALTY ISLAND, ALASKA
  US GEOL SURVEY BULLETIN #1950
  p. A1-A9
- 105 G FINLAYSON LAKE MINFILE
  + MINFILES 105G049, 105G050
  105G051, 105G099
  105G111,
- 105 J minfiles (NORTHWEST OF PROJECT)
  105J018, 105J027, 105J028
- 105 K minfiles (NORTH of project)
  105K097, 105K098
- OPEN FILE 1648 - 1987 (GEOL/SILTS)
  105 G FINLAYSON LAKE
- OPEN FILE 486 - 1977
  105 G FINLAYSON LAKE
  DJ TEMPELMAN KLUIT
- GEOPHYSICAL PAPER - MAP 1404 G
  WEASEL LAKE YUKON TERR
- BEEP MAT ~~a THE INSTRUMENTATION~~
  INSTRUMENTATION GDD INC
  3700, boul de la Chaudière
  St. Foy Québec
  CANADA G1X 4B7

① 9

References

PERSONAL communication

- Don Murphy } EDA geologists
JEFF BOND }
- Ken Galambos } YMIP geologist
- JP Loiselle } prospector who owns
~~uses~~ a Beep Mat.

- GEOLOGY OF CANADIAN MINERAL
DEPOSIT TYPES
GSC Canada 1995

BEEP MAT
MINING ENVIRONMENTAL
NEVILLE CROSBY INDUSTRIES

# Geophysics

## Beep Mat BM-IV

A powerful, miniaturized survey instrument that efficiently and inexpensively detects conductive and magnetic outcrops or boulders hidden down to 1.5 metres of overburden. Its size, shape and weight allow it to be easily pulled through the bush.

When it beeps, you know that the conductor causing the anomaly is right under the Beep Mat. You can then immediately trench and take a sample for assay to determine if it is a valuable showing or a barren sulphide/graphite conductor.

**Features:**

- Magnetites and conductive materials each have a different audio signal and their relative value is displayed to help pin-point the high sulphide. Adjustable threshold audio alarm to signal conductors and/or magnetites.
- Sensor consists of a rugged waterproof unicoil inserted in a polyethylene shell.
- Large, bright dot matrix LCD displays clear, readable, simultaneous measurements of the conductivity and susceptibility (magnetites content) of the underlying material.
- Detects sulphide conductors such as: pyrite, pyrrhotite, chalcopyrite (Cu), graphite, pentlandite (Ni), galena (Pb), and even silver (Ag) or gold (Au) nugget's and veinlets.
- Continuous ground coverage (1o readings/second): detects even small near-surface sulphide veinlets.

**Physical Description:**

**Readout Meter:** Size 18 x 20 x 6.4 cm (7" x 8" x 2.5").

**Weight:** 1.9 kg (4.2 lb).

**Case:** Plastic with leather casing waterproof.

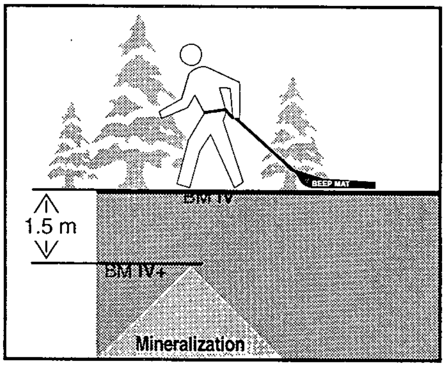
**Probe Size:** 30 x 91 x 7.6 cm (12" x 36" x 3").

**Weight:** 3.8 kg (8.4 lb).

**Case:** Shockproof, waterproof.

**Environmental:**

**Operating Temp.:** -10° C to 40° C (15° F to 104° F)




**Humidity:** Operates on all rainy, foggy or snowy days.

710-00082 **Each...$9,000.00**
**Rental/week** 190-00004...**$490.00**
**Yearly Maintenance Contract...$950.00**

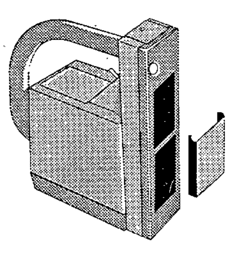
## Beep Mat BM-IV+

Faster and more sensitive, this improved unit can detect conductors up to 3 metres deep. It has been winterised for cold weather use.

**Each...$10,000.00 Rental / day...$80.00**
***One week minimum***

# Ultra Violet Lamps

## Portable UV Lamps



Uses 2 6 volt batteries. Wt: 4 lb (1.8 kg) with batteries.
Size: 9.5" x 2.8" x 9.4" (241 mm x 71 mm x 238 mm).

**UVG47:** 6W Short Wave (1350*) 137-00090...**$269.95**
**UVGL48:** 6W Long and Short Wave (930/710*) 137-00051...**$284.95**
**6v** Alkaline Heavy Duty 103-00001...**$11.45**

## Compact UV Lamps

**Uses 115 volt. Wt.: 1 lb (.45 kg). Size: 7.8" x 2.8" x 2.1" (198 mm x 71 mm x 53 mm).**

**UVG11:** 4W Short Wave (1120*) 137-00039 ..............**$209.95**
**UVGL15:** 4W Long and Short Wave (650/500*) 137-00041 ..............**$199.95**

*Relative intensities @ 3" (Om/cm2)*

## Mini UV Lamps

Great for occasional use. Have the same tube wattage as most of the larger ones but have significantly lower intensities. Uses 4 AA Batteries. Wt.: 8 oz. (.23 kg). Size: 6.5" x 1.25" x 1.75" (165 mm x 32 mm x 45 mm).

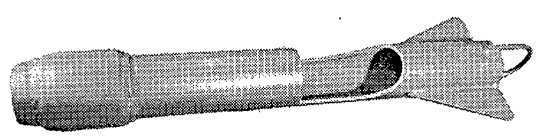
**UVL4:** 4W Long Wave (230*) 137-00038 ..............**$39.95**
**UVG4:** 4W Short Wave (170*) 137-00052 ..............**$59.95**
**UVSL14P:** 4W Long and Short Wave (113/68*) 137-90500 ..............**$89.95**

## Fluorescent Mineral Samples

3 Samples in display case. **Set** 137-00194 ..............**$19.95**

# Lake Bottom Sampler

Two fin style with stainless butterfly valve in weight tube bottom sampler. The valve has a protective crossbar and is designed to auto close on retrieval. Red plastic coated steel body allows for little cross contamination. These units have been used for thousands of samples. Tip can be resharpened.



**Lake Bottom Sampler** 126-00213 ..............**$449.95**

# Self-Potential Kit

Self-potential kits offer an inexpensive means to evaluate some sulphide deposits, including those containing pyrite, chalcopyrite and pyrrhotite. It will also identify bodies of graphite.

The kit includes 2 electrodes (pots), one spool with 300 metres of wire, millivolt meter and instructions.

These electrodes use a super-saturated solution of water and copper sulphate. Copper sulphate can be ordered from pharmacies, chemical companies and garden supply firms.

**Kit** 126-00401 ..............**$595.00**
**Spare Electrodes** 126-90010 ..............**$65.00**
**3/4 size Electrode** 126-90403 ..............**$65.00**

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WEASEL LAKE
2001 GRASSROOTS
PROJECT

# BUDGET

## 1ST TRIP

| | $ |
|---|---|
| DIEM 1 day to Ross River, 1 back 10 days/camp = 12 x $35 | 420 |
| GAS 360 KM x 2 x .42 | 302 |
| HELICOPTER in/out | 900 |
| TRUCK $1450/m x 1/2 m x 25% self own | 181 |
| RADIO $150/m x 1/2 x 25% self own | 18 |
| MISC | 200 |
| 1/2 = PROSPECT, 1/2 = CLAIMS | $2021 |

## 2ND TRIP

| | |
|---|---|
| DIEM 1 → RR, 1 back 30 days at camp 32 x $35 | 1120 |
| GAS | 302 |
| HELICOPTER | 900 |
| TRUCK $1450 x 1 x 25% self own | 362 |
| RADIO $150/m x 1 x 25% self own | 38 |
| BEEP MAT 30 days x 5 shipping time 35 x $80 day | 2800 |
| REPORT JP ROSS 4 days x $350 Bob STIRLING $200 | 340 |
| ASSAYS 60 ROCKS x $25 | 1500 |
| 25 SILTS x $25 | 625 |
| MISC Beep mat freight, ins. bags, etc. | 600 |
| | $8587 |

TOTAL = 2021 + 8587 = $10,608

WEASEL LAKE PROJECT ON CLAIMS MAPS

# SHEET 105G-13

LATITUDE 61° 45' To 62°00'
LONGITUDE 131° 30' To 132°00'

CANADA
DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
NORTHERN ADMINISTRATION AND LANDS BRANCH
LANDS DIVISION

SCALE 1/2 MILE To 1 INCH

ISSUED UNDER THE AUTHORITY OF THE MINISTER OF NORTHERN AFFAIRS AND NATIONAL RESOURCES

NOV 20, 2000

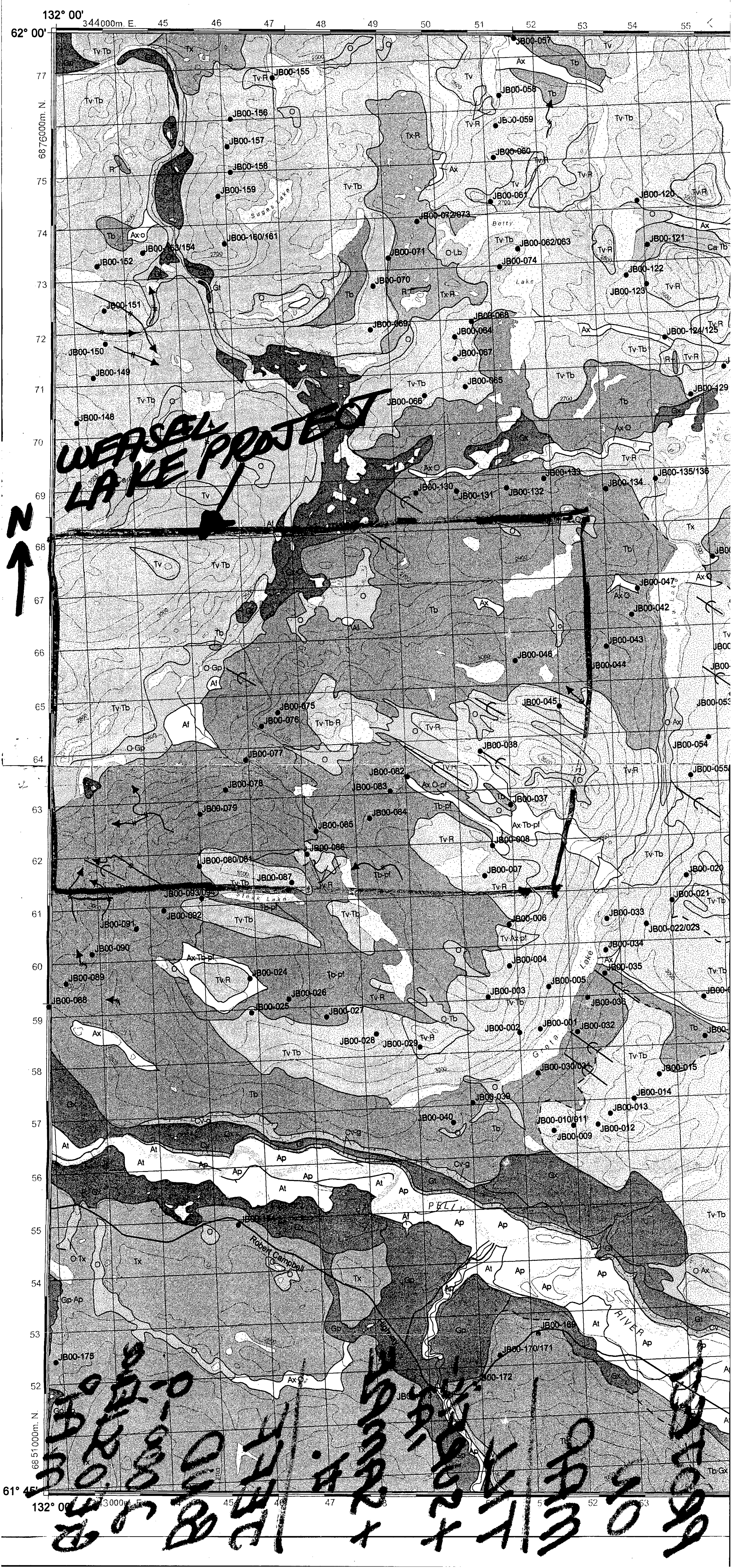
## NOTICE

THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS WHATSOEVER

SEE ADJACENT MAP SHEET(S) EDGES FOR ADJOINING MINERAL CLAIMS NOT SHOWN ON THIS MAP

I.G. INDIAN GRAVE SITE

WATSON LAKE MINING DISTRICT



132° 00'
344000m. E.
62° 00'
6876000m. N.
WEASEL LAKE PROJECT
N
Sugar Lake
Betty Lake
Steak Lake
Glacier Lake
PELLY RIVER
Robert Campbell
JB00-155
JB00-156
JB00-157
JB00-158
JB00-159
JB00-160/161
JB00-153/154
JB00-152
JB00-151
JB00-150
JB00-149
JB00-148
JB00-057
JB00-058
JB00-059
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JB00-062/063
JB00-074
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JB00-003
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JB00-001
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JB00-030/031
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JB00-013
JB00-012
JB00-010/011
JB00-009
JB00-039
JB00-040
JB00-091
JB00-092
JB00-090
JB00-089
JB00-088
JB00-024
JB00-025
JB00-026
JB00-027
JB00-028
JB00-029
JB00-169
JB00-170/171
JB00-172
JB00-175
68 51000m. N.
61° 45'

PROJECT ON MAP

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TILL + SURFIC-IAL + SAMPLE #.

---

JEFF BOND 2000-9 GEOSCIENCE MAP

# LEGEND FOR TILL GEOCHEM. MAP

● JB00-076 TILL GEOCH. SAMPLE

Tb — TILL Blanket
gentle to moderately sloping plain controlled by bedrock or underlying surficial deposits
=>1 meter thick

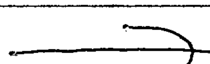
Tv — TILL VENEER conforms to underlying topography
=<1 meter thick

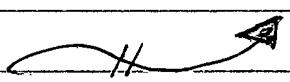
R — bedrock - small scattered outcrops of resistant rock.

pf — permafrost within 1 meter of surface

O — organics consisting of woody sedge peat of variable thickness

Af — alluvial fan, up to or >10m thick

 — alligned landform

 — meltwater channel

GEOCHEMISTRY DATA



survey area. This level of sample density provides a high level of regional information for future exploration.

The samples taken for geochemical analysis were representative of either basal till or colluviated basal till. ICP-MS instrumentation combined with an aqua-regia digestion were used to analyse the –230 mesh fraction of the till samples. The geochemical results indicated numerous anomalies in base metals, gold and platinum group pathfinders. They include:

- Potential epithermal gold mineralization in the northwest corner of the map area. This is supported by a multi-element anomaly in Hg, Sb, Ag, As, Au and Tl at station JB00-155. This may be related to the Finlayson Lake fault zone and Tertiary mafic volcanics in the area.
- Base metal anomalies in zinc and copper in the western part of the map area. Anomalies occur both within Yukon-Tanana Terrane and in ancient North American rocks of the Cassiar Platform. Most anomalies are not associated with current claim holdings in the area.
- Clusters of platinum group element pathfinders in the northeast part of the map area. These coincide with mafic basalts.

## ACKNOWLEDGEMENTS

Funding for this project was provided by the Yukon Geology Program, consisting of Yukon Economic Development and Indian and Northern Affairs Canada, Exploration and Geological Services Division. Many thanks are owed to Jeffrey Boyce for assisting with the field program and for contributing to its success. Much appreciated assistance was also provided by Cheryl Peters, Victor Bond, Lara Melnik and Darren Holcombe. Exceptional transportation services were provided by Brian and Warren at Inconnu Lodge/Kluane Airways. Thanks also to Inconnu Lodge for their hospitality and expediting service. Much appreciated assistance was gained from Gordon Nevin and Gary Stronghill at the Yukon Geology Program for pulling together the geochemical figures and surficial geology map. Thanks to Leyla Weston and Bill LeBarge for editing this paper.

## REFERENCES

Bobrowsky, P.T., Paulen, R., Little, E., Prebble, A., Ledwon, A. and Lett, R., 1998. Till geochemistry of the Louis Creek-Chu Chua Creek area (NTS 92P/1E and 92P/8E). British Columbia Ministry of Energy, Mines and Petroleum Resources, Open File 1998-6.

Bond, J.D., 2000. Surficial geology and till geochemistry of Weasel Lake (105G/13), central Yukon (1:50 000 scale). Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 2000-9.

Eyles, N., 1983. Glacial Geology: A Landsystems Approach. *In:* Glacial Geology - An Introduction for Engineers and Earth Scientists, N. Eyles (ed.), Pergamon Press, Britain, p. 1-18.

Gordey, S.P. and Makepeace, A.J., 1999. Yukon Digital Geology. S.P. Gordey and A.J. Makepeace (comp.), Geological Survey of Canada, Open File D3826, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1999-1(D).

Hoffman, S.J., 1986. Geothermal Exploration - The Soil Survey. *In:* Exploration Geochemistry: Design and Interpretation of Soil Surveys, J.M. Robertson (ed.), Society of Economic Geologists, Reviews in Economic Geology, vol. 3, p. 19-38.

Hornebrook, E.H.W. and Friske, P.W.B., 1988. Regional Stream and Water Geochemical Data, Southeastern Yukon (105G). Geological Survey of Canada, Open File 1648.

Jackson, L.E. Jr., 1994. Terrain inventory and Quaternary history of Pelly River area, Yukon Territory. Geological Survey of Canada, Memoir 437, 41 p.

Yukon MINFILE, 1997. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

Metal mobility from solid mine wastes

Soluble sulfate salt minerals derived from weathering and oxidation of sulfide minerals in mine dumps and tailings piles represent a potential source of metal contamination and acid generation. As percolating surface and ground water evaporates during dry periods, efflorescent metal-sulfate salt minerals form encrustations around and below the base of the piles, which effectively stores acidity and metals released during sulfide mineral breakdown. Subsequent rainfall or snowmelt following a dry period is likely to release a highly concentrated pulse of acid mine water. Mine dumps associated with lead-rich VMS deposits (Kuroko-type) may be a source of lead contamination due to high concentrations of soluble secondary lead minerals.

Secondary minerals in tailings impoundments include a variety of iron oxyhydroxides (goethite, lepidocrocite, akaganeite, maghemite, and ferrihydrite), sulfates (gypsum, bassanite, jarosite, hydronium jarosite, melanterite, goslarite, ferrohexahydrite, epsomite, hexahydrite, siderotil, rozenite, anglesite, alunogen, and copiapite), and minerals such as marcasite, covellite, and native sulfur (Jambor, 1994). Pore water from tailings impoundments associated with the Heath Steele, New Brunswick, deposit are acidic (pH 1.8 to 5.2), have Eh of 280 to 580 mV, and contain significant dissolved metal abundances, including 0.3 to 600 mg/l copper, 0.8 to 11 mg/l lead, 23 to 4,880 mg/l zinc, 1,200 to 36,000 mg/l iron, and 600 to 67,600 mg/l sulfate (Boorman and Watson, 1976). Similarly, pore water from tailings impoundments associated with the Waite Amulet, Quebec, deposit are acidic (pH 2.5 to 6.0), have Eh of 200 to 700 mV, and contain significant dissolved metal abundances, including as much as 65 mg/l copper, as much as 5 mg/l lead, as much as 250 mg/l zinc, as much as 8,000 mg/l iron, and as much as 20,000 mg/l sulfate (Blowes and Jambor, 1990). Finally, pore water from tailings impoundments associated with the Kidd Creek, Ontario, deposit are acidic (pH 3.5 to 7.5), have Eh of 50-500 mV, and contain significant dissolved metal abundances, including 0 to 38 mg/l copper, 0 to 2 mg/l lead, 0 to 6,200 mg/l zinc, 0 to 350 $\mu$g/l arsenic, 1 to 990 mg/l iron, and 1,860 to 27,000 mg/l sulfate (Al and others, 1994).

Extremely fine grinding required for beneficiation of VMS ore may enhance airborne transport of lead-arsenic-cadmium-antimony-bearing dust. This phenomenon is most probable in semi-arid to arid regions in which strong winds prevail.

Soil, sediment signatures prior to mining

The elemental suite and magnitude of geochemical anomalies in soil and sediment collected from undisturbed VMS deposits depend upon a number of factors, including VMS deposit type, extent of ore outcrop or overburden, climate, topography, etc. Stream sediment samples collected below Kuroko-type deposits in temperate rain forest on Admiralty Island, Alaska, contain 5 to 10 weight percent iron, as much as 10,000 ppm barium, hundreds to several thousand ppm zinc, hundreds of ppm lead, tens to hundreds of ppm arsenic, copper, and nickel, as well as 0 to 20 ppm silver, bismuth, cadmium, mercury, molybdenum, and antimony (Kelley, 1990; Rowan and others, 1990; Taylor and others, 1992; C.D. Taylor, unpub. data, 1995).

Stream sediment geochemical signatures associated with undisturbed to variably disturbed Cyprus and Besshi VMS deposits in the Prince William Sound, Alaska, are similar to those just described. They contain 10 to 40 weight percent iron, several hundred ppm barium, hundreds of ppm arsenic and zinc, tens to hundreds of ppm lead, hundreds to thousands of ppm copper, and 0 to 20 ppm silver, bismuth, mercury, molybdenum, and antimony (R.J. Goldfarb, unpub. data, 1995).

Potential environmental concerns associated with mineral processing

Tailings ponds below mills are likely to contain high abundances of lead, zinc, cadmium, bismuth, antimony, and cyanide and other reactants used in flotation and recovery circuits. Highly pyritic-pyrrhotitic orebodies that are exposed to oxidation by air circulating through open adits, manways, and exploration drill holes may evolve $SO_2$ gas; in some cases, spontaneous combustion can cause sulfide ore to burn. Tailings that contain high percentages of non-ore iron sulfide minerals have extremely high acid-generating capacity. Surficial stockpiles of high-sulfide mineral ore are also potential sources of metal-rich mine water.

Smelter signatures

Most base-metal rich ore concentrates are smelted. In most cases, concentrates are shipped to custom smelters, and therefore do not contribute to the environmental impact in the immediate mine vicinity. Larger districts are often served by a smelter co-located in the district. Data compiled by Gulson and others (1994) document the relationship between lead in soil near smelters and blood lead in children; similar data for the Leadville, Colo., area indicate similar trends. Additional data may be available for the Trail, British Columbia and El Paso, Tex. smelters.

ACME ANALYTICAL

# Yukon Geology Program FILE # A003918



ACME ANALYTICAL

| SAMPLE# | Mo ppm | Cu ppm | Pb ppm | Zn ppm | Ag ppb | Ni ppm | Co ppm | Mn ppm | Fe % | As ppm | U ppm | Au ppb | Th ppm | Sr ppm | Cd ppm | Sb ppm | Bi ppm | V ppm | Ca % | P % | La ppm | Cr ppm | Mg % | Ba ppm | Ti % | B ppm | Al % | Na % | K % | W ppm | Sc ppm | Tl ppm | S % | Hg ppb | Se ppm | Te ppm | Ga ppm | Sample gm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JB00-062 | 2.22 | 66.65 | 13.58 | 144.4 | 428 | 74.3 | 8.1 | 225 | 2.46 | 19.9 | 1.0 | 9.2 | 5.5 | 28.4 | .33 | 3.58 | .19 | 39 | .20 | .045 | 19.9 | 28.8 | .20 | 663.9 | .013 | 2 | .52 | .005 | .05 | <.2 | 3.6 | .14 | .03 | 1981 | 1.3 | .07 | 1.4 | 30.0 |
| JB00-063 | 2.34 | 67.21 | 14.23 | 149.0 | 572 | 74.9 | 8.2 | 256 | 2.53 | 21.4 | 1.0 | 9.1 | 5.4 | 29.4 | .37 | 3.70 | .20 | 40 | .24 | .050 | 19.4 | 29.3 | .23 | 688.5 | .013 | 1 | .52 | .007 | .06 | <.2 | 3.4 | .14 | .04 | 1970 | 1.4 | .08 | 1.5 | 30.0 |
| JB00-064 | 3.58 | 96.14 | 15.89 | 153.5 | 942 | 106.7 | 13.5 | 673 | 3.03 | 15.1 | 1.5 | 11.9 | 4.6 | 34.5 | .31 | 3.69 | .26 | 53 | .34 | .066 | 17.6 | 35.3 | .35 | 2905.9 | .009 | 1 | .85 | .008 | .09 | <.2 | 4.7 | .15 | .08 | 1062 | 1.9 | .11 | 2.1 | 30.0 |
| JB00-065 | 1.96 | 40.84 | 15.14 | 94.7 | 332 | 62.6 | 8.5 | 297 | 2.27 | 13.4 | 1.4 | 5.3 | 5.4 | 27.4 | .20 | 2.11 | .19 | 45 | .31 | .089 | 19.6 | 43.2 | .45 | 487.9 | .016 | 2 | .93 | .012 | .10 | <.2 | 4.5 | .14 | .02 | 223 | .8 | .05 | 2.3 | 30.0 |
| JB00-066 | 1.67 | 52.51 | 11.32 | 79.8 | 644 | 53.9 | 7.5 | 297 | 1.99 | 11.7 | .9 | 9.0 | 4.0 | 39.7 | .25 | 2.08 | .17 | 38 | .84 | .069 | 17.0 | 31.2 | .47 | 696.7 | .010 | 1 | .86 | .010 | .07 | .2 | 3.4 | .09 | .02 | 309 | .7 | .05 | 2.0 | 30.0 |
| JB00-067 | 2.59 | 55.50 | 14.29 | 111.9 | 109 | 94.3 | 12.7 | 394 | 2.76 | 18.2 | 1.3 | 8.2 | 4.9 | 20.0 | .29 | 2.31 | .21 | 49 | .17 | .060 | 19.0 | 47.1 | .32 | 506.4 | .018 | 1 | .83 | .008 | .11 | <.2 | 4.9 | .15 | <.01 | 529 | 1.4 | .06 | 1.8 | 30.0 |
| JB00-068 | 2.27 | 70.20 | 11.84 | 95.4 | 755 | 190.7 | 14.0 | 406 | 2.48 | 12.4 | .9 | 6.1 | 2.2 | 83.3 | .83 | 3.38 | .17 | 28 | 5.75 | .104 | 10.3 | 57.1 | 1.11 | 801.3 | .006 | 2 | .55 | .009 | .07 | <.2 | 2.6 | .11 | .08 | 542 | 1.2 | .07 | 1.5 | 30.0 |
| JB00-069 | 2.43 | 74.62 | 12.54 | 110.1 | 259 | 69.4 | 8.9 | 331 | 2.82 | 12.3 | 1.1 | 10.7 | 4.7 | 18.7 | .19 | 2.33 | .21 | 42 | .19 | .050 | 16.5 | 26.7 | .24 | 702.4 | .011 | 1 | .70 | .010 | .08 | <.2 | 4.4 | .12 | .02 | 475 | 1.4 | .08 | 1.6 | 30.0 |
| JB00-070 | 3.92 | 62.70 | 19.62 | 144.8 | 790 | 106.5 | 9.6 | 418 | 2.78 | 17.2 | .9 | 8.8 | 3.3 | 60.2 | .82 | 3.15 | .22 | 34 | 1.13 | .101 | 11.7 | 35.6 | .67 | 586.8 | .007 | 1 | .60 | .011 | .05 | <.2 | 4.4 | .19 | .05 | 545 | 1.8 | .06 | 1.5 | 30.0 |
| JB00-071 | 1.74 | 55.75 | 11.36 | 95.8 | 284 | 151.6 | 11.0 | 375 | 2.72 | 11.2 | .8 | 4.7 | 4.2 | 22.2 | .19 | 2.18 | .17 | 45 | .24 | .047 | 16.0 | 50.7 | .43 | 579.8 | .008 | 1 | .74 | .009 | .06 | .2 | 6.4 | .14 | .02 | 273 | .8 | .09 | 1.9 | 30.0 |
| JB00-072 | .70 | 63.25 | 4.97 | 46.5 | 169 | 420.8 | 36.5 | 604 | 2.86 | 5.0 | .4 | 2.9 | 1.3 | 144.1 | .60 | 1.00 | .05 | 45 | 6.79 | .059 | 5.0 | 173.1 | 3.79 | 900.5 | .006 | 2 | .86 | .009 | .03 | <.2 | 9.6 | .08 | .04 | 405 | .3 | .04 | 2.5 | 30.0 |
| JB00-073 | .66 | 65.66 | 4.75 | 44.3 | 153 | 409.3 | 34.7 | 592 | 2.83 | 4.8 | .4 | 1.8 | 1.3 | 139.4 | .60 | .97 | .05 | 47 | 6.58 | .058 | 4.7 | 164.8 | 3.44 | 890.1 | .006 | 2 | .85 | .009 | .04 | <.2 | 9.2 | .08 | .06 | 373 | .3 | .03 | 2.3 | 30.0 |
| JB00-074 | 2.14 | 44.54 | 11.96 | 94.9 | 255 | 53.4 | 7.9 | 219 | 2.39 | 15.8 | .9 | 5.8 | 4.5 | 18.9 | .20 | 2.91 | .17 | 40 | .14 | .043 | 16.7 | 27.7 | .24 | 363.5 | .010 | <1 | .65 | .007 | .07 | <.2 | 4.0 | .13 | .04 | 1164 | 1.3 | .05 | 1.5 | 30.0 |
| JB00-075 | 1.77 | 55.14 | 17.58 | 88.0 | 471 | 118.4 | 12.2 | 455 | 2.41 | 17.8 | .8 | 7.0 | 3.4 | 76.4 | .69 | 3.11 | .20 | 34 | 2.39 | .091 | 11.9 | 59.5 | 1.05 | 604.7 | .013 | 2 | .95 | .010 | .07 | <.2 | 4.0 | .11 | .03 | 278 | .7 | .04 | 2.5 | 30.0 |
| JB00-076 | 5.10 | 61.96 | 24.29 | 171.6 | 1153 | 106.3 | 18.8 | 629 | 2.76 | 21.8 | 2.0 | 6.0 | 4.5 | 92.9 | 1.78 | 4.32 | .28 | 38 | 2.13 | .114 | 8.3 | 46.0 | 1.12 | 377.7 | .010 | 1 | .91 | .017 | .13 | <.2 | 3.2 | .27 | .48 | 988 | 3.5 | .10 | 2.5 | 30.0 |
| JB00-077 | 5.83 | 47.19 | 19.10 | 134.8 | 434 | 54.3 | 14.2 | 517 | 3.41 | 11.2 | 1.2 | 2.0 | 5.4 | 64.9 | 1.16 | 2.20 | .35 | 19 | 1.38 | .075 | 4.3 | 29.3 | 1.03 | 282.2 | .010 | 1 | 1.45 | .009 | .13 | <.2 | 3.7 | .21 | .17 | 298 | 2.0 | .08 | 3.8 | 30.0 |
| JB00-078 | 2.38 | 72.27 | 15.97 | 147.1 | 314 | 73.8 | 14.4 | 639 | 3.07 | 16.0 | .9 | 6.4 | 6.1 | 38.8 | .89 | 2.53 | .29 | 42 | .43 | .118 | 19.1 | 43.4 | .62 | 509.0 | .022 | 3 | 1.10 | .007 | .17 | <.2 | 3.7 | .15 | .02 | 264 | .9 | .10 | 2.9 | 30.0 |
| JB00-079 | 2.29 | 73.45 | 13.42 | 131.8 | 525 | 55.8 | 9.3 | 348 | 2.25 | 13.2 | 1.3 | 5.4 | 4.9 | 58.7 | 1.13 | 2.54 | .21 | 45 | 1.40 | .083 | 15.7 | 44.1 | .59 | 738.3 | .015 | 3 | 1.03 | .006 | .18 | <.2 | 3.4 | .12 | .03 | 170 | 1.0 | .10 | 2.7 | 30.0 |
| JB00-080 | 1.83 | 62.26 | 12.20 | 114.7 | 187 | 62.7 | 10.9 | 461 | 2.78 | 14.3 | .9 | 6.7 | 5.7 | 23.4 | .21 | 1.98 | .21 | 45 | .27 | .051 | 22.8 | 40.9 | .51 | 711.9 | .020 | 1 | 1.29 | .006 | .15 | <.2 | 3.6 | .11 | <.01 | 200 | .7 | .07 | 2.9 | 30.0 |
| CONTROL STANDARD 4 | 15.00 | 225.18 | 40.84 | 56.0 | 160 | 14.6 | 6.0 | 292 | 3.18 | 98.3 | 2.4 | 4.0 | 12.2 | 9.6 | .14 | .78 | 45.64 | 42 | .12 | .074 | 29.4 | 25.6 | .48 | 77.6 | .124 | 1 | 1.74 | .030 | .28 | 150.1 | 3.6 | .30 | .05 | <5 | .4 | .18 | 5.4 | 7.5 |
| JB00-081 | 1.81 | 64.63 | 12.96 | 117.6 | 197 | 67.1 | 11.8 | 467 | 2.90 | 15.6 | .9 | 10.7 | 6.1 | 25.2 | .21 | 2.13 | .23 | 45 | .30 | .060 | 23.8 | 41.5 | .53 | 717.5 | .019 | 2 | 1.29 | .007 | .14 | .8 | 3.7 | .12 | <.01 | 196 | .6 | .05 | 2.9 | 30.0 |
| JB00-082 | 1.76 | 40.19 | 12.91 | 94.5 | 289 | 53.8 | 11.2 | 448 | 2.45 | 11.3 | .7 | 4.2 | 5.1 | 70.5 | .81 | 1.63 | .22 | 34 | 1.88 | .085 | 15.7 | 41.8 | .93 | 546.1 | .015 | 2 | 1.27 | .011 | .12 | <.2 | 3.0 | .11 | .01 | 140 | .5 | .04 | 3.4 | 30.0 |
| RE JB00-082 | 1.76 | 42.99 | 12.84 | 97.2 | 309 | 55.3 | 11.0 | 462 | 2.51 | 11.1 | .8 | 3.7 | 5.2 | 72.8 | .75 | 1.64 | .23 | 34 | 1.92 | .087 | 16.3 | 42.2 | .94 | 566.4 | .015 | 2 | 1.29 | .011 | .12 | <.2 | 3.1 | .11 | .04 | 151 | .6 | .05 | 3.5 | 30.0 |
| JB00-083 | 1.93 | 69.58 | 15.75 | 111.6 | 377 | 102.2 | 16.4 | 610 | 3.14 | 18.5 | .9 | 5.5 | 6.3 | 28.7 | .27 | 2.36 | .27 | 52 | .47 | .063 | 22.4 | 60.3 | .87 | 749.2 | .020 | 2 | 1.46 | .008 | .14 | <.2 | 5.1 | .12 | .03 | 217 | .7 | .03 | 3.8 | 30.0 |
| JB00-084 | 2.00 | 51.61 | 15.27 | 126.7 | 194 | 69.0 | 13.3 | 560 | 2.85 | 15.5 | .8 | 4.5 | 5.5 | 41.1 | .74 | 2.21 | .27 | 49 | .71 | .111 | 16.6 | 48.5 | .82 | 730.9 | .018 | 2 | 1.41 | .009 | .16 | <.2 | 3.9 | .15 | .01 | 174 | .5 | .06 | 3.8 | 30.0 |
| JB00-085 | 1.86 | 57.21 | 12.50 | 102.8 | 147 | 63.3 | 12.2 | 518 | 2.86 | 14.8 | 1.6 | 8.6 | 5.6 | 25.0 | .25 | 2.12 | .22 | 48 | .32 | .035 | 20.6 | 47.7 | .60 | 628.5 | .021 | 2 | 1.25 | .007 | .13 | <.2 | 4.2 | .11 | <.01 | 211 | 1.0 | .07 | 3.0 | 30.0 |
| JB00-086 | 3.08 | 60.63 | 13.54 | 118.2 | 75 | 51.8 | 9.3 | 404 | 2.86 | 14.2 | 2.1 | 6.2 | 5.2 | 21.0 | .37 | 2.45 | .22 | 40 | .13 | .048 | 19.3 | 43.7 | .43 | 461.9 | .012 | <1 | 1.01 | .004 | .07 | <.2 | 2.8 | .08 | .03 | 212 | 2.4 | .06 | 2.4 | 30.0 |
| JB00-087 | 2.64 | 61.12 | 12.19 | 119.1 | 68 | 54.3 | 8.7 | 414 | 2.61 | 12.8 | 2.4 | 7.5 | 5.0 | 20.4 | .25 | 2.22 | .22 | 34 | .21 | .063 | 19.9 | 31.5 | .38 | 436.9 | .014 | 1 | .92 | .004 | .12 | <.2 | 2.8 | .09 | .04 | 193 | 1.3 | .06 | 2.0 | 30.0 |
| JB00-088 | 1.35 | 44.33 | 13.10 | 73.8 | 422 | 74.2 | 12.4 | 521 | 2.30 | 15.7 | .7 | 5.3 | 4.7 | 29.3 | .31 | 1.94 | .21 | 38 | .54 | .081 | 17.7 | 37.7 | .66 | 850.6 | .026 | 1 | .99 | .013 | .15 | .3 | 3.2 | .19 | .04 | 165 | .6 | .02 | 2.6 | 30.0 |
| JB00-089 | 1.62 | 48.41 | 15.63 | 92.2 | 372 | 73.9 | 12.8 | 459 | 2.66 | 18.6 | 1.2 | 5.7 | 6.2 | 26.2 | .22 | 2.50 | .26 | 47 | .38 | .091 | 22.7 | 44.3 | .59 | 495.9 | .021 | 2 | 1.21 | .011 | .16 | .3 | 3.9 | .14 | .01 | 187 | .8 | .04 | 3.1 | 30.0 |
| JB00-090 | .85 | 25.52 | 9.82 | 62.3 | 166 | 34.5 | 6.4 | 302 | 1.72 | 11.1 | .6 | 2.7 | 3.7 | 79.3 | .55 | 1.13 | .15 | 22 | 2.86 | .103 | 13.7 | 25.9 | .73 | 481.7 | .017 | 1 | .77 | .011 | .06 | .2 | 2.1 | .08 | .03 | 92 | .4 | <.02 | 1.9 | 30.0 |
| JB00-091 | 1.42 | 44.25 | 11.37 | 95.0 | 101 | 44.7 | 9.1 | 315 | 2.28 | 11.2 | .9 | 6.2 | 4.4 | 18.2 | .15 | 1.82 | .16 | 33 | .13 | .038 | 17.6 | 38.2 | .49 | 450.7 | .015 | 1 | 1.01 | .006 | .10 | <.2 | 3.7 | .08 | .02 | 139 | 1.0 | .04 | 2.5 | 30.0 |
| JB00-092 | 1.31 | 38.09 | 16.10 | 122.7 | 350 | 43.4 | 11.9 | 384 | 2.54 | 12.6 | .6 | 3.8 | 4.5 | 21.8 | .33 | 1.39 | .23 | 37 | .32 | .062 | 18.2 | 35.9 | .57 | 700.5 | .022 | 1 | 1.09 | .007 | .10 | .2 | 2.7 | .09 | .02 | 72 | .4 | .02 | 2.9 | 30.0 |
| STANDARD DS2 | 14.36 | 124.63 | 33.47 | 153.4 | 258 | 34.4 | 11.9 | 808 | 3.01 | 58.4 | 19.6 | 196.5 | 3.7 | 28.9 | 10.21 | 9.97 | 10.65 | 74 | .52 | .086 | 15.6 | 160.1 | .58 | 159.1 | .089 | 2 | 1.68 | .028 | .15 | 7.4 | 3.0 | 1.81 | .03 | 239 | 2.1 | 1.85 | 5.6 | 30.0 |

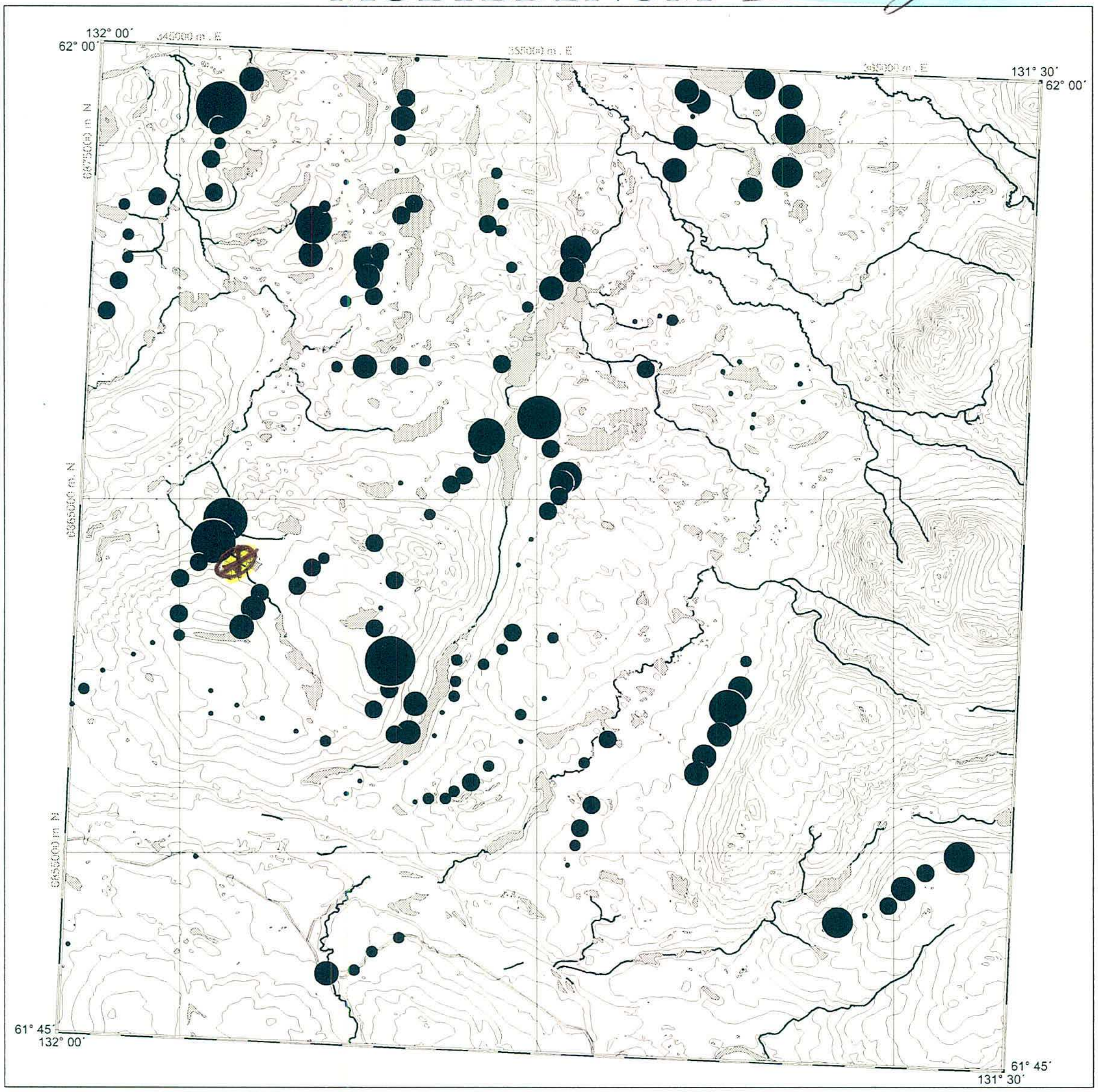
Sample type: TILL S230 60C. Samples beginning 'RE' are Reruns and 'RRE' are Reject Reruns.



Data FA

(X) APROXIMATE CENTER FOR POSSIBLE KUROKO VMS TARGET.

# MOLYBDENUM




N

| %tile Range | ppm |
|---|---|
| 0 - 25 | 0 - 1.53 |
| 25.1 - 50 | 1.531 - 1.815 |
| 50.1 - 75 | 1.816 - 2.383 |
| 75.1 - 90 | 2.383 - 3.128 |
| 90.1 - 95 | 3.129 - 3.623 |
| 95.1 - 97 | 3.624 - 4.297 |
| 97.1 - 99 | 4.298 - 6.576 |
| 99.1 - 100 | 6.577 - 7.9 |

| | | |
|---|---|---|
| 105K/1 | 105J/4 | 105J/3 |
| 105F/16 | 105G/13 | 105G/14 |
| 105F/9 | 105G/12 | 105G/11 |

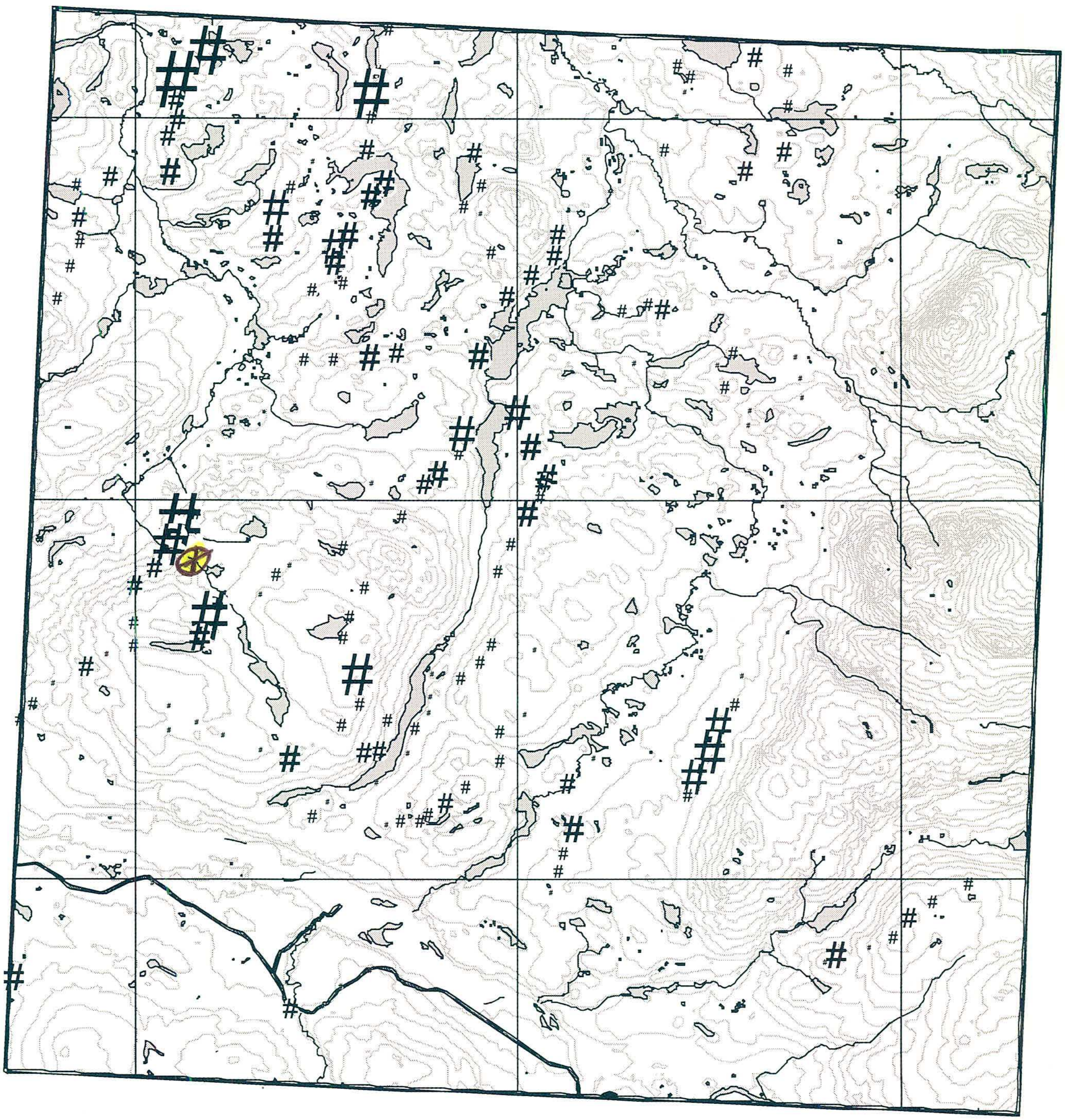
105g13
National Topographic System
Transverse Mercator Projection
NAD 1983
UTM Grid Zone 9

# Mo

2 0 2 4 6
Kilometers

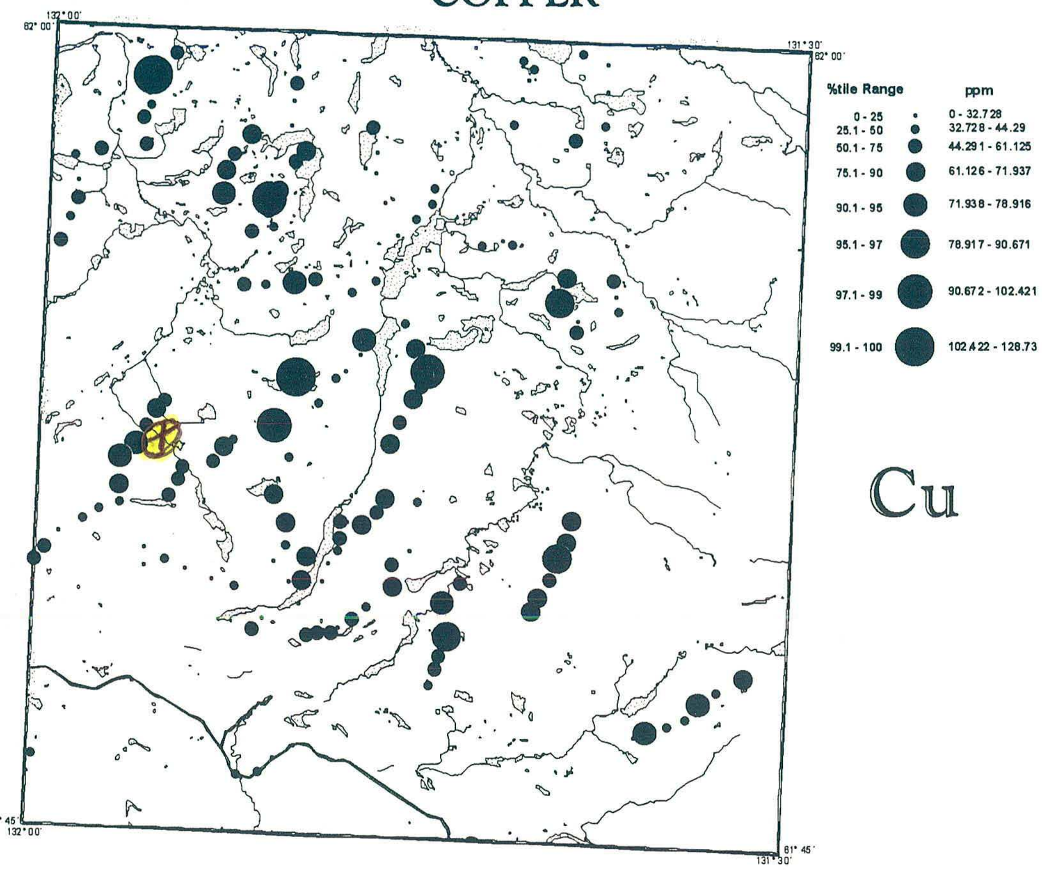
YUKON
GEOLOGY PROGRAM

# Selenium Se

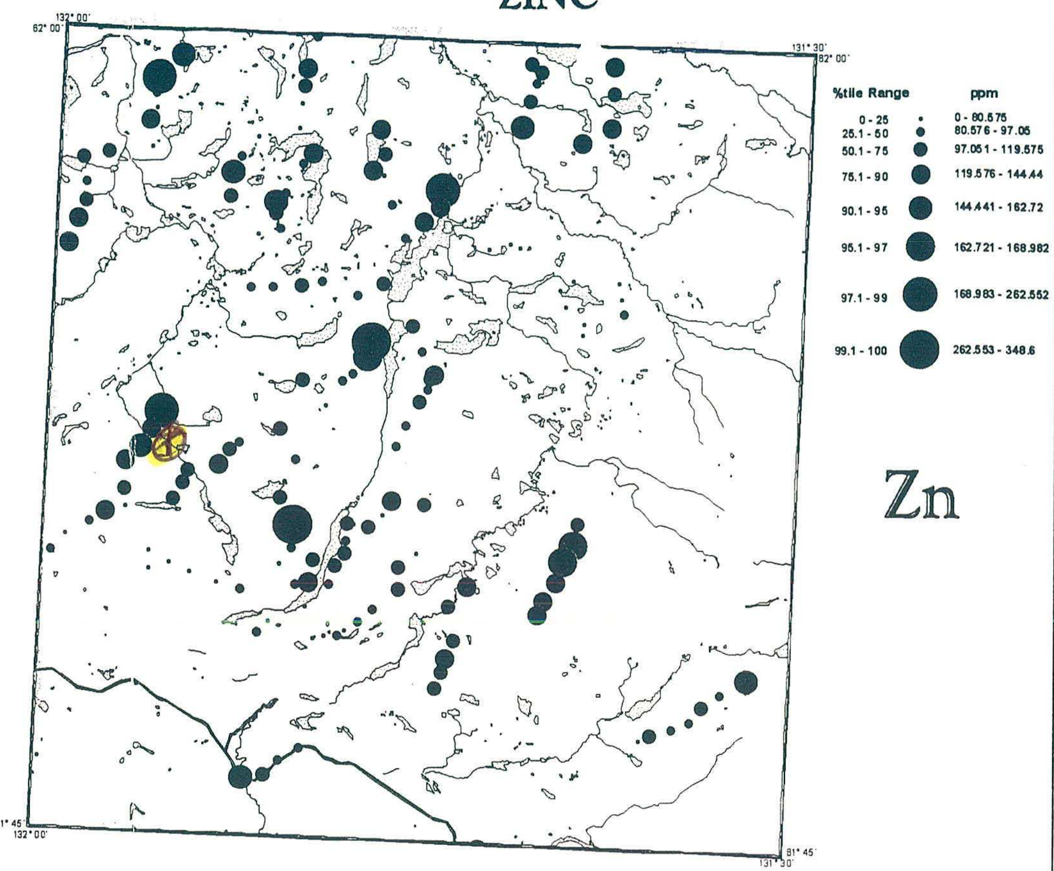


105K/1

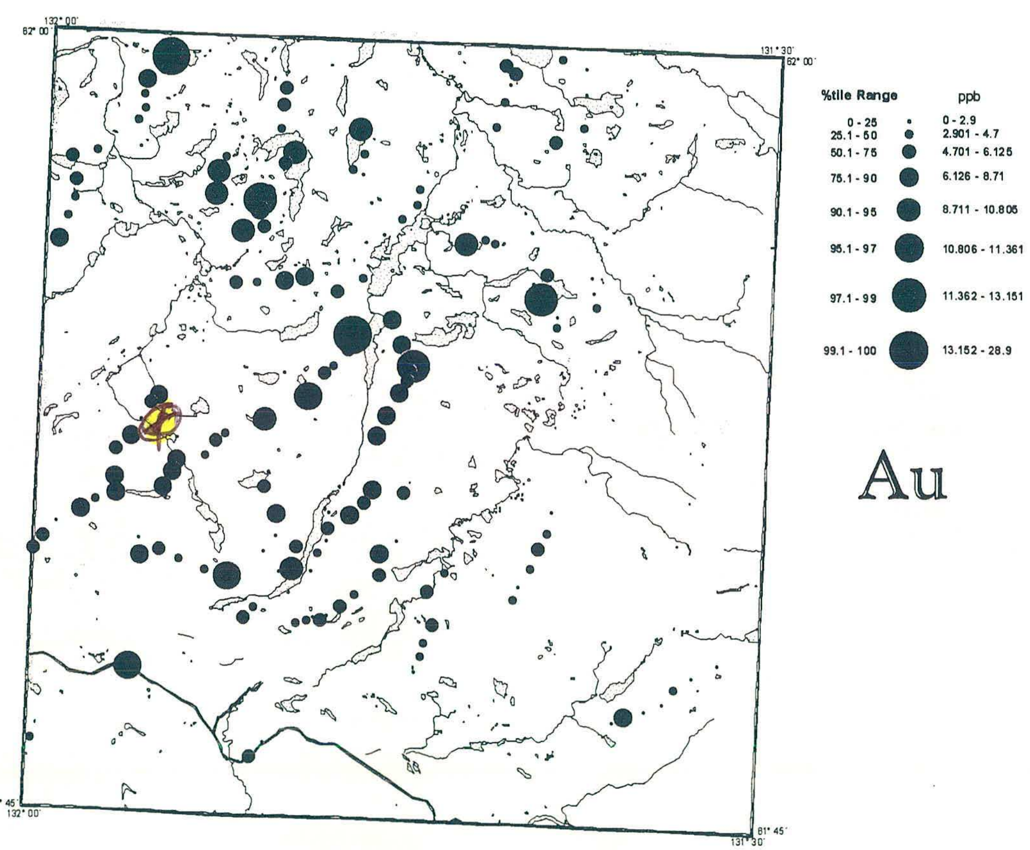
## COPPER



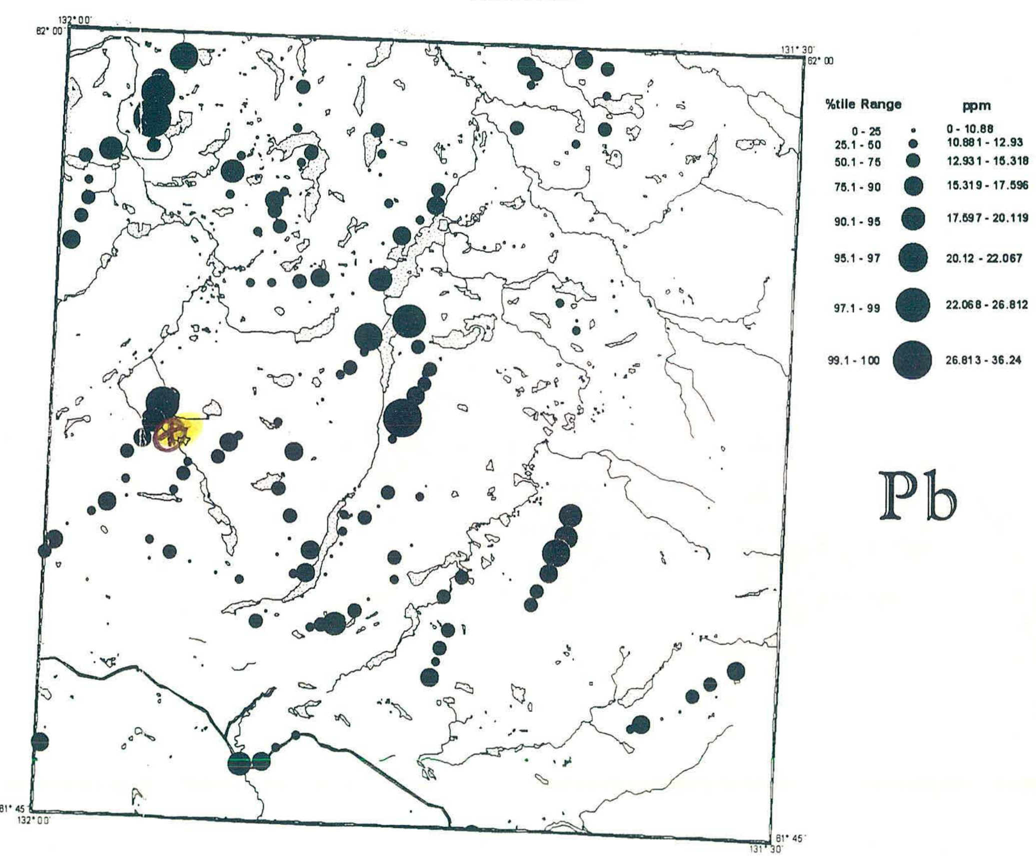

## ZINC



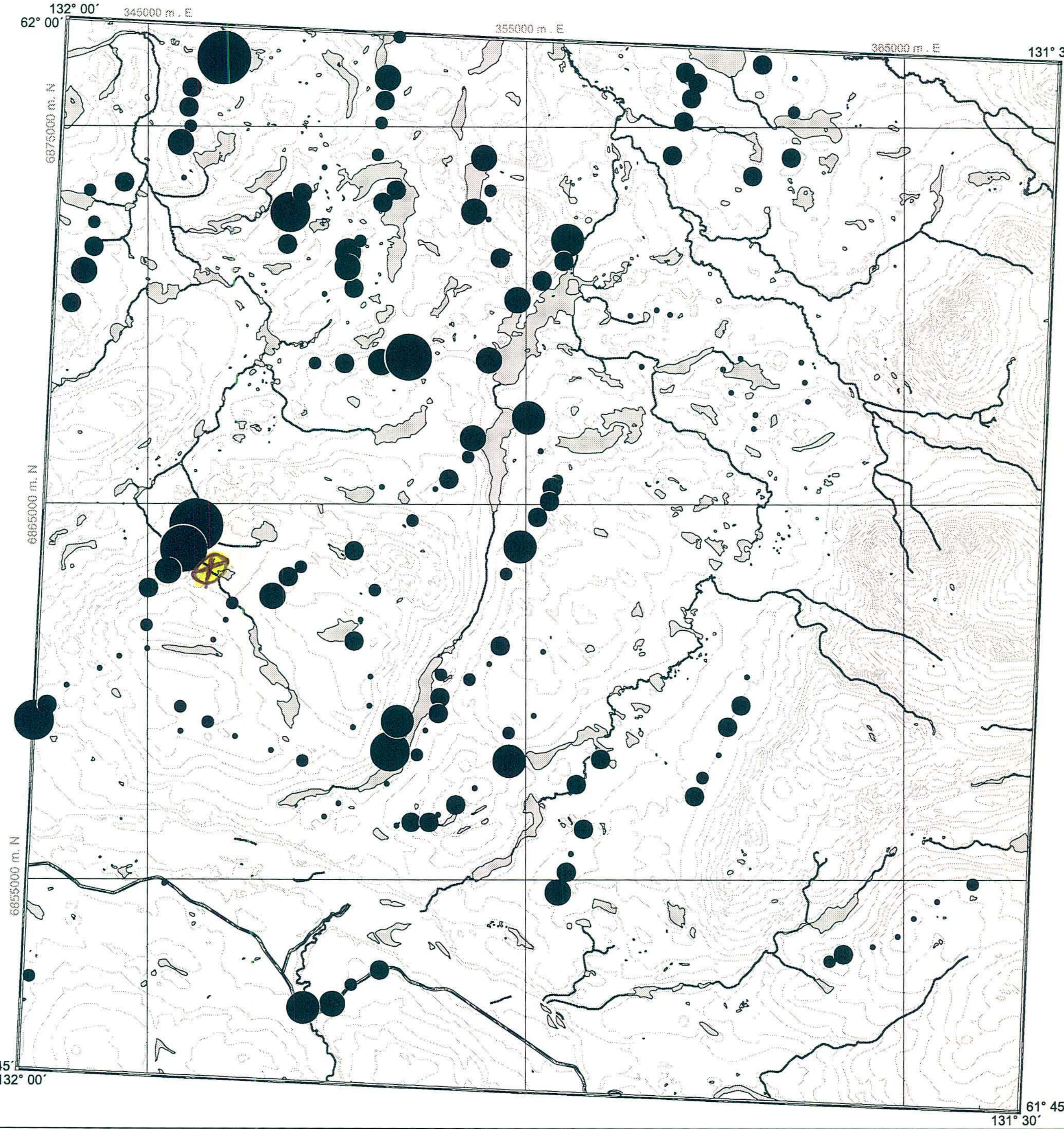

## GOLD




## LEAD



# THALLIUM




| %tile Range | ppm |
|---|---|
| 0 - 25 | 0 - 0.09 |
| 25.1 - 50 | 0.091 - 0.11 |
| 50.1 - 75 | 0.111 - 0.14 |
| 75.1 - 90 | 0.141 - 0.15 |
| 90.1 - 95 | 0.151 - 0.17 |
| 95.1 - 97 | 0.171 - 0.19 |
| 97.1 - 99 | 0.191 - 0.258 |
| 99.1 - 100 | 0.259 - 1 |

| | | |
|---|---|---|
| 105K/1 | 105J/4 | 105J/3 |
| 105F/16 | **105G/13** | 105G/14 |
| 105F/9 | 105G/12 | 105G/11 |

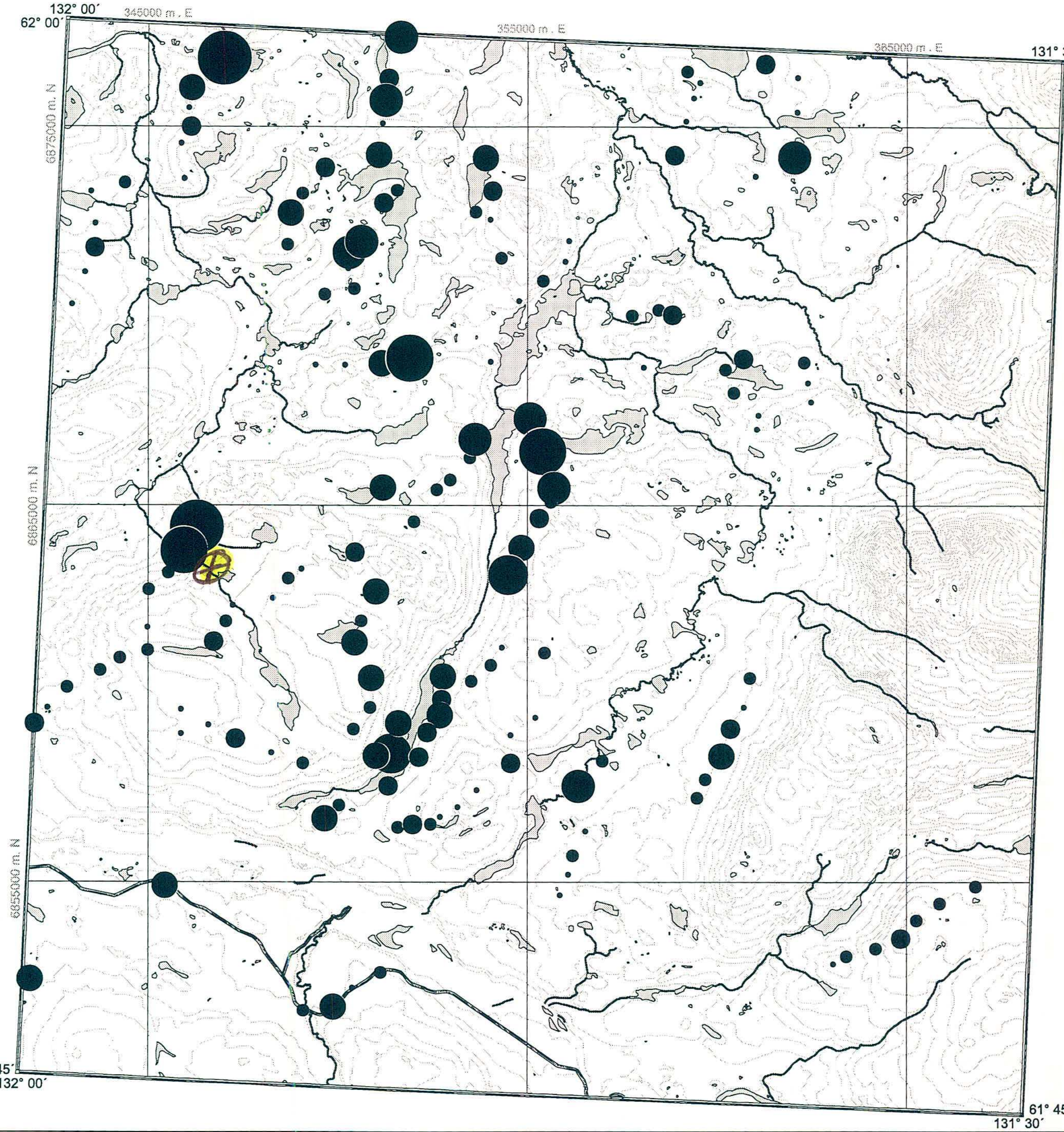
105g13
National Topographic System
Transverse Mercator Projection
NAD 1983
UTM Grid Zone 9

# Tl

2 0 2 4 6
Kilometers

YUKON
GEOLOGY PROGRAM

# SULFUR




| %tile Range | % |
|---|---|
| 0 - 25 | 0 - 0.01 |
| 25.1 - 50 | 0.011 - 0.03 |
| 50.1 - 75 | 0.031 - 0.04 |
| 75.1 - 90 | 0.041 - 0.061 |
| 90.1 - 95 | 0.062 - 0.09 |
| 95.1 - 97 | 0.091 - 0.114 |
| 97.1 - 99 | 0.115 - 0.247 |
| 99.1 - 100 | 0.248 - 0.48 |

| | | |
|---|---|---|
| 105K/1 | 105J/4 | 105J/3 |
| 105F/16 | 105G/13 | 105G/14 |
| 105F/9 | 105G/12 | 105G/11 |

S

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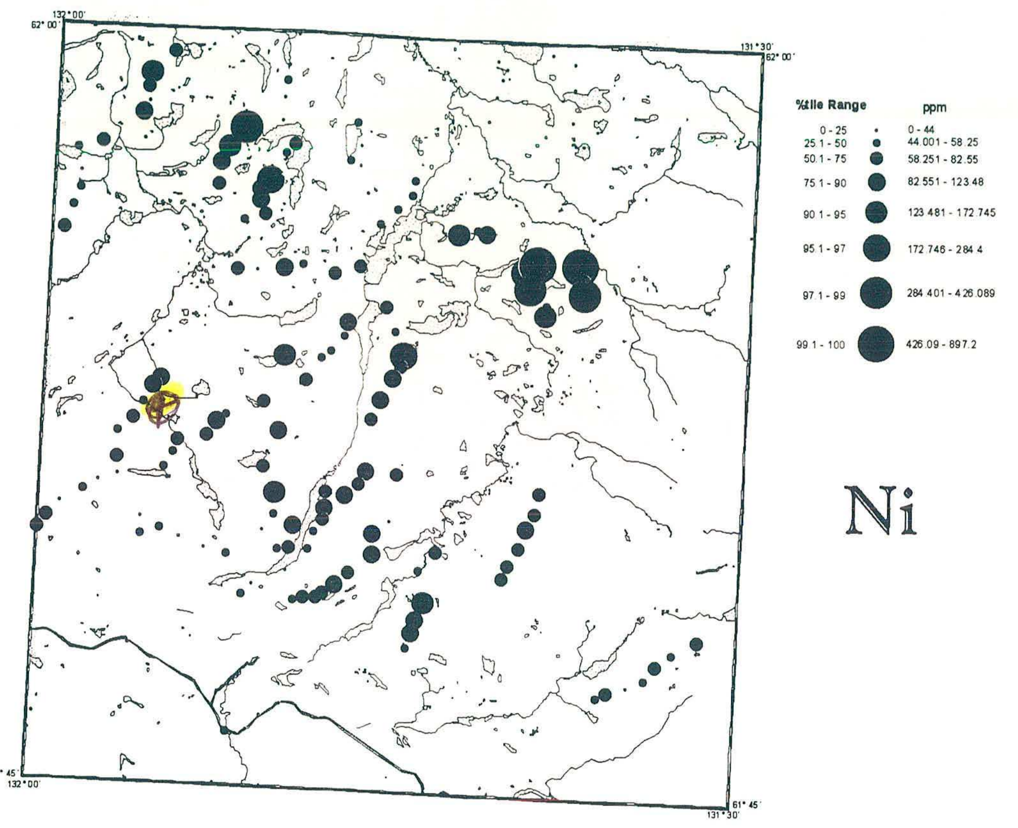
Kilometers

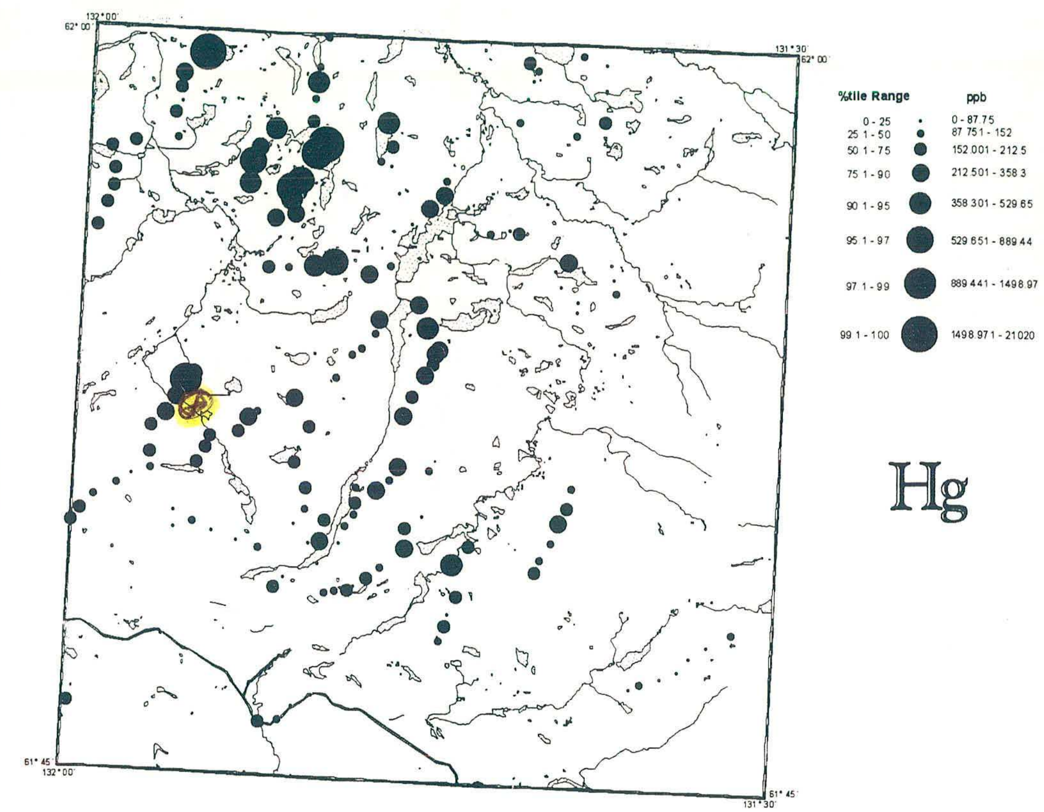
105g13
National Topographic System
Transverse Mercator Projection
NAD 1983
UTM Grid Zone 9

YUKON GEOLOGY PROGRAM

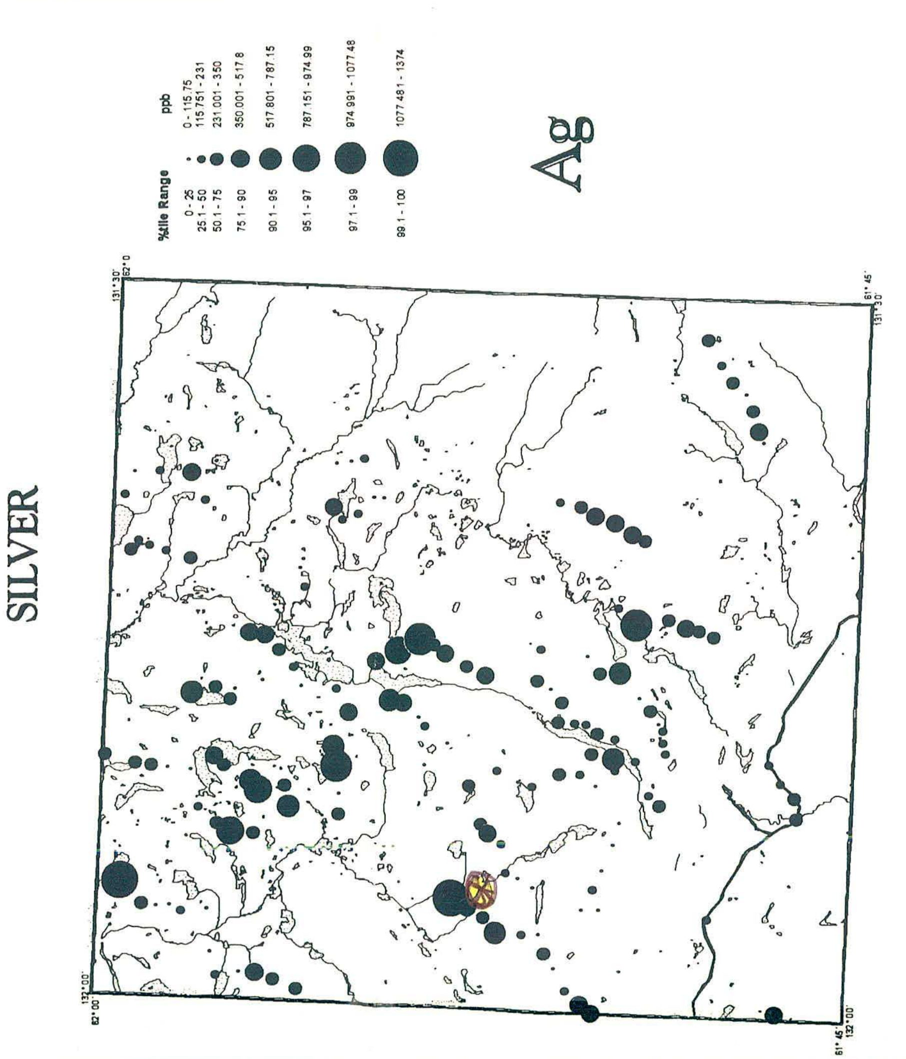
## NICKEL



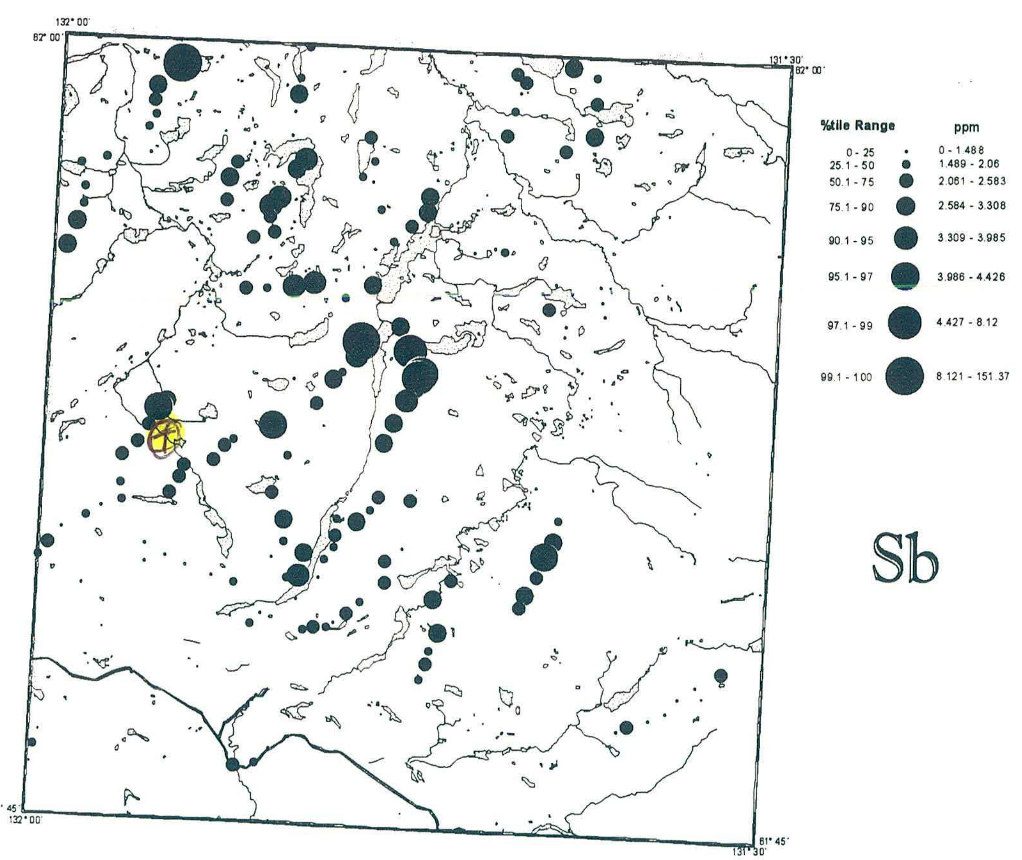

## MERCURY



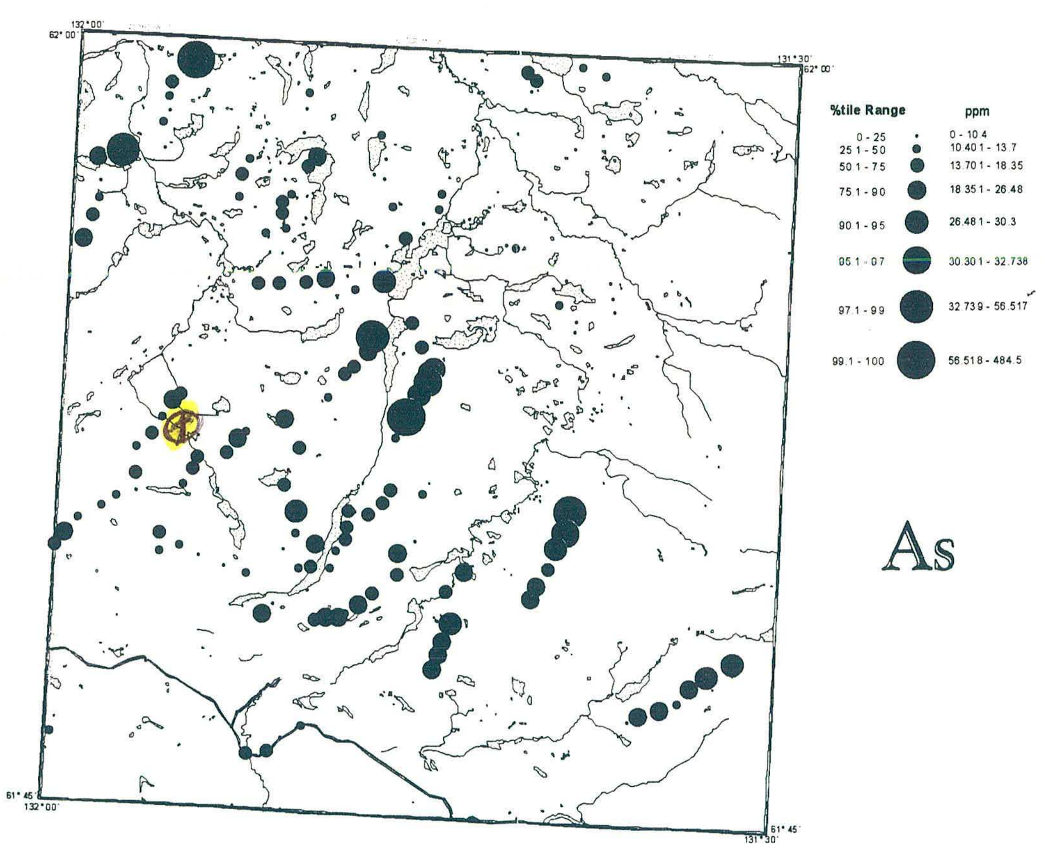

## SILVER




## ANTIMONY



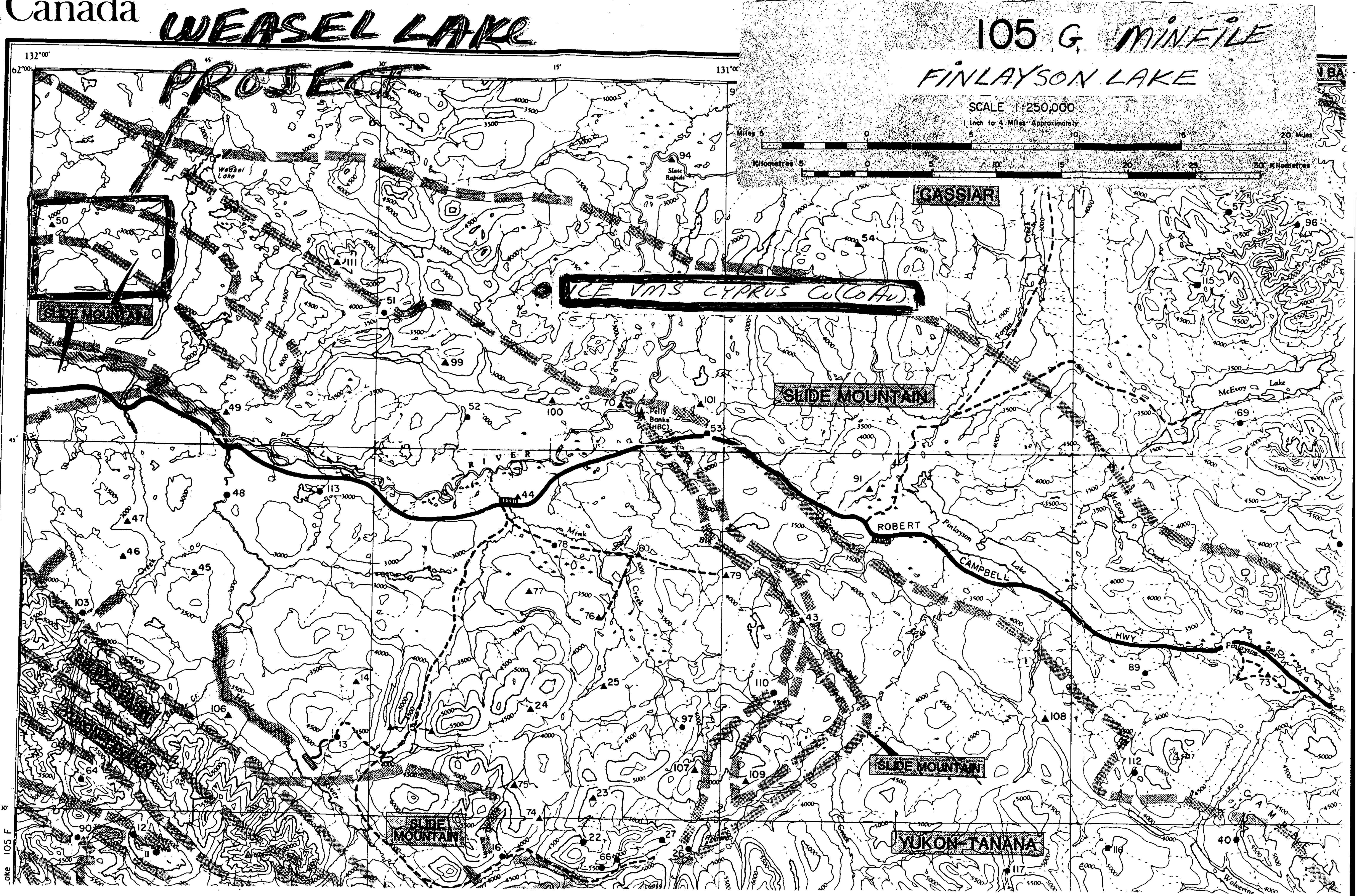

## ARSENIC




4 2 0 2 4 6 8 10

Kilometres

Canada



WEASEL LAKE PROJECT
105 G MINFILE
FINLAYSON LAKE
SCALE 1:250,000
1 Inch to 4 Miles Approximately
Miles
Kilometres
N
CASSIAR
SLIDE MOUNTAIN
ICE VMS CYPRUS Cu(Co,Au)
YUKON-TANANA
Weasel Lake
Slate Rapids
Pelly Banks (HBC)
RIVER
ROBERT CAMPBELL HWY
Finlayson Lake
McEvoy Lake
Mink
Big Creek

debenture for $10 million. The debenture is to be repaid over a four-year term with $1,000,000 payable on each of the first, second and third anniversaries, and the balance on the fourth anniversary. The debenture is repayable at any time and shall bear interest after the second anniversary at a rate of 8% per annum. Expatriate may extend the final payment an additional 180 days by paying 12% per annum interest after the fourth anniversary. The debenture provides that Cominco may at its election, at anytime after the second anniversary, convert up to 70% of the outstanding indebtedness into common shares of Expatriate. The conversion price shall be 115% of the average closing share price for the 10 days prior to giving notice to convert.

Cominco will receive an additional $2 million on the commencement of commercial production

from any of the properties included in the Cominco Assets and a Net Smelter Return royalty on all production from these properties. The NSR royalty shall be 1.0% during the first four years of production. After four years, the NSR royalty shall range from 2.0% to 3.5% based on the price of zinc. Expatriate shall have a right of first refusal to purchase the NSR royalty should Cominco wish to dispose of it.

Cominco will also be issued a warrant to purchase up to 2,500,000 of Expatriate's common shares. The warrant shall expire on March 1, 2007. The conversion price for Expatriate shares is $1.00 per share.

Expatriate shall replace Cominco's letters of credit for security bonds related to the surface rights lease and water licence, estimated at $450,000, and provide it with an additional $100,000 environmental performance bond. Lastly, Cominco will receive a right of first offer to purchase all or part of the products from the Cominco Assets or any processing facility treating ores from the Cominco Assets.

## Other Finlayson District Properties

Expatriate has identified several attractive drill targets on its wholly owned Goal Net and Red Line properties based on its geological and geochemical surveys during the past two summers. These targets also appear to be on the same lower mineralized horizon as the GP4F Deposit.

A large geophysical anomaly has been defined on the Goal Net property upslope of a strong multi-element soil geochemical anomaly. Re-examination of the drill core from the 1996 drilling on the Red Line property has defined a footwall alteration zone in several weakly mineralized holes. The targets on the Goal Net and Red Line are shallow dipping and a discovery could provide additional open pit mineralization. Followup drilling is planned to test these targets during the summer 2000 program.

## Ice Deposit

The Ice Deposit was discovered in 1996 by Expatriate following up regional geochemical data from a survey done many years before by Archer, Cathro & Associates (1981) Limited. The deposit is located 60 km east of Ross River in the northern part of the Finlayson District and is hosted in mafic volcanic rocks within the Slide Mountain Terrane.

The mineral resource has been estimated at 4,561,863 tonnes grading 1.48% copper with minor cobalt, gold, silver and zinc. Much of the resource is near surface and may be amenable to open pit mining. Although additional exploration is warranted, the Company's exploration effort in 2000 will focus on the central part of the Finlayson District.

## Exploration 2000 Plan

Expatriate is proposing a major exploration program costing approximately $3 million for this exploration season. All three of the known deposits are considered open and will receive additional drilling to expand their resource bases. In addition, it is proposed to test the Sable Zone, a stratigraphic target on the WOL Claims, and targets on Expatriate's Goal Net and Red Line properties.



annual Report 1999

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Cow
**MINFILE #:** 105G 049
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 G 13
**LATITUDE:** 61°46'14"N
**LONGITUDE:** 131°42'53"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Anomaly

## CLAIMS (PREVIOUS AND CURRENT)

COW, BEAVER, EM

## WORK HISTORY

Staked as Cow cl (88173) by Newmont in Apr/63. Restaked as Cow cl (Y7728) in May/66 by Quatsino Copper-Gold Mines L, New Privateer ML and Buchanan ML, which performed a ground mag and EM survey in Jul/67 and a small gravity survey in 1968. The Beaver cl (Y42977) were staked immediately to the west in Aug/70 by P. Anderson and were transferred to J.M. Veinott in 1970 and to P. Sotrer in Jan/72. Restaked as EM cl (YA12357) in Jan/77 by M. Sherman.

## GEOLOGY

Staking was probably prompted by GSC aeromagnetic maps, which show a complex pattern in this area. Outcrops of Tertiary gabbro or basalt were found during the geophysical survey, together with limestone and schist. Further work was recommended on one EM conductor.

## REFERENCES

QUATSINO COPPER-GOLD MINES LTD, Aug/67. Assessment Report #060587 by John Lloyd.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Elk
**MINFILE #:** 105G 050
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Slide Mountain Terrane

**NTS MAP SHEET:** 105 G 13
**LATITUDE:** 61°53'42"N
**LONGITUDE:** 131°58'18"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

ELK, CUP

## WORK HISTORY

Staked as Elk cl (86617) by Newment in Oct/63. More staking (Cup cl 89718) was done in Dec/65 to the east by individuals. This activity was based on aeromagnetic data and did not lead to any significant follow up work.

## GEOLOGY

The claims cover an area of extensive overburden with allochthonous Permian or older basalt and quartz-carbonate rock capping hilltops.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Chow
**MINFILE #:** 105G 051
**MAJOR COMMODITIES:** Zn
**MINOR COMMODITIES:** Pb,Cu
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 G 14
**LATITUDE:** 61°50'29"N
**LONGITUDE:** 131°29'20"W
**DEPOSIT TYPE:** Volcanogenic?
**STATUS:** Drilled Prospect

## CLAIMS (PREVIOUS AND CURRENT)

KAY, PALO, GAY, GEM, BB, POLO, JIM, ISKUT, WIT, MY, FRET, DOT, PLAY

## WORK HISTORY

Staked as Kay cl (Y16398) in Sep/66 by Kerr Addison ML following regional geochem surveys. Restaked as Palo cl (Y73482) in Jun/73 by A. Harmon and as Gay cl (Y83797) in Oct/74 by A. Carlos. Restaked as Gem cl (YA156) in Jul/76 by A. Carlos and optioned to Yukon Revenue ML which added BB, etc cl (YA889) in Sep/76-Jan/77 and performed mapping and soil sampling in 1976 and 1977 and drilled several holes in 1977. The property was transferred in Dec/80 to Harjay EL.

Fringe staking between Nov 76 and Oct/77 included Polo cl (YA11972) by Welcome North ML and Jim cl (YA12042) by P.S. White to the southwest; Iskut cl (YA12834) by Iskut Silver ML to the northwest; Wit cl (YA12026) by E. Wedekind to the south; and MY cl (YA12212) by Marge Enterprises L.

In June/94 Cominco restaked the property as the Fret cl 1-51 (YB50023). In the same month Cominco staked the Dot cl 1-76 (YB49847) 5 km to the southwest. In Mar/95 Expatriate Resources Ltd staked Play cl 1-64 (YB59231) on the northwest boundary of the Fret claims. In Aug/95 Expatriate staked Play cl 77-88 (YB60923) on the western end of their claim block.

## GEOLOGY

Pyritic siderite veinlets and breccia fillings carrying minor amounts of galena, sphalerite and chalcopyrite have been found as float near a small diorite body in an area underlain by phyllite, schist, dolomite and schistose volcanic rocks mapped as Klondike Schist (Permian).

Yukon Revenue located a copper-zinc anomaly over a strongly leached area from which selected specimens of phyllite assayed up to 2.2% Zn and 0.5% Pb. The drilling intersected pyritic schist with traces of galena, chalcopyrite and sphalerite. The best core assays returned 0.5% Zn, 0.1% Pb and 0.03% Cu over 1.5 m.

## REFERENCES

BRENDEX RESOURCES LTD, Feb/77. Assessment Report #0602083 by C.L. Smith.

MARGE ENTERPRISES LTD, Feb/77. Assessment Report #0602084 by D.W. Goodbrand & A.E. Nevin.

MINERAL INDUSTRY REPORT 1976, p. 206; 1977, p. 80.

YUKON REVENUE MINES LTD, Sep/76. Vancouver Stock Exchange Open File by J.J. Crowhurst.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Brendex
**MINFILE #:** 105G 099
**MAJOR COMMODITIES:** Zn
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 G 14
**LATITUDE:** 61°48'29"N
**LONGITUDE:** 131°24'07"W
**DEPOSIT TYPE:** Sedex
**STATUS:** Drilled Prospect

## CLAIMS (PREVIOUS AND CURRENT)

LEACH, FAULT, PATCHES, RAB, EAGLE

## WORK HISTORY

The north side was staked as Leach & Fault cl (YA12058) in Dec/76 by Brendex Res L, which carried out mapping and a geochem survey in 1977. During 1978, Tenas JV (DuPont & Western ML) conducted airborne and ground mag/EM surveys, mapping and a gravity survey and drilled 5 holes (305 m) under a brief option.

G. Harris tied on Patches cl (YA28476) to the east in Apr/78 and performed linecutting in 1981. The south side was restaked as RAB cl (YA67577) in Feb/82 by Hudson's Bay Mg, which explored with mapping and MaxMin and mag surveys later in the year.

B. Harris staked the Eagle 1-6 cl (YB35383) 2.5 km to the northeast in Jun/93.

## GEOLOGY

The claims are underlain by phyllite and schist of the Cambrian Mt Mye Formation. The holes were drilled on soil geochemical anomalies associated with sulphide-bearing quartzite, phyllite and graphitic phyllite with minor breccia and quartz veining. Analyses up to 2.5% Zn over 1.5 m were obtained.

The Rab claims were staked on an airborne mag and EM anomaly.

## REFERENCES

BRENDEX RESOURCES LTD, Feb/77. Prospectus Report by C.L. Smith.

BRENDEX RESOURCES LTD, Oct/77. Assessment Report #090250 by C.K. Ikona.

HUDSON BAY MINING AND SMELTING CO. LTD, Feb/83. Assessment Report #091426 by R. Stroshein.

MINERAL INDUSTRY REPORT 1977, p. 89; 1978, p. 67.

YUKON EXPLORATION AND GEOLOGY 1982, p. 128-129.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Tor
**MINFILE #:** 105G 111
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Slide Mountain Terrane

**NTS MAP SHEET:** 105 G 13
**LATITUDE:** 61°52'28"N
**LONGITUDE:** 131°33'36"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

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## CLAIMS (PREVIOUS AND CURRENT)

TOR, NECK, PIN

## WORK HISTORY

Staked as Tor cl (YB15155) in Jul/88 by Welcome North ML, which carried out prospecting and soil sampling later in the year.

In Jun/94 Cominco Ltd. staked the Pin cl 1-29 (YB49923) 10 km to the northwest and the Neck cl 1-71 (YB49952) 12 km to the northwest.

## GEOLOGY

The claims are cover zones of quartz-carbonate alteration in serpentinized units of the Permo-Carboniferous Anvil-Campbell Allochthon. Geochemical response was flat.

## REFERENCES

YUKON MINING AND EXPLORATION OVERVIEW 1988, p. 26-27.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Carolyn
**MINFILE #:** 105J 018
**MAJOR COMMODITIES:** Coal
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°02'02"N
**LONGITUDE:** 131°47'36"W
**DEPOSIT TYPE:** Coal
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

COAL LEASES (4815)

## WORK HISTORY

Staked as three coal leases (4815) in Jun/02 by D. McIntyre.

## GEOLOGY

The location is given as 40 km above the mouth of Ross River, 1.6 km from the left limit. Outcrop is scarce and consists mainly of Tertiary volcanic flows and pyroclastic rocks. Paleocene coal-bearing sedimentary rocks are sometimes interbedded with the volcanics and it is possible that the staking was based on coal float found in a creek.

## REFERENCES

AURUM GEOLOGICAL CONSULTANTS INC., 1994. Yukon Coal Inventory 1994. Energy and Mines Branch, Economic Development, Yukon Territorial Government, 169 p.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Marilyn
**MINFILE #:** 105J 027
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°03'29"N
**LONGITUDE:** 131°49'58"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

AJ

## WORK HISTORY

Staked as AJ cl (YA12822) in March/77 by M.D. Wood.

## GEOLOGY

The claims are underlain by Cambro-Ordovician siltstone and chert near the margin of a mid-Cretaceous granodiorite stock.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Bojo
**MINFILE #:** 105J 028
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 J 4
**LATITUDE:** 62°00'22"N
**LONGITUDE:** 131°45'56"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Anomaly

---

## CLAIMS (PREVIOUS AND CURRENT)

BOJO, PIN, NECK

## WORK HISTORY

Staked as 174 Bojo cl (YA20239) in Jun/77 by Cyprus Anvil and Hudson's Bay O & GL, which explored with airborne mag and EM survey sand grid soil sampling and mapping in 1977 and ground mag and EM surveys in 1978.

In Jun/94 Cominco Ltd. staked the Pin cl 1-29 (YB49923) 8 km south and the Neck cl 1-71 (YB49923) 6.5 km southwest of the anomaly.

## GEOLOGY

The claims were staked in a totally overburden-covered area to cover three coincident airborne EM-magnetic anomalies outlined by an Input survey and covering an area of projected Anvil-type stratigraphy. Rocks to the north consist of limestone and black calcareous shale of Paleozoic age while to the south, two-mica schist, calc-silicate and black to grey phyllite with metabasite interbeds were noted. The ground surveys outlined two coincident mag-EM targets.

## REFERENCES

CYPRUS ANVIL MINING CORP., May/78. Assessment Report by W. Roberts.

MINERAL INDUSTRY REPORT 1978, p. 71.

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

NAME(S): Petancic
MINFILE #: 105K 097
MAJOR COMMODITIES: -
MINOR COMMODITIES: -
TECTONIC ELEMENT: Yukon Tanana Terrane

NTS MAP SHEET: 105 K 1
LATITUDE: 62°02'54"N
LONGITUDE: 132°05'01"W
DEPOSIT TYPE: Unknown
STATUS: Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

RAT, FEX, HOT, AXBO, SHALE

## WORK HISTORY

Staked as Rat cl (Y83133) in Jul/74 by J. Acklack and as FEX cl (Y80613) in Sep/74 by R. Blusson and associates. B. Goodwin added the Hot cl (YA3138) in Aug/74 and R. Davies added Shale cl (YA3793) in Oct/74 to the east.

Restaked as AXBO cl (YA18574) in Jun/77 by Cyprus Anvil Mg Corp following an airborne mag-EM survey.

## GEOLOGY

The claims were staked in an overburden-covered area near the margin of a mid-Cretaceous granodiorite batholith. They are probably underlain by mid-Cretaceous crystal tuff or Carboniferous to Triassic quartzite and schist of the Nisutlin Allochthonous Assemblage.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Chaplin
**MINFILE #:** 105K 098
**MAJOR COMMODITIES:** Pb,Zn,Ag
**MINOR COMMODITIES:** Ba,Cu
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 K 1
**LATITUDE:** 62°00'28"N
**LONGITUDE:** 132°07'59"W
**DEPOSIT TYPE:** Vein
**STATUS:** Drilled prospect

## CLAIMS (PREVIOUS AND CURRENT)

ARO, COJ, NWC, GEOX, T, TENAS, SKATE

## WORK HISTORY

Staked as ARO cl (Y83128) in Aug/74 by AEX Mls Corp L and Anvil Range Synd (Teck & DuPont), which carried out recce mag and geochem surveys and prospecting. The adjoining COJ and NWC groups (Y83435) and the nearby GEOX cl (Y80637) to the north were recorded in September by R. Blusson and associates.

Restaked as T cl (YA11590) in Oct/76 by Tenas JV (DuPont and Western ML), which added more T and Tenas claims as part of a 728 claim belt 45 km long and explored with mapping, geochem sampling, gravity surveys and two holes (455 m) in 1977; gravity and airborne mag and EM surveys in 1978; and wide spaced drilling on the T group in 1979.

The Tenas JV claims were optioned in 1980 by Cyprus Anvil. The DuPont interest was transferred to CSA Mls Inc in 1984 and to Goldsearch Inc in 1985.

Restaked as Skate cl 1-44 (YB68969) by Expatriate Resources Ltd in Oct/95. Claim block extends south into map sheet 105F 16.

## GEOLOGY

The ARO group was staked on a weak gossan and aeromagnetic anomaly underlain by phyllite and altered volcanic rocks which have been assigned to the Carboniferous-Triassic Nisutlin Allochthonous Assemblage. One hole intersected massive sulphides with some sections of 6% combined Zn + Pb.

The only mineralization seen on surface is a vein of massive sulphides south of the deposit which was found in 1974 and further investigated in 1977. The mineralization consists of pyrrhotite and pyrite with galena, sphalerite and barite and a trace of chalcopyrite and arsenopyrite. It ranges from 15 to 60 cm wide and has been traced for well over 60 m along strike. No mineralization was encountered in the 1979 drilling.

## REFERENCES

DUPONT OF CANADA EXPLORATION LTD, Aug/78. Assessment Report #090335 by C.A. Ager.

GEOLOGICAL SURVEY OF CANADA Map 13-1961.

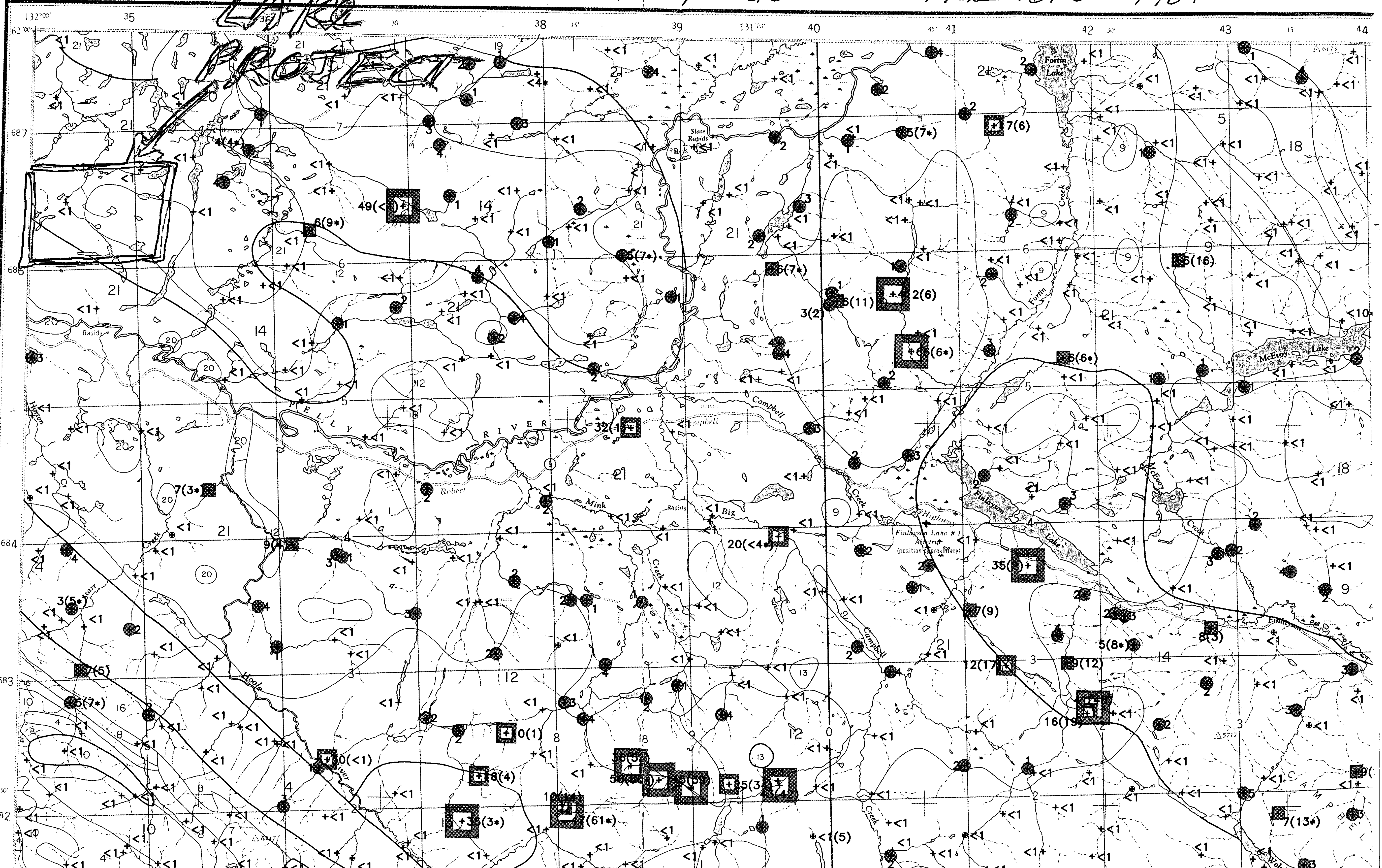
MINERAL INDUSTRY REPORT 1974, p. 137; 1977, p. 62-63; 1978, p. 40.

Geological Survey of Canada
Commission géologique du Canada

WEASEL LAKE PROJECT

GOLD SILT SURVEY GSC OPEN FILE 1648 - 1987

(GEOLOGY?)

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## LEGEND

# GOLD (ppb)
# STREAM SEDIMENTS
GSC OPEN FILE 1648
EAST-CENTRAL YUKON; 1987

QUATERNARY

PLEISTOCENE AND RECENT

| | | | |
|---|---|---|---|
| 21 | Qs | 64* | Glacial and surficial deposits |

TERTIARY

PLIOCENE

| | | | |
|---|---|---|---|
| 20 | Pv | 62 | Basalt |

CRETACEOUS

| | | | |
|---|---|---|---|
| 19 | Kgdp | 52 | Granodioritic and monzonitic porphyry |
| 18 | Kqm | 52 | Quartz monzonite, granodiorite; Cassiar quartz monzonite; alaskite |

TRIASSIC

| | | | |
|---|---|---|---|
| 17 | Tgdh | 42 | Foliated hornblende granodiorite, quartz |
| 16 | Tcg | 42 | Polymictic conglomerate |

PENNSYLVANIAN AND PERMIAN

| | | | |
|---|---|---|---|
| 15 | PPAt | 35 | Chert |

CARBONIFEROUS AND PERMIAN

| | | | |
|---|---|---|---|
| 14 | CPAV | 35 | ANVIL RANGE GROUP: andesite, basalt, slate, chert, limestone |
| 13 | CPub | 35 | Serpentinite; diorite, pyroxenite, peridotite |
| 12 | CPsh | 35 | Schist; gneiss; includes BIG SALMON METAMORPHIC COMPLEX |
| 11 | CPv | 35 | Andesite; basalt; chert; tuff |

MISSISSIPPIAN

| | | | |
|---|---|---|---|
| 10 | Mvp | 31 | Black slate; chert; acidic volcanics |

DEVONIAN AND MISSISSIPPIAN

| | | | |
|---|---|---|---|
| 9 | DME | 29 | EARN GROUP: undivided; shale, chert arenite; conglomerate |
| 8 | DMS | 29 | SYLVESTER GROUP: shale, chert arenite, basic volcanic rocks |

SILURIAN AND DEVONIAN

| | | | |
|---|---|---|---|
| 7 | SDcq | 24 | Dolomite, quartzite, argillite |

ORDOVICIAN, SILURIAN AND LOWER DEVONIAN

| | | | |
|---|---|---|---|
| 6 | OSDR | 19 | ROAD RIVER: black graptolitic shale, chert |

CAMBRIAN AND ORDOVICIAN

| | | | |
|---|---|---|---|
| 5 | COp | 14 | Shale, limestone |
| 4 | COK | 14 | KECHIKA GROUP: phyllite, limestone |

LOWER CAMBRIAN

| | | | |
|---|---|---|---|
| 3 | lCAq | 11 | ATAN GROUP: quartzite; shale, phyllite |
| 2 | lCq | 11 | Quartzite; shale |

HADRYNIAN

| | | | |
|---|---|---|---|
| 1 | Hsn | 07 | Schist; gneiss; quartzite |

*A mnemonic code assigned to rock types and recorded as part of field observations.

Geological boundary . . . . . . . . . . . . . . . . .

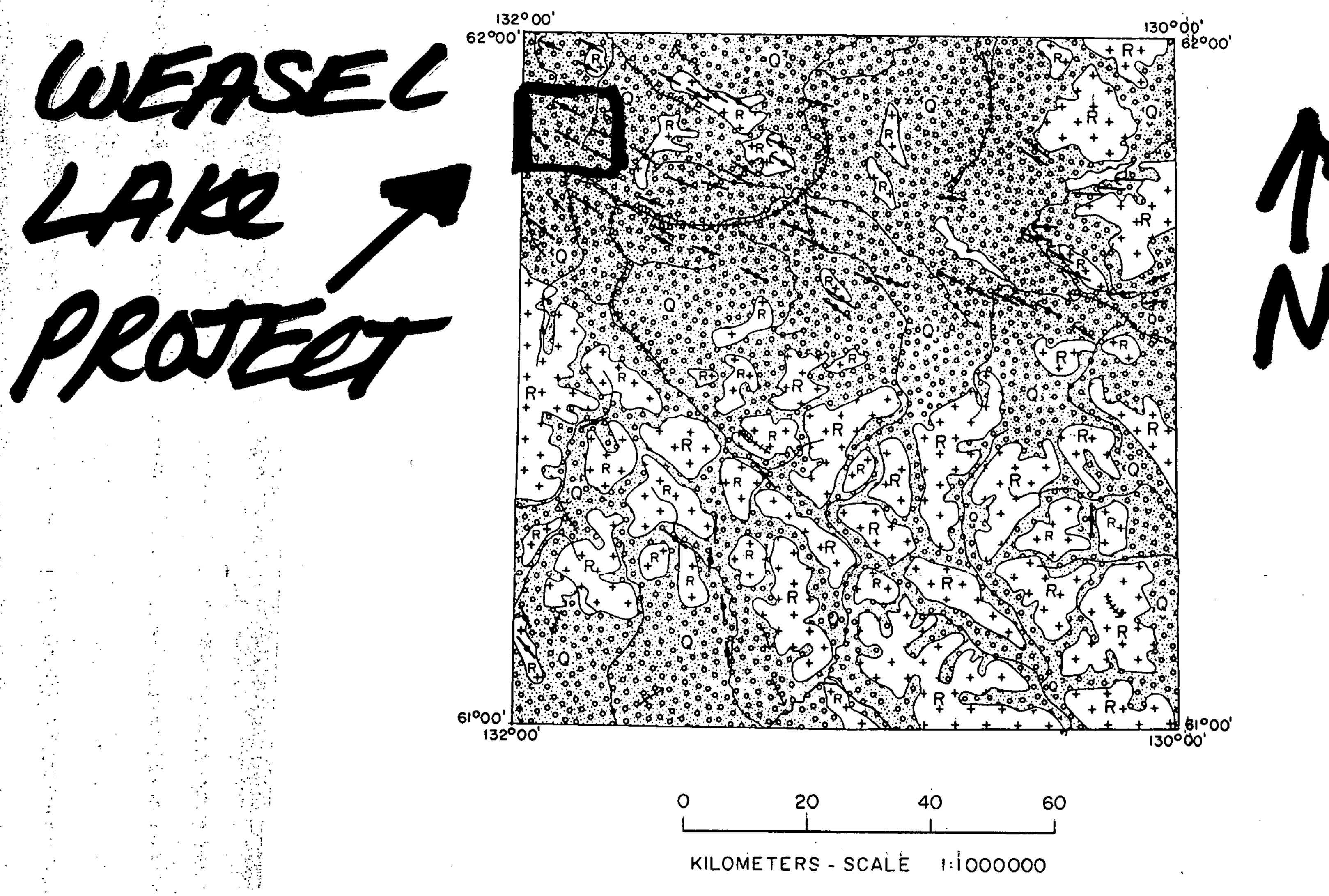
Fault . . . . . . . . . . . . . . . . . . . . . . . . .

No analytical results . . . . . . . . . . . . . . . . . . . . . *

Field duplicate sample sites . . . . . . . . . . . . . . . . . . . *

Geology base and legend are derived from:

Gabrielse, H., Tempelman-Kluit, D.J., Blusson, S.L. and Campbell, R.B. (1980) Map 1398A, MacMillan River, Yukon - District of Mackenzie - Alaska, NTS Sheet 105, Geological Survey of Canada, Energy, Mines and Resources Canada. 1:1,000,000 Scale.




## SURFICIAL GEOLOGY

Q — Unconsolidated surficial deposits.

R — Bedrock exposures; includes discontinuous veneer of undivided glacial drift.

## SYMBOLS

Surficial deposit boundary . . . . . . . . . . . . . . . . . . . . . .

Major meltwater channels, indicating direction of flow . . . . . . . . .

Druminoid form; direction of glacial movement inferred, not inferred . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

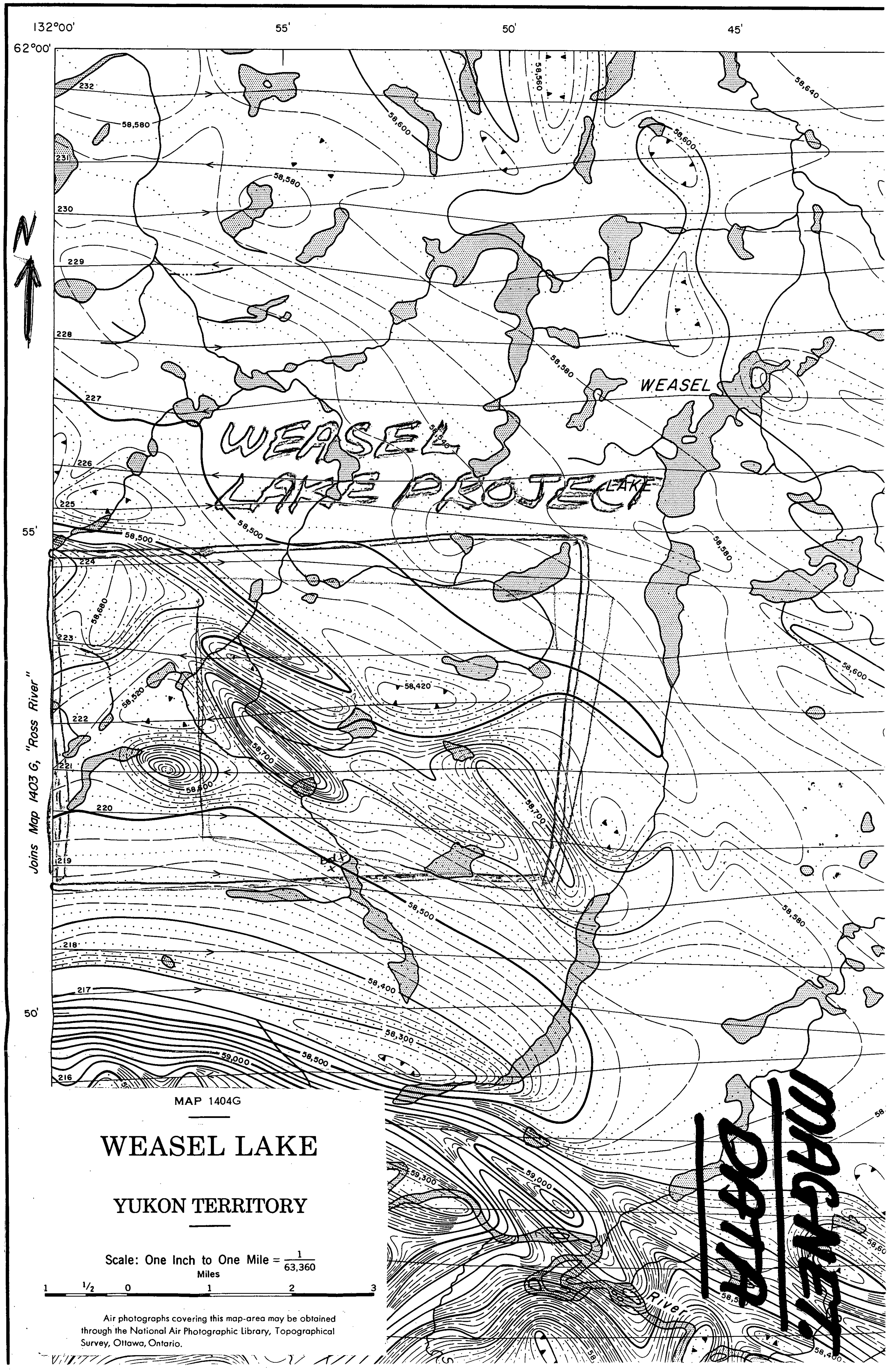
Sources of information:


Hughes, O.L., Campbell, R.B., Muller, J.E., and Wheeler, J.O. (1968) Glacial Map of Yukon Territory, Geological Survey of Canada, Map 6-1968 (1:1,000,000 scale) to accompany GSC Paper 68-34.

Jackson, L.E. Jr. (1968) Terrain Inventory, Finlayson Lake, Yukon Territory (105 G), Geological Survey of Canada, Open File 1379, 1:125,000 scale.

Prest, V.K., Grant, D.R., and Rampton, V.N. (1967) Glacial Map of Canada, Geological Survey of Canada, Map 1253A, 1:5,000,000 scale.

Wheeler, J.O., Green, L.H., and Roddick, J.A. (1960) Geology - Finlayson Lake, Yukon Territory, Geological Survey of Canada, Map 8-1960, scale 1 inch to 4 miles.




MAP 1404G

# WEASEL LAKE

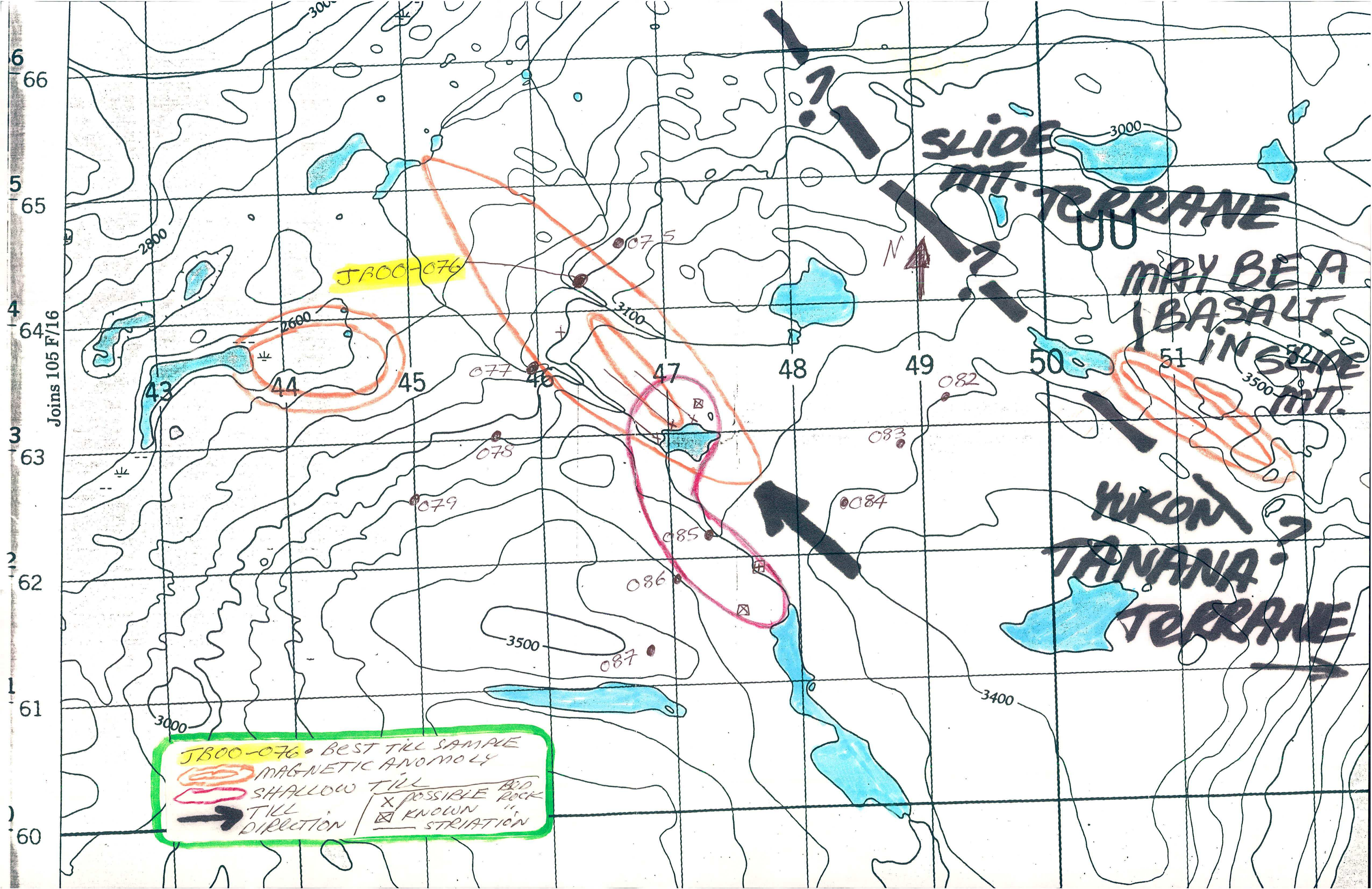
## YUKON TERRITORY

Scale: One Inch to One Mile = $\frac{1}{63,360}$

Miles

1 1/2 0 1 2 3

Air photographs covering this map-area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario.



Joins 105 F/16
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3500
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JB00-076
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083
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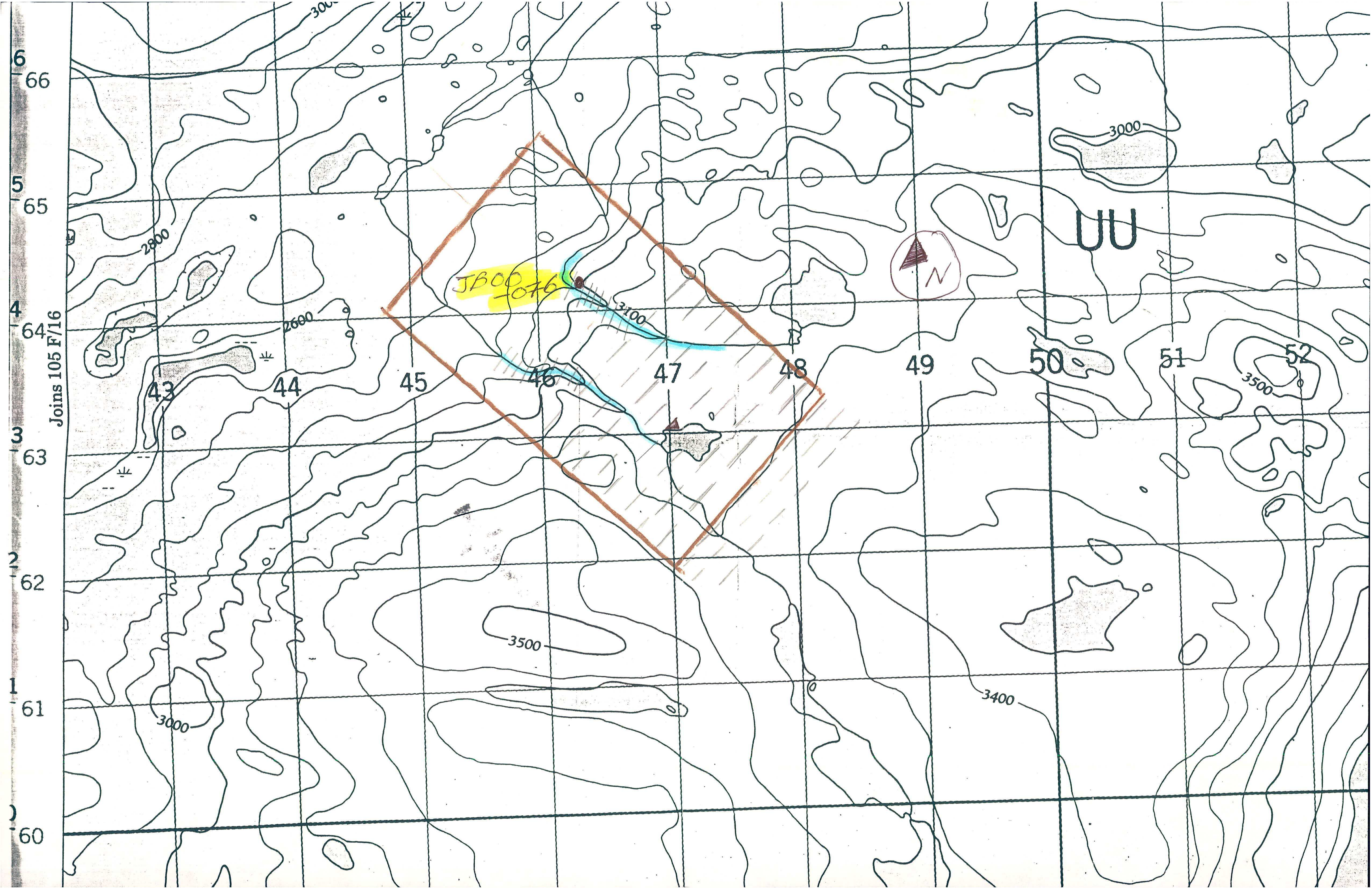
085
086
087
N
SLIDE MT. TERRANE
MAY BE A BASALT IN SLIDE MT.
YUKON TANANA TERRANE
JB00-076 • BEST TILL SAMPLE
MAGNETIC ANOMOLY
SHALLOW TILL
TILL DIRECTION
X POSSIBLE BED ROCK
⊠ KNOWN "
STRIATION



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plans (b)

28
PROPOSED
QUARTZ
CLAIMS

stream
silt
samples

CAMP

APROXIMATE
BEEP MAT
GRID

2/1

2001 + 066
GRASSROOTS

# TANTALUM PROJECT

## 2A LANCER PROJECT

The project is about 36 miles (57 KM) south east of Ross River. Access by helicopter. A good road goes past the KETSA GOLD MINE - then an old trail/road goes close to the project. Access by truck and foot maybe possible. The old road is about 6-7 Km (Dodge comm.)

It is in Watson Lake Mining Dist. on map 105 F 8.

My target is a NIOBIUM-TANTALUM vein system (pegmatite?)

I have discussed this project with JOHN KOWALCHUK (ex placer Dome-YUKON) and KEN GALAMBOS (YMIP GEOLOGIST)

## 2B HENRY CREEK PROJECT

The project is about 4 miles (6 KM) east of BARLOW LAKE (KLondike Highway). One turns off on the Clear Creek placer mine access road. The project is about 2.5 miles (4 KM) from turn off and then one walks down to Henry Creek - Clear Cr junction. Cat trails may be present but all relevant air photos from area are unavailable for study.

(2) 2

It is in the Dawson Mining District on map 115 P 13.

My target is a NIOBIUM (Nb) - TANTALUM (Ta) VEIN SYSTEM (pegmatites?)

I have discussed this project with KEN GALAMBOS (YMIP GEOLOGIST)

REASONS for LANCER PROJECT [2A]

(1) I want to diversify my claim holdings. Almost all are gold properties.

(2) TANTALUM prices are now high because of a supply shortage. Range for 2001 $85 - $400 US per pound. Many companies are now exploring for it.

(3) The LANCER claims have an inferred resource of 1,500,000 tons at .62% $Nb_2O_5$. (Dodge YMIP) In the report I saw no data on TANTALUM tests.

(4) John Kowalchuk visited the Lancer claims in 1992? + liked it.

(5) In 1979, UKON JV tested the NOKLIUT 1-8 claims = the same area and tested 64 rock samples for Nb. but only 4 for Ta. 2 of 4 had TANTALUM. TANTALUM may be present in economic amounts in this area.

(6) Access is good to about 6 KM from the area. Then a trail of doubtful quality.

② 3

REASONS for Henry Cr project [2B]
① same as before
② same as before
③ The area has granites that are enriched in U-Th. Sometimes these kind of systems produce a zonation of pegmatites around + over them that are enriched in Be, Nb, Ta, Li, Cs. Minfile Clear Cr 115 P 014.
④ perhaps the area was never explored for Nb and Ta pegmatite systems.
⑤ Access is excellent - one can drive almost to the area?

TANTALUM background
Ⓐ Ta and Nb are almost always found together.
Ⓑ

| | earth CRUST | MELT POINT | spec gravity |
|---|---|---|---|
| Ta | 2 PPM | 2996°C ± | 16.6 |
| Nb | 24 PPM | 2480°C ± | 8.4 |

Ⓒ Ta is rare, heavy, inert metal used in electronics as a capacitor, resists corrosion, inert to body fluids (used medically in the body). has many OTHER uses.
Ⓓ I have 3 samples - TANTALUM (placer Uganda) - Nb + Ta samples from a GSC rock kit.
Ⓔ Most common ore is columbium
Nb > Ta = COLUMBITE - $Nb_2O_5$
Ta > Nb = TANTALITE - $Ta_2O_5$ — $(Nb,Ta)_2O_5$
Ⓕ Can the price be forecast? NO! Not by me.?!
1999 used 4,200,000 pounds
2000 used 5,500,000 "
(WORLD-WIDE)

(2) 4

(g) Production comes from placers in tropics (eluvial + alluvial) which are declining; Sn slags (in decline due to less Sn mining - part. placer Sn); Nb-Ta mines and Ta mines.

* Forecasting of Ta prices is hard; but it seems Ta use is bound to increase yearly at a rate above inflation in the western world. (my opinion after reading articles on Ta.) ? PRICE?

(h) WORLD WIDE PRODUCERS

| | | |
|---|---|---|
| AUSTRALIA | GREENBUSHES | Nb-Ta |
| | WODGINA | Ta |
| Brazil | CBM | Nb |
| | MBRA | Nb-Ta |
| | Pitinga | Nb-Ta |
| | Catalao | Nb |
| Canada | Niobec | Nb |
| | TANCO | Ta |
| China | govt | Nb-Ta |
| Australia, Brazil, thailand | Sn slags | Nb-Ta |

(i) Economic grades. WD Sinclair (Ottawa GSC + Ta knowledgible) says +.02% is economical. Geol. at CME display at 2001 Roundup said 200 gm / ton. Both are the same.

(j) Geochemical association. F, Sn, W, U, Th, Mo, Li, Rb, Cs, Be, B. Sinclair

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Nokluit
**MINFILE #:** 105F 080
**MAJOR COMMODITIES:** Th,REE,Nb,Ag,Pb
**MINOR COMMODITIES:** U,F,Ba,Zn,Cu,Au
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 8
**LATITUDE:** 61°29'00"N
**LONGITUDE:** 132°10'00"W
**DEPOSIT TYPE:** Vein
**STATUS:** Prospect

## CLAIMS

KAY, NOKLUIT, KETZA, LANCER, DIG.

## WORK HISTORY

The syenite stock and associated fluorite and barite were first noted by British Yukon ECL on its Kay cl (69843), staked in Oct/54 and mapped in 1955. The radioactivity and rare earth minerals were discovered by Ukon JV (Chevron and Kerr Addison), which staked the Nokluit cl (YA567) in Aug/76 and explored with mapping, soil sampling and radiometric surveys in 1976 and 1977 and wide-spaced rock sampling in 1979.

The north side was restaked as Ketza cl (YA72436) in Oct/84 by a joint venture between Quillo Res Inc and High River Res L, which performed mapping and geochem sampling in 1985. In 1987, Canamax Res Inc performed airborne mag, geochem and VLF-EM surveys under an option. The claims were transferred to Canamax in May/89 then returned to Quillo and High River in Dec/89.

Restaked as Lancer claims (YB33962) in May/91 by J. Dodge, who prospected and sampled that year and transferred the claims to Dodgex Ltd in Jan/92. Dodge added the Lancer 9-10 cl (YB46275) and the Dig 1-2 cl (YB46273) in Sep/93, and performed hand trenching, sampling and a scintillometer survey. In June/94 Dodge carried out further trenching on Lancer cl 8 (YB33969).

## GEOLOGY

Radioactive and rare earth minerals are associated with purple fluorite in skarns peripheral to a small Mississippian syenite stock cutting Cambrian carbonate rocks. Similar mineralization is found nearby in narrow siliceous veins cutting trachyte and tuff of Mississippian age. Assays range up to 3200 ppm Th, 74 ppm U, 2000 ppm Ce, 2000 ppm La, 2000 ppm Nd, 2000 ppm Y and 0.95% $Cb_2O_5$. The best chip sample collected in 1979 contained 1.2% rare earth elements and 0.5% niobium across 10 m.

Mapping by J. Dodge in 1991 showed that the rare earth elements are concentrated throughout a 3 to 8 m wide silicified and carbonatized zone in a metasomatized syenite dyke. The zone is slightly radioactive and has a strike of 120°and a subvertical dip. Petrographic analysis of a piece of leucocratic syenite showed that it consists almost entirely of fresh perthitic K feldspar, with up to 10% plagioclase, 10% quartz and 16% carbonate. Along the mineralized zone the syenite is altered to an almost structureless quartz-carbonate rock with relict lath textures. A more melanocratic phase of the syenite stock consisted of 53% albite and 28% aegirine, and lesser amounts of carbonate, hematite, fluorite, phlogopite and quartz.

Two galena-sphalerite showings were located by Quillo/High River. Grab samples of galena-rich and sphalerite-rich talus about 2 km northwest assayed 42.8% Pb, 1230.8 g/t Ag, 4.8% Zn and 0.07 g/t Au; and 17.7% Zn, 1.0% Pb, 48.0 g/t Ag and 0.03 g/t Au, respectively. This mineralization occurs in Lower Cambrian limestone near a major northwest-trending regional fault.

The second showing, one km to the northwest, consists of a northeast-trending vein swarm in Siluro-Devonian carbonate rocks. Individual veins are less than 4 cm wide within a zone that is 30 m wide. A grab sample assayed 918.8 g/t Ag, 25.1% Pb, 0.1% Cu and 0.07% Zn.

**REFERENCES**

BRITISH YUKON EXPLORATION CO. LTD, Jan/56. Assessment Report by A.E. Aho & W.A. Padgham.

DODGEX LTD, Jul/92. Assessment Report #093036 by J.S. Dodge.

DODGEX LTD, May/94. Assessment Report #093196 by J.S. Dodge.

MINERAL INDUSTRY REPORT 1976, p. 190-191; 1977, p. 80.

QUILLO RESOURCES INC./HIGH RIVER RESOURCES LTD, Mar/86. Assessment Report by C.G. Verley.

UKON JOINT VENTURE, Jan/77, Dec/79 & Jan/80. Assessment Reports #090574 & 090577 by A.R. Archer.

YUKON EXPLORATION 1987, p. 153.

YUKON GEOLOGY & EXPLORATION 1979-80, p. 55-59, 175.

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AND ASSOCIATES LTD.
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1016 STANDARD BUILDING
510 WEST HASTINGS STREET
VANCOUVER, B.C.
V6B 1L8

# ROCK SAMPLING PROGRAM

## NOKLUIT PROPERTY

## NOKLUIT 1-8 CLAIMS



CLAIM SHEET 105F/8

Latitude 61°29'N; Longitude 132°11'W

Work Done July 26-30, 1979

JANUARY 15, 1980

A.R. Archer, B.A.Sc., P.Eng. Consulting Engineer

090577

# APPENDIX 1

UKON JOINT VENTURE 1979

NOKLUIT PROPERTY

| Sample Number | Radioactivity CPS in bag | $U_3O_8$ ppm | Nb ppm | Th ppm | Ta ppm | Sn ppm | W ppm | Au ppm | Rare Earths (%) Total | Ce | Dy | Er | Eu | La | Lu | Nd | Sm | Yb | Sc | Y | K % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A00651 | 120/120 | 2 | 140 | 22 | | 5 | 7 | | .0073 | | | | | .005 | | | | .0003 | | .002 | 2 |
| A00652 | 140/120 | 3 | 200 | 26 | | 13 | 2 | | .0082 | | | | | .007 | | | | .0002 | | .001 | 5 |
| A00653 | 120/120 | 3 | 180 | 30 | | 1 | 2 | | .0073 | | | | | .005 | | | | .0003 | | .002 | 1 |
| A00654 | 120/120 | 3 | 220 | 26 | | 3 | 2 | 10 | .0110 | | | | | .01 | | | | | | .001 | >5 |
| A00655 | 190/120 | 6 | 500 | 120 | | 23 | 1 | | .0265 | | | | | .02 | | | | .0015 | | .005 | >5 |
| A00656 | 120/120 | 2 | 240 | 43 | | 9 | 2 | 10 | .0102 | | | | | .007 | | | | .0002 | | .003 | 5 |
| A00657 | 170/120 | 3 | 320 | 230 | | 2 | 4 | | .1860 | .1 | .005 | | | .05 | | .02 | | .001 | | .01 | >5 |
| A00658 | 140/120 | 3 | 380 | 19 | | 3 | 4 | | .0285 | | | | | .02 | | | | .015 | | .007 | 3 |
| A00659 | 120/120 | 2 | 160 | 24 | | 1 | 2 | 20 | | | | | | | | | | | | | 5 |
| A00660 | 140/120 | 2 | 280 | 43 | | 2 | 2 | | .0815 | .05 | | | | .02 | | | | .0015 | | .01 | >5 |
| A00661 | 120/120 | 5 | 320 | 28 | | 4 | 2 | | .0157 | | | | | .01 | | | | .0007 | | .005 | >5 |
| A00662 | 140/120 | 3 | 240 | 47 | | 1 | 1 | | .0115 | | | | | .01 | | | | | | .0015 | >5 |
| A00663 | 120/120 | 3 | 220 | 36 | | 2 | 1 | | .0090 | | | | | .007 | | | | | | .002 | >5 |
| A00664 | 130/120 | 3 | 240 | 31 | | 6 | 2 | | .0088 | | | | | .007 | | | | .0003 | | .0015 | >5 |
| A00665 | 250/120 | 10 | 380 | 110 | | 25 | 5 | | .1120 | .05 | | | | .03 | | .02 | | .002 | | .011 | 2 |
| A00666 | 140/120 | 2 | 200 | 39 | | 3 | 6 | | .0125 | | | | | .007 | | | | .0005 | | .005 | 1 |
| A00667 | 130/120 | 2 | 100 | 27 | | 4 | 1 | | .0010 | | | | | | | | | | | .001 | 2 |
| A00668 | 150/120 | 5 | 280 | 87 | | 2 | 7 | 10 | .0155 | | | | | .01 | | | | .0005 | | .005 | 1 |
| A00669 | 170/120 | 6 | 180 | 67 | | 1 | 6 | 10 | .0132 | | | | | .01 | | | | .0002 | | .003 | 1 |
| A00670 | 130/120 | 3 | 200 | 40 | | 1 | 35 | | .0103 | | | | | .007 | | | | .0003 | | .003 | 1 |
| A00671 | 120/120 | 1 | 180 | 26 | | 2 | 1 | | .0165 | | | .002 | | .01 | | | | .0005 | .001 | .003 | 2 |
| A00672 | 120/120 | 1 | 220 | 44 | | 1 | 10 | 10 | .0665 | .05 | | .003 | | .01 | | | | .0005 | | .003 | 3 |
| A00673 | 120/120 | | 120 | 32 | | 1 | 12 | | .0173 | | | | | .015 | | | | .0003 | | .002 | 3 |
| A00674 | 120/120 | 1 | 100 | 18 | | 1 | 4 | 10 | .0157 | | | | | .01 | | | | .0007 | | .005 | >5 |
| A00675 | 120/120 | 2 | 80 | 20 | | 1 | 4 | | .0033 | | | | | | | | | .0003 | | .003 | 3 |
| A00976 | 130/120 | 3 | 210 | 29 | | 1 | 8 | 10 | .0160 | | | | | .01 | | | | .001 | | .005 | 5 |
| A00977 | 120/120 | | 120 | 18 | | 2 | 10 | | .0075 | | | | | .005 | | | | .0005 | | .002 | >5 |
| A00978 | 120/120 | | 120 | 14 | | 2 | 6 | 10 | .0092 | | | | | .007 | | | | .0002 | | .002 | 5 |
| A00979 | 140/120 | 3 | 280 | 56 | | 2 | 15 | 10 | .0093 | | | | | .007 | | | | .0003 | | .002 | 2 |
| A00980 | 140/120 | 2 | 240 | 30 | | 2 | 1 | 10 | .0062 | | | | | .005 | | | | .0002 | | .001 | 5 |
| A00981 | 145/120 | 3 | 370 | 52 | | 6 | 1 | | .0280 | | | | | .02 | | | | .001 | | .007 | 5 |
| A00982 | 140/120 | 5 | 320 | 82 | | 2 | 1 | | .0118 | | | | | .01 | | | | .0003 | | .0015 | 3 |
| A00983 | 220/120 | 14 | 660 | 120 | <50 | 10 | 1 | | .0357 | | | | | .03 | | | | .0007 | | .005 | 2 |
| A00984 | 340/120 | 56 | 1600 | 410 | 50 | 7 | 12 | | .2530 | .15 | | | | .05 | | .02 | | .003 | | .03 | 5 |
| A00985 | 120/120 | 2 | 1500 | 20 | | 1 | 7 | | .0062 | | | | | .005 | | | | .0002 | | .001 | 2 |
| A00986 | [illegible]20/120 | | 100 | 10 | | 2 | 15 | | .1108 | .1 | | | | .007 | | | | .0003 | .0015 | .002 | >5 |
| A00987 | 120/120 | | 160 | 18 | | 1 | 8 | | .0072 | | | | | .005 | | | | .0002 | | .002 | 2 |
| A00988 | 130/120 | | 190 | 17 | | 1 | 10 | | .0083 | | | | | .005 | | | | .0003 | | .003 | >5 |
| A00989 | 130/120 | 3 | 220 | 33 | | 4 | 10 | | .0157 | | | | | .01 | | | | .0007 | | .005 | 1 |
| A00990 | [illegible]0/120 | 4 | 140 | 47 | | 1 | 8 | | .0633 | .05 | | | | .007 | | | | .0003 | .001 | .005 | 3 |

UKON JOINT VENTURE 1979

HOKLUIT PROPERTY

| Sample Number | Radioactivity CPS in bag | $U_3O_8$ ppm | Nb ppm | Th ppm | Ta ppm | Sn ppm | W ppm | Au ppm | Total | Ce | Dy | Er | Eu | La | Lu | Nd | Sm | Yb | Sc | Y | K % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Rare Earths (%) | | | | | | | | | | | | |
| A00991 | 130/120 | 2 | 80 | 12 | | 1 | 2 | | .0032 | | | | | | | | | .0002 | .001 | .002 | 5 |
| A00992 | 140/120 | 4 | 60 | 28 | | 1 | 12 | | .0083 | | | | | .005 | | | | .0003 | .001 | .002 | 2 |
| A00993 | 140/120 | 3 | 100 | 23 | | 1 | 5 | | .0593 | .05 | | | | .005 | | | | .0003 | .001 | .003 | 3 |
| A00994 | 160/120 | 3 | 20 | 56 | | 2 | 1 | | .0093 | | | | | .007 | | | | .0003 | | .002 | 3 |
| A00995 | 380/120 | 23 | 1400 | 830 | | 45 | 5 | | .2770 | .2 | | | | .015 | | .03 | | .002 | | .03 | 1 |
| A00996 | 300/120 | 93 | 2500 | 150 | 100 | 80 | 14 | 10 | 1.164 | .406 | .01 | | .002 | .304 | .002 | .2 | .02 | .07 | | .15 | 2 |
| A00997 | 120/120 | 6 | 100 | 24 | | 2 | 8 | | .0012 | | | | | | | | | .0002 | | .001 | 3 |
| A00998 | 130/120 | 12 | 780 | 51 | | 35 | 7 | | .1950 | | | | | .03 | .005 | | .01 | .05 | | .1 | 5 |
| A00999 | 130/120 | 20 | 1000 | 61 | | 25 | 15 | | .2220 | .1 | .005 | | | .05 | .03 | | | .007 | | .003 | 5 |
| A01000 | 200/120 | 71 | 2500 | 200 | <50 | 1 | 35 | | .4395 | .2 | .5 | | .0015 | .15 | | .05 | | .003 | | .03 | 5 |
| A01451 | 180/120 | 8 | 100 | 300 | | 1 | 15 | | 2.139 | 1.70 | | | .001 | .157 | | .1 | | .001 | .15 | .03 | 2 |
| A01452 | 1200/120 | 45 | 1000 | 1930 | | 27 | 4 | 10 | .3530 | .15 | | | | .15 | | .02 | | .003 | | .03 | 1 |
| A01453 | 360/120 | 11 | 1000 | 330 | | 6 | 18 | | .0877 | .05 | | | | .03 | | | | .0007 | | .007 | 5 |
| A01454 | 150/120 | 5 | 480 | 64 | | 5 | 1 | | .0380 | | | | | .03 | | | | .001 | | .007 | 5 |
| A01455 | 140/120 | 6 | 380 | 52 | | 10 | 1 | 10 | .0275 | | | | | .02 | | | | .0005 | | .007 | 5 |
| A01456 | 200/120 | 5 | 380 | 160 | | 5 | 1 | | .0380 | | | | | .03 | | | | .0001 | | .007 | 5 |
| A01457 | 280/120 | 40 | 1800 | 620 | | 70 | 8 | 20 | .2030 | .07 | | | .001 | .05 | | .02 | | .007 | | .005 | 1 |
| A01458 | 150/120 | 2 | 260 | 76 | | 3 | 25 | | .0023 | | | | | | | | | .0003 | | .002 | 5 |
| A01459 | 270/120 | 34 | 2700 | | | 14 | 30 | | 1.243 | .487 | .02 | | .003 | .256 | .002 | .115 | .01 | .15 | | .2 | 3 |
| A01460 | 160/120 | 8 | 440 | 120 | | 1 | 12 | | .0210 | | | | | .01 | | | | .001 | | .01 | 3 |
| A01461 | 660/120 | 64 | 5000 | 870 | | 10 | 12 | | 1.20 | .546 | | | .0015 | .352 | | .2 | | .005 | | .1 | 1 |
| A01462 | 120/120 | | 100 | 10 | | 1 | 10 | | .006 | | | | | .005 | | | | | .001 | | 3 |
| A01463 | 540/120 | 37 | 1400 | 820 | | 1 | 15 | | .0465 | | | | | .03 | | | | .015 | | .015 | 0.5 |
| A01464 | 270/120 | 21 | 1000 | 320 | | 1 | 14 | | .0557 | | | | | .05 | | | | .0007 | | .005 | 1 |

## CONCLUSION

Although the Mississippian syenite dyke is anomalous in rare earth elements and niobium, there is no evidence of high grade concentrations and its average grade of 304 ppm REE and 336 ppm Nb is too low to be of interest.

Of the eight zones of anomalous radioactivity located in the metavolcanics, only Zones 1, 2 and 6 have sufficient size and grade to warrant further attention. Talus from Zone 1 and outcrop in nearby Zone 2 outline an area of interest about 100 m x 150 m in size where mineralized material returns assays up to 1.164% REE, 0.25% Nb and 0.01% Ta. Zone 6 is a 6 m wide by 30 m long dyke, open on both ends, which returned an assay of 1.2% REE and 0.5% Nb across a sample width of 10 m. This sample included 2 m of country rock on either side of the zone.

Respectfully submitted,

ARCHER, CATHRO AND ASSOCIATES LTD.

A.R. Archer, B.A.Sc., P.Eng.

/mc

92-122

RESULTS OF PROSPECTING

YMIP 1992

JAMES S. DODGE

# INTRODUCTION

The 1992 YMIP prospecting program by the writer was focused on the search for yttrium, niobium, zirconium, and rare earths (REE) in the Mississippian syenite terrane of the St. Cyr Range of the Pelly Mountains in south-central Yukon. Three areas chosen were: Porcupine Creek, Cloutier Creek, and Ketza River District.

Incentive for the search for a new Y+Nb+Zr+REE deposit was the favorable results the writer achieved in re-evaluating the former Nokluit occurrence under the 1991 YMIP. Staked as the LANCER claims, the deposit was shown to be an extensive metasomatized syenite dike with probable-economic concentrations of Y+Nb+Zr and attractive REE credits.*

As on the LANCER property, detailed ground radiometric scanning of outcrops is the only cost-effective method of prospecting, since in this style of mineralization the accompanying thorium and, to a lesser degree, uranium minerals serve as pathfinder signatures.

A hand-held Scintrex GIS-4 integrating gamma ray spectrometer was carried in a zig-zag and/or closely spaced multiple parallel traverse configuration over accessible syenite outcrop areas. This procedure, called "Prospection Systematique" was demonstrated to the writer in 1958 by the French Atomic Energy Commission at vein-type, overburden concealed uranium deposits in metropolitan France.

The GIS-4 permitted a discrimination of source of gamma radiation, i.e., proportionately from uranium, thorium, and potassium. Because of varying intensity of K-metasomatism in the syenite terrane, frequent re-evaluation of "background", vis-a-vis thorium+uranium, values was required.

From the LANCER investigation, the presence of purple fluorite was to be considered a reliable visual indicator of likely accompanying concentrations of Y+Nb+Zr.

Although the LANCER vein-type model was uppermost in the writer's prospecting anticipation, the potential for a carbonatite or even a syenite tuff stratiform deposit (Brockman in Western Australia) was also being considered. Since both of these latter two settings exhibit relatively weak gamma radiation signatures, uneasy field decisions kept evolving as to the prudent extent of rock sampling to be undertaken. On the other hand, it did broaden the investigative spectrum which, in fact, led to a surprising discovery.

* Subsequently, during 2 days in 1992 (outside the YMIP), a bold, continuous 300+ meter extension of the LANCER vein was discovered which from four samples representative of over 70 kg of outcrop sampling yielded probable-economic values in Y+Nb+Zr. Total inferred mineral resource now is 1,500,000 tonnes grading 0.15% $Y_2O_3$, 0.62% $Nb_2O_5$, 1.10% $ZrO_2$ and 1.37% REO; open at depth.

BC
Ministry of Energy, Mines and Petroleum Resources
Mineral Resources Division
**Geological Survey Branch**
**Hon. Jack Davis, Minister**

# HIGH-TECH METALS IN BRITISH COLUMBIA

BY JENNIFER PELL AND Z.D. HORA

INFORMATION CIRCULAR 1990-19

# NIOBIUM AND TANTALUM

## USES

Niobium, which is also referred to as columbium, is a metal used as an alloying element in the production of high-temperature specialty steels (high-strength, low-alloy, or HSLA steels) and superalloys used in heavy equipment, ships, structural steels and in nuclear, aerospace and pipeline applications. The addition of a small amount of niobium to steel helps control the grain size and thereby improves mechanical properties and strength-to-weight ratios. It also improves the heat resistance of steel which allows its use in gas and steam turbine engines, aircraft and aerospace power systems and heat shields on rocket nozzles. Niobium also has important potential as a superconductor of electricity at cryogenic temperatures (Griffith, 1970).

Tantalum is a relatively rare, heavy, inert metal that is used in electronics, chemical processing equipment, metal-cutting tools and high-temperature steel alloys. Tantalum capacitors are used in solid-state circuitry for computer and communications equipment used in space, defense and industrial fields. It is also used in electronic tubes, battery chargers, transistors and voltage-surge arresters. Because of its resistance to corrosion and good thermal conductivity it is used extensively in chemical and metallurgical processing equipment and laboratory ware. Tantalum is completely inert to human body fluids and can therefore be used in numerous medical applications such as screws to hold bones together, surgical staples to close wounds, replacement joints and bone parts (Griffith and Sheridan, 1970).

## OCCURRENCE-GEOLOGICAL SETTING

Niobium is the 33rd most abundant element in the earth's crust, which contains 24 ppm on average. The principal niobium-bearing mineral is pyrochlore, a niobium-titanium-calcium oxide, although other niobium-bearing species, such as columbite and fersmite, are also known. It is principally concentrated in carbonatites and related alkaline rocks; the Aley prospect in northern British Columbia is a good example of this type of deposit. To a lesser extent, niobium is also found in alkaline granite-syenite complexes, such as Thor Lake, N.W.T., associated with other 'high-tech' elements, or in pegmatites and tin deposits associated with volatile-enriched granite systems.

Tantalum is a relatively rare element, the 54th most abundant in the earths crust, where it has an average abundance of 2.1 ppm. It is generally associated with tin in skarns, greissens and pegmatites related to volatile-enriched granite systems. Tantalum is mined from the Tanco pegmatite, near Winnipeg, Manitoba. It also occurs in alkaline granite-syenite systems, as at Thor Lake, N.W.T. and Strange Lake, Labrador, and may also be present in carbonatites, generally in the mineral pyrochlore. In carbonatites and alkaline rocks the niobium/tantalum ratios commonly exceed 100, whereas in granitic rocks they average 4.8 (Currie, 1976). The exception are carbonatites in Blue River area, B.C. where niobium/tantalum ratio is 4.

Niobium occurs in all carbonatite complexes in B.C.; however, in most it is present in subeconomic concentrations, generally less than 0.3 per cent $Nb_2O_5$. The Aley carbonatite complex appears to have the greatest potential of any carbonatites so far discovered in this province. Work by Cominco Ltd. since 1982 has defined extensive zones containing between 0.66 and 0.75 per cent $Nb_2O_5$, and localized areas containing in excess of 2 per cent $Nb_2O_5$ (K. Pride, personal communication 1988), grades that easily rival the Niobec deposit at St. Honoré, Quebec. In light of the current soft niobium market, this deposit is not currently being developed.

Tin-bearing mineralization is associated with specialty granites in northern British Columbia in the Cassiar district and in some areas in the south of the province, but little information is available on the tantalum potential of these rocks. No tantalum pegmatites are known in British Columbia.

## ECONOMICS

The majority of the world's niobium is produced from carbonatites and residual weathered zones overlying carbonatite complexes. Approximately 85 per cent of total world production comes from Brazil, where pyrochlore has been concentrated by residual weathering to grades in the order of 3 per cent $Nb_2O_5$. In Canada, niobium is being mined by Niobec Inc. at St. Honoré, near Chicoutimi, Quebec, where grades are 0.5 to 0.67 per cent $Nb_2O_5$. Minor amounts are recovered as byproducts from placer tin placer mining in Nigeria. In 1988 and 1989 niobium concentrate (containing approximately 60 per cent $Nb_2O_5$ in pyrochlore or columbite) sold for $2.25 to 2.65US per pound, which was considerably down from the mid-1980s price of around $4.00US per pound.

Tantalum is principally recovered as a coproduct of mining, tin lodes, tin placers and beryllium-tin-niobium pegmatites (Griffith and Sheridan, 1970). The principal tantalum-producing countries are Zaire, Nigeria, Brazil, French Guiana, Mozambique, Thailand, Australia, Malaysia, South Africa and Canada. In 1989 tantalite sold for about $39US per pound of contained tantalium pentoxide.

Pyrochlore crystals from the Blue River carbonatite, British Columbia.

# POTENTIAL TARGETS IN BRITISH COLUMBIA

"High-tech" elements are commonly hosted by, or associated with the rock types identical in the accompanying table. In British Columbia, a number of carbonatite-syenite complexes and volatile-rich or "specialty" granites have been discovered and others may be recognized in the future. These rocks are good exploration targets for a number of the "high-tech" elements and will be described in more detail in the following sections. Carbonate-hosted lead-zinc and volcanogenic massive sulphide deposits are present in British Columbia; some are known to have anomalous concentrations of gallium and germanium and therefore should always be analyzed for those two elements.

Peralkaline granite-syenite complexes are important in that they may host significant quantities of a number of "high-tech" metals. Copper-rich breccia pipes are important potential gallium and germanium hosts. Neither of these environments have been recognized in British Columbia; however, brief descriptions are included in this report as no *a priori* reason exists for their absence. Bauxite deposits do not occur in British Columbia; the conditions for their formation (deep tropical weathering) never existed in this part of the world. Other deposit types mentioned are less important and, while they should not be overlooked by the prospector or geologist, will not be dealt with in any detail here.

## CARBONATITE - SYENITE SYSTEMS

Carbonatite/syenite complexes are mined for lanthanides, yttrium and niobium. They may also contain significant concentrations of zirconium and can be anomalous in tantalum. In Africa, Brazil and the U.S.S.R. they are also mined for associated copper, phosphate (apatite), iron and vermiculite. Nepheline syenite is quarried in Ontario for use in the glass industry (Currie, 1976). In the Jordan River area of British Columbia, northwest of Revelstoke, molybdenum associated with a nepheline syenite gneiss complex was extensively explored in the late 1960s (Fyles, 1970).

### DESCRIPTION

Carbonatites are igneous rocks composed of more than 50 per cent primary carbonate minerals, predominantly calcite or dolomite. Common accessory minerals include olivine, pyroxene (often sodic), amphibole (also, often sodic), phlogopite, apatite, magnetite, ilmenite, zircon columbite and pyrochlore. Other minerals such as feldspars, fluorite and rare-earth carbonates may also be present. Carbonatites occur most commonly as intrusive bodies; they may form as dikes, sills, plugs, veins or segregations in other alkaline rocks. Less common are extrusive carbonatite flows, tuffs or agglomerates. Metasomatic rocks (fenites), which are generally enriched in sodium and ferric iron and depleted in silica, are often developed marginal to intrusive carbonatites or carbonatite complexes.

Carbonatites can be associated with nephelinite or nephelinite/nepheline syenite complexes (*e.g.* the Ice River complex near Field, B.C.; Currie; 1975, 1976), with nepheline or sodalite syenites only (*e.g.* Paradise Lake carbonatite, near Blue River, B.C.; Pell, 1987), or with weakly alkaline syenites (*e.g.* Lonnie complex, near Man-

| ROCK TYPE/DEPOSIT TYPE | ASSOCIATED ELEMENTS |
|---|---|
| Carbonatite-syenite complexes | Nb, Y, REE, Zr, (Ta) |
| Volatile-rich granite systems | Be, Ta, Y, Ree, Nb |
| *Peralkaline granite-syenite systems | Be, Nb, Ta, Y, Ree, Zr, Ga |
| Carbonate-hosted lead-zinc deposits | Ga, Ge |
| Zinc-rich volcanogenic massive sulphide deposits | Ga |
| *Sediment-hosted, copper-rich breccia pipes and oxidized equivalents | Ga, Ge |
| *Bauxite deposits | Ga |
| Coals | Ge |
| Iron oxide deposits | Ge |
| Sedimentary phosphorites | Y |

* *Not known to occur in British Columbia*

son Creek, B.C.; Currie, 1976; Pell, 1987). The nephelinites associated with carbonatite complexes contain varying amounts of pyroxene (generally sodic or titanium-bearing) and nepheline. Nepheline and sodalite syenites generally contain potassium feldspar, nepheline and plagioclase feldspar with or without sodalite, with biotite or pyroxene as the common mafic phase. Weakly alkaline syenites do not contain feldspathoids. In all cases, the associated rocks are devoid of quartz as with the carbonatites.

In the field, carbonatites resemble marbles or other carbonate rocks, but in British Columbia most can be recognized by their unique orangish brown to dark reddish brown weathering colour, unusual mineral assemblage (apatite, olivine, pyroxene, magnetite, zircon, *etc.*) and anomalous radioactivity (the scintillometer is a useful prospecting tool). Other distinctive minerals such as purple fluorite may also be associated with carbonatite complexes. The most common associated igneous rock types are quartz-free syenites and nepheline or sodalite syenites which are usually white to greyish weathering. When present, nepheline can be identified in hand specimen by its slightly greyish colour and greasy lustre, while sodalite can be easily recognized by its distinctive ultramarine blue colour.

The fenites, or metasomatic alteration zones associated with intrusive carbonatite complexes, vary from being almost non-existent to forming halos extending several hundreds of metres into the hostrocks. Their nature is also highly variable, dependant on the original lithology and the composition of the fluids associated with the alkaline rocks. In general, calcsilicate and biotite-rich hostrocks are altered to sodic pyroxene and amphibole-rich rocks; quartzo-feldspathic protoliths (granites or quartz and feldspar-rich sedimentary rocks) are altered to rocks of syenitic or monzonitic composition; and carbonate hostrocks are altered to iron and magnesium-rich carbonates that may contain fluorite and rare-earth minerals.

Geochemically, carbonatites and related alkaline rocks are undersaturated with respect to silica and may contain high concentrations of elements such as strontium (generally 1000 ppm), barium, niobium and rare earths. Mineralization generally occurs in primary magmatic deposits; commonly, rare-metal enriched phases, crystallized directly from the melt, occur as accessory or, less commonly, rock forming minerals.

### DISTRIBUTION

In British Columbia, carbonatites, syenite gneisses and related alkaline rocks are present in a broad zone which follows the Rocky Mountain Trench. They occur in three discrete areas (Figure 2): along the western edge of the Foreland Belt, east of the Rocky Mountain Trench and immediately east of the Trench in the Cassiar Mountains (northeastern Omineca Belt); along the eastern edge of the Omineca Belt; and within the Omineca Belt in the vicinity of the Frenchman Cap dome, a core gneiss complex.

Carbonatites and related rocks in the Foreland and northeastern Omineca belts are generally present in large, multiphase intrusive and extrusive complexes with extensive metasomatic or contact metamorphic alteration halos overprinting Middle Cambrian to Middle Devonian miogeoclinal hostrocks. Carbonatites along the eastern margin of the Omineca Belt are found westward from the Rocky Mountain Trench for 50 kilometres or more. All the intrusions within this belt are hosted by late Precambrian (Upper Proterozoic) to early Cambrian metasedimentary rocks. They form foliated sill-like bodies and are associated with only minor amounts of fenitization. Along the margins of the Frenchman Cap gneiss dome, intrusive and extrusive carbonatites and syenite gneiss bodies are conformable in a mixed paragneiss succession of probable late Proterozoic to Eocambrian age (Pell and Höy, 1989; Pell, in preparation).

Alkaline igneous rocks intruding Paleozoic strata in the Foreland and northeastern Omineca belts are of Devono-Mississippian and possibly Silurian ages. Carbonatites and syenites hosted by Precambrian rocks in the eastern Omineca Belt are predominantly Devono-Mississippian. All have been deformed and metamorphosed to some degree; those in the Foreland and northeastern Omineca belts were subjected to sub-greenschist to greenschist facies metamorphism, while those elsewhere in the Omineca belt attained upper amphibolite facies (Pell and Höy, 1989; Pell, 1987, and in preparation).

Carbonatites with the best economic potential for "high-tech" elements appear to be those of mid-Paleozoic age hosted by Paleozoic sediments that are found in the Rocky Mountains and eastern Cassiar Mountains, however, carbonatites found elsewhere should not be overlooked.

## VOLATILE-RICH GRANITES

In many parts of the world, "specialty" or volatile-enriched granitoids of 'topaz rhyolite' affinity are metallogenically linked to deposits of a variety of high-tech metallic and non-metallic minerals such as beryllium, yttrium, rare-earths, niobium and to deposits of tin, tungsten, molybdenum and possibly gold. Important deposit types include: Climax-type molybdenum-tungsten porphyries; silver-lead-zinc manto deposits, such as Santa Eulalia, Mexico and Midway, British Columbia; tin skarn deposits; replacement fluorite deposits, for example Las Cuevas, Mexico or beryllium deposits such as Spor Mountain, Utah.

## DESCRIPTION

Volatile-enriched or "specialty" granites may be of two types. The first are generally not true granites, in the strictest petrographic sense, but are commonly alaskites (alkali feldspar granites). They have a low colour index and contain few mafic minerals; biotite is the most common and alkaline clinopyroxene (aegirine) or alkaline amphibole (riebekite or arfvedsonite) may also be present. Accessory minerals may include titanite (sphene), magnetite, apatite, zircon, allanite, fluorite, melanite garnet and monazite. Miarolitic cavities lined with quartz, feldspar, biotite, fluorite and alkaline amphiboles are commonly developed. Quartz syenites are also often present in zoned intrusions with the alaskites. Associated mineralization generally consists of one or more of molybdenum, tungsten, tin, fluorine, uranium, thorium, niobium, tantalum, yttrium or rare-earth elements in vein, greissen, skarn, porphyry or pegmatitic deposits (Anderson, 1988).

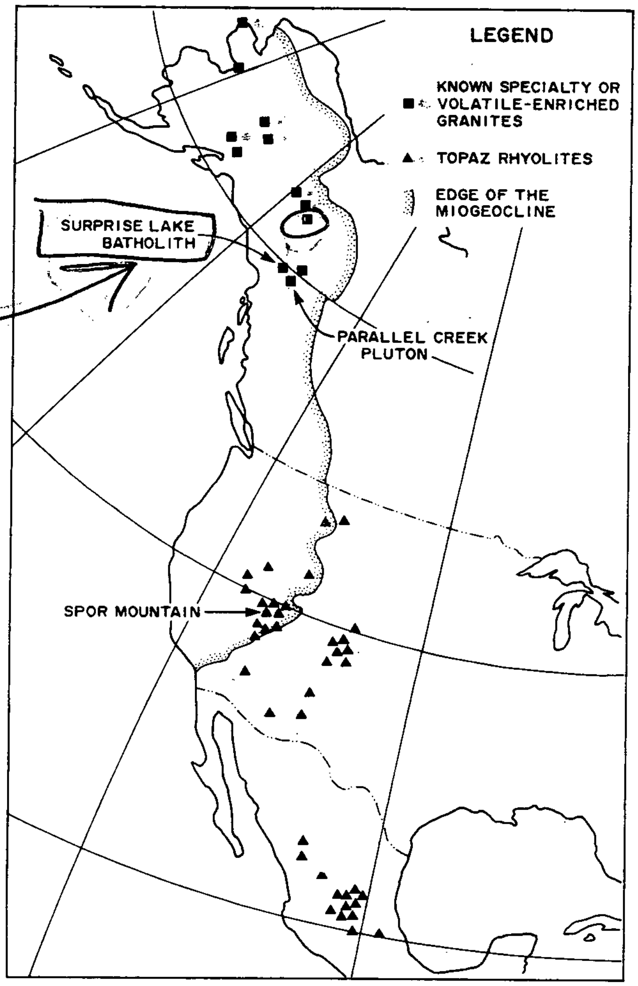



Figure 3. Distribution of specialty granites in western North America.

Two-mica granites, or more accurately, quartz monzonites may also be enriched in volatile elements. These rocks commonly have low colour indexes and contain plagioclase, potassic feldspar, quartz, muscovite, biotite and accessory tourmaline, fluorite, ilmenite, monazite and topaz. Miarolitic cavities containing quartz, feldspar and tourmaline are commonly developed. As is the case with the previous example, quartz syenites are common plutonic associates. Mineralization related to these granitic rocks may consist of tin, tungsten, copper, beryllium, zinc and, to a lesser extent, molybdenum in skarn, greissen or vein deposits (Anderson, 1988; Swanson *et al.*, 1988).

In both cases, the granitic rocks are characterized by high silica contents ($SiO_2$ >70 wt%), $K_2O$ > $Na_2O$, relatively low $TiO_2$ and high concentrations of associated volatile-enriched elements such as fluorine. In general, they are peraluminous to peralkaline in composition. As well, $^{87}Sr/^{86}Sr$ isotopic ratios are commonly greater than 0.708, although the alaskites may have strontium ratios as low as 0.703. In western North America, most volatile-enriched granitoids are late Cretaceous to early Tertiary in age (Anderson, 1988; Barton, 1987).

The volatile-enriched granite environment can be most easily recognized by its geochemical signature or by the recognition of petrologic features such as miaroli cavities or accessory minerals such as fluorite. Regional geochemical surveys are a good prospecting tool; granitic bodies with associated fluorine, tin, tungsten, uranium and molybdenum anomalies are potential hosts for deposits of "high-tech" metals, particularly rare earths, yttrium, beryllium, niobium and tantalum. As previously mentioned, the deposits can occur in many forms, such as skarns, greissens, veins and pegmatites. In many cases, the mineralization is not obvious; some tin-fluorite skarns known as wrigglites (Kwak, 1987) look more like banded metasediments than conventional skarns. In exploring for these deposits any slightly unusual or altered rock should be carefully examined and, if in doubt, analyzed.

## DISTRIBUTION

A well-defined belt of topaz rhyolites and specialty granites exists north and south of British Columbia within the Cordillera (Figure 3), with numerous examples in the western United States and Mexico (Barton, 1987; Burt *et al.*, 1981, 1982; Christiansen *et al.*, 1986; Ruiz *et al.*, 1985) and in Alaska and the Yukon (Anderson, 1986; Ballantyne *et al.*, 1978, 1982, 1983; Mitchell and Garson, 1981; Sinclair, 1986; Taylor, 1979). With the exception of the Surprise Lake batholith near Atlin, and the Parallel Creek batholith between Cassiar and Teslin Lake (Ballantyne and Ellwood, 1984), no examples have been documented in British Columbia. However, there are a number of indirect indicators - namely fluorine and uranium anomalies in stream waters and silts, in some

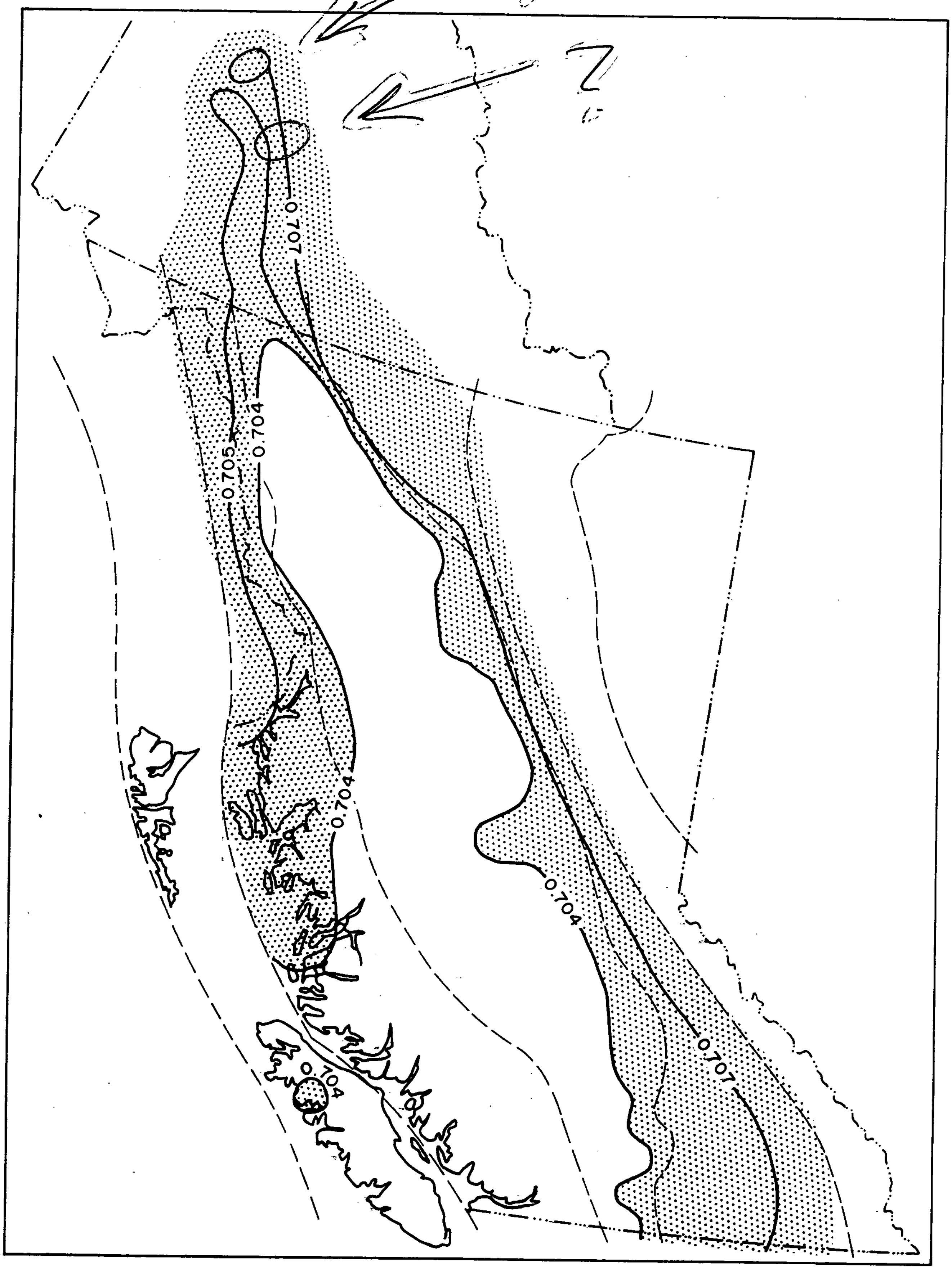



Figure 4. Map of the Canadian Cordillera showing Mesozoic $^{87}Sr/^{86}Sr$ initial ratios.

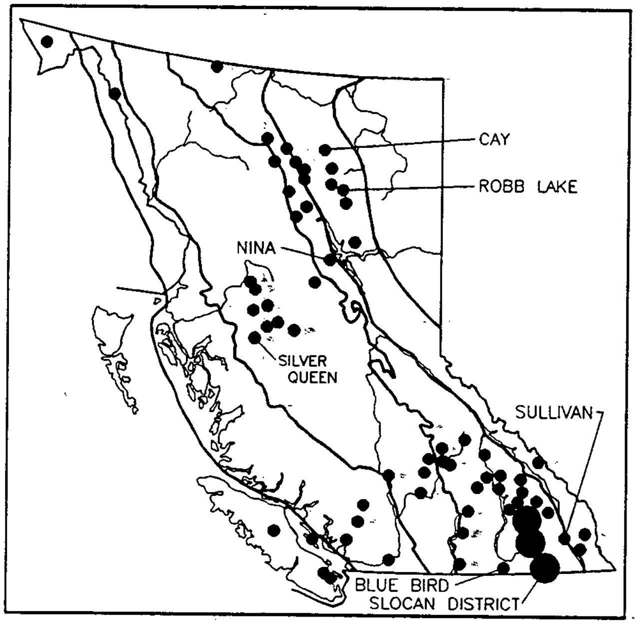



Figure 5. Location of lead-zinc deposits in B.C.

cases with coincident tin, tungsten and molybdenum anomalies, that point to the possible presence of these metallogenically important rocks in British Columbia. Isotopic evidence (Armstrong, 1985) indicates that volatile-enriched granites could possibly exist anywhere in the Cordillera where initial $^{87}Sr/^{86}Sr$ are greater than 0.704, that is areas underlain by Precambrian basement or tectonically reworked Precambrian basement or Proterozoic continent-derived clastic sedimentary rocks (Figure 4).

## LEAD-ZINC-COPPER DEPOSITS

Lead-zinc-copper accumulations occur in many geological environments, forming carbonate-hosted (Mississippi Valley type) deposits, volcanogenic massive sulphide deposits (Kuroko type, Beshi type, *etc.*), sedimentary exhalative deposits (Sullivan type), skarns, mantos and veins. Trace metals, in particular gallium and germanium, can be concentrated in these deposits, commonly within the sphalerite lattice or as discrete mineral grains (*e.g.* germanite) forming inclusions within sphalerite or along sphalerite grain boundaries, however, concentrations vary greatly from deposit to deposit. Carbonate-hosted deposits, as a class, have the best potential for containing anomalous germanium concentrations. Zinc concentrates from these deposits may contain as much as 6000 ppm germanium. Individual carbonate-hosted or sedimentary exhalative deposits can be extremely anomalous with respect to gallium (in excess of 600 ppm Ga in sphalerite concentrates), but volcanogenic massive sulphide deposits, on average, have higher gallium contents (Leighton *et al.*, 1989).

It is beyond the scope of this review to deal in detail with all lead-zinc deposits. Because of the wide range of geologic environments in which they form, they are found in a variety of localities and associated with rocks of varying ages. Studies to date (Leighton *et al.*, 1989) indicate that, in British Columbia, carbonate-hosted deposits contain the greatest concentrations of gallium and germanium. These trace metal enriched deposits, for example the Cay prospect in the Robb Lake belt, are commonly characterized by the presence of distinctive reddish orange sphalerite, an abundance of pyrobitumen and silicification. Any lead-zinc-copper prospect should be checked for the presence of trace metals; elevated concentrations of elements such as gallium and germanium could potentially raise a marginal prospect to economic status.

]

ION

| Upper Limit |
|---|
| 200 ppm |
| 20 % |
| 10000 ppm |
| 200 ppm |
| 10000 ppm |
| 1000 ppm |
| 4000 ppm |
| 40 % |
| 2000 ppm |
| 4000 ppm |
| 4000 ppm |
| 10000 ppm |
| 10000 ppm |
| 60 % |
| 1000 ppm |
| 10 % |
| 10000 ppm |
| 2000 ppm |
| 30 % |
| 10000 ppm |
| 4000 ppm |
| 10 % |
| 2000 ppm |
| 10000 ppm |
| 5 % |
| 10000 ppm |
| 2000 ppm |
| 10 % |
| 4000 ppm |
| 2000 ppm |
| 2000 ppm |
| 10000 ppm |
| 2000 ppm |
| 4000 ppm |
| 10 % |
| 4000 ppm |
| 10000 ppm |
| 200 ppm |
| 2000 ppm |
| 10000 ppm |
| 2000 ppm |

nd Group 1EX)

# GEOCHEMICAL – Ultratrace ICP-MS

## GROUP 1F-MS & 1T-MS ULTRATRACE BY ICP-MS

### Group 1F-MS – Aqua Regia Digest

uses an aqua regia digestion to give total to near total precious and base metals and a partial leach for rock-forming elements*. A 1 gm sample is standard; 15 and 30 gm options are available to reduce the nugget effect for elements in rare or coarse-grained minerals (eg. Au). Intended for lean geological materials, samples undergo a primary ICP-ES scan. ***High-grade samples (See upper limits in table) will be analysed by the High-grade Option (See below.)***

| | Cdn | U.S. |
|---|---|---|
| 1st element | $8.50 | $6.55 |
| Any 6 elements | $10.00 | $7.70 |
| Any 11 elements | $11.50 | $8.85 |
| Full Suite | $15.50 | $11.95 |
| Run 15 gm sample........add | $3.00 | $2.30 |
| Run 30 gm sample........add | $5.00 | $3.85 |
| Pt (2 ppb) & Pd (10 ppb)..add | $3.90 | $3.00 |
| Optional elements.......... each | $0.70 | $0.50 |
| Rare earth element suite . add | $5.20 | $4.00 |
| High-grade Option (0.25 g sample, 10X higher d.l.) | $23.00 | $17.75 |

### Group 1T-MS – 4-Acid Digest

like Group 1E, uses a 4-Acid digestion on a 0.25 gm sample for total to near total concentrations on all elements including rock-forming elements. Some elements are partially lost due to volatilization‡. Optional 1 g analysis available.

Detection limits may change without notice due to nature of some samples. Massive sulphide samples will cause elevated detection limits.

| | Cdn | U.S. |
|---|---|---|
| 1st element | $11.00 | $8.50 |
| Any 6 elements | $12.50 | $9.65 |
| Any 11 elements | $14.00 | $10.78 |
| Full Suite | $18.00 | $13.85 |
| Rare earth element suite..add | $5.20 | $4.00 |
| Optional 1 gm analysis ....add | $3.00 | $2.30 |

| | Group 1F-MS Detection | Group 1T-MS Detection | Upper Limit |
|---|---|---|---|
| Au | 0.2 ppb | - | 100 ppm |
| Ag | 2 ppb | 20 ppb | 100 ppm |
| Al* | 0.01 % | 0.02 % | 10 % |
| As‡ | 0.1 ppm | 0.2 ppm | 10000 ppm |
| B* | 1 ppm | - | 2000 ppm |
| Ba* | 0.5 ppm | 1 ppm | 10000 ppm |
| Bi | 0.02 ppm | 0.04 ppm | 2000 ppm |
| Ca* | 0.01 % | 0.02 % | 40 % |
| Cd | 0.01 ppm | 0.02 ppm | 2000 ppm |
| Co | 0.1 ppm | 0.2 ppm | 2000 ppm |
| Cr* | 0.5 ppm | 1 ppm | 10000 ppm |
| Cu | 0.01 ppm | 0.02 ppm | 10000 ppm |
| Fe* | 0.01 % | 0.02 % | 40 % |
| Hg | 5 ppb | - | 100 ppm |
| Ga | 0.1 ppm | 0.02 ppm | 100 ppm |
| K* | 0.01 % | 0.02 % | 10 % |
| La* | 0.5 ppm | 1 ppm | 10000 ppm |
| Mg* | 0.01 % | 0.02 % | 30 % |
| Mn* | 1 ppm | 2 ppm | 10000 ppm |
| Mo | 0.01 ppm | 0.02 ppm | 2000 ppm |
| Na* | 0.001 % | 0.002 % | 10 % |
| Ni* | 0.1 ppm | 0.2 ppm | 10000 ppm |
| P* | 0.001 % | 0.002 % | 5 % |
| Pb | 0.01 ppm | 0.02 ppm | 10000 ppm |
| S* | 0.01 % | 0.02 % | 10 % |
| Sb‡ | 0.02 ppm | 0.02 ppm | 2000 ppm |
| Sc* | 0.1 ppm | 0.1 ppm | 100 ppm |
| Se | 0.1 ppm | - | 100 ppm |
| Sr* | 0.5 ppm | 1 ppm | 10000 ppm |
| Te | 0.02 ppm | - | 100 ppm |
| Th* | 0.1 ppm | 0.2 ppm | 2000 ppm |
| Ti* | 0.001 % | 0.002 % | 10 % |
| Tl | 0.02 ppm | - | 100 ppm |
| U* | 0.1 ppm | 0.2 ppm | 2000 ppm |
| V* | 2 ppm | 4 ppm | 10000 ppm |
| W* | 0.2 ppm | 0.4 ppm | 100 ppm |
| Zn | 0.1 ppm | 0.2 ppm | 10000 ppm |
| Be | 0.1 ppm | 1 ppm | 1000 ppm |
| Ce | 0.1 ppm | 0.02 ppm | 2000 ppm |
| Cs | 0.02 ppm | 0.1 ppm | 2000 ppm |
| Ge | 0.1 ppm | - | 100 ppm |
| Hf | 0.02 ppm | 0.02 ppm | 1000 ppm |
| In | 0.02 ppm | - | 1000 ppm |
| Li | 0.1 ppm | 0.2 ppm | 2000 ppm |
| Nb | 0.02 ppm | 0.04 ppm | 2000 ppm |
| Rb | 0.1 ppm | 0.1 ppm | 2000 ppm |
| Re | 1 ppb | - | 1000 ppm |
| Sn | 0.1 ppm | 0.1 ppm | 100 ppm |
| Ta | 0.05 ppm | 0.1 ppm | 2000 ppm |
| Y | 0.01 ppm | 0.1 ppm | 2000 ppm |
| Zr | 0.1 ppm | 0.2 ppm | 2000 ppm |

SHADED ELEMENTS ARE OPTIONAL

**(Minimum analytical charge of CDN $25.00 or US $19.25)**

② 5

suggests silt and pan conc. in streams.
Acme now has a good test for rare
earths + Ta, Nb + others.
(l) Interest is high but lower than interest
for PLATINUM group elements at the
Round-up; no talk on TANTALUM!
(m) Yukon geochem. surveys never did
test for Ta or Nb but many areas
have anomolous amounts of Sn, W, U, etc.
Possible assoc with pegmatites and
Ta, Nb.

2A LANCER PROJECT
Radioactive and rare earth minerals
are associated with purple fluorite in
skarns peripheral to a small Mississipian
syenite stock cutting Cambrian carb.
rocks. Similar mineralization is
found nearby in narrow siliceous
veins cutting trachyte + tuff of Miss.
age. (1-8)
In past 1979 NOKLUIT claims on
same location: assess report 090577
states (YUKON JV) Chevron + Kerr Addison.
64 rocks tested for Radioact, $U_3O_8$, Nb, Sn,
W, REE
4 ONLY tested for Ta

ppm

| Nb | Ta |
| --- | --- |
| 660 | < 50 |
| 1600 | 50 ← |
| 2500 | 100 ← |
| 2500 | < 50 |

② 6

Best rock was .25% Nb and 0.01 % Ta

J. Dodge later staked the Lancer 1-8 claims in 1991 and stated (same area) TOTAL INFERRED MINERAL RESOURCE now is 1,500,000 Tons 0.15% $Y_2O_3$

0.62% $Nb_2O_5$

after 1992 season 1.10 % $ZrO_2$

1.37% REO

open at depth.

NB No tantalum data is mentioned.

My plan for 2001 is to restake the LANCER 1-8 claims as early as possible.

- RESTAKE and record 8 claims
- Locate veins, skarns by
  - PURPLE FLUORITE
  - Hand held SCINTREX GIS-4 integrating gamma ray spectrometer
- take samples of Float and Bedrock
- locate JIM DODGE'S FOOTWALL, VEIN } zones
- take samples of → VEIN, → FOOTWALL, HANGING WALL } zones

(page.1 1995 OPEN FIRE -3(T))

- all samples will be tested for ACME'S - ULTRATRACE IF-MS (Au+36el) plus Rare EARTH Suite

detection level

TA 0.05 PPM Nb 0.02 ppm

② 7

NB If .25% Nb has 0.01% Ta (1979 TESTS), higher values of Nb may produce Ta values of over .02% (economic threshold?).

Upon completion of the project and season I will give to the YMIP a journal with all data, assays, conclusions, maps, receipts, etc and a TECHNICAL REPORT. All WORK will be done "INDUSTRY STANDARDS" and all bills will be paid.

Reclamation and environmental work (pits, camps, trenches, access, etc) will be done to "industry standards" and as regulations are stated. Campsites will be cleaned up, all garbage will be removed and taken out.

(2) 8

## References


- HIGH TECH METALS in BC
  INFORM. CIRCULAR 1990-19
- ROCK Sampling PROgram (1979)
  NOKLIUT PROPERTY (1-8 claims)
  # 090577 assess report!
- RESULTS OF PROSPECTING YMIP 1992
  #92-122 James S. Dodge
- MINFILE 105 F QUIET LAKE
  105F080 NOKLUIT.
  105F014, 105F015, 105F016,
  105F072, 105F081, 105F117
- OPEN FILE (1995 - 3(T))
  MINERALOGICAL ANALYSIS OF ORE
  SPECIMENS From the Rare Earth
  Deposit of DODGEX LTD.
- ~~GEOLOGY~~ PART 1+2
- GEOLOGY OF CAN. MIN. DEPOSIT TYPES
  (1995) 21. GRANITE PEGMATITES
  23. PERALKALINE ROCK-ASSOC
  RARE metals
  24. CARBONATITE-ASSOC. DEPOSITS
- NUMEROUS BROCHURES on TANTALUM
  + NIOBIUM
- GSC - Rock kit
  Ta + Nb samples

(2) 9

2001 YMIP
PROJECT [2A] LANCER

## BUDGET

| | ($) |
|---|---|
| **1ST TRIP** | |
| DIEM 1 → work, 1 back (9) 7 Days $9 × 35 | 305 |
| GAS 360 KM × 2 × $.42 | 288 |
| TRUCK $1450 × 1/2 m × 25% self owned | 181 |
| RADIO $150/m × 1/2 × 25% | 19 |
| Helicopter in 800, out 700 | 1500 |
| Rocks $25 × 25 | 625 |
| misc | 300 |
| | $ 3218 |
| **2ND TRIP** | |
| DIEM 1 → RR, 1 → WH, 9 Day (11) = 11 × $35 | 385 |
| gas | 288 |
| TRUCK | 181 |
| RADIO | 19 |
| Helicopter ? (? Road ?) | 1400 |
| Rocks $50 × 25 | 1250 |
| SCINTREX GIS-4 Rent | 500 |
| misc | 300 |
| | $ 4323 |

TOTAL 3218 + 4323 → $ 7540

Indian and Northern Affairs Canada / Affaires indiennes et du Nord Canada
Northern Affairs Program / Programme des affaires du Nord

Mineral Rights / Droits miniers

SEE ADJACENT MAP SHEET(S) EDGES FOR ADJOINING MINERAL CLAIMS NOT SHOWN ON THIS MAP

# 105F-9
## QUARTZ & PLACER

LATITUDE 61°30' TO 61°45'
LONGITUDE 132°00' TO 132°30'

ISSUED UNDER THE AUTHORITY OF THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

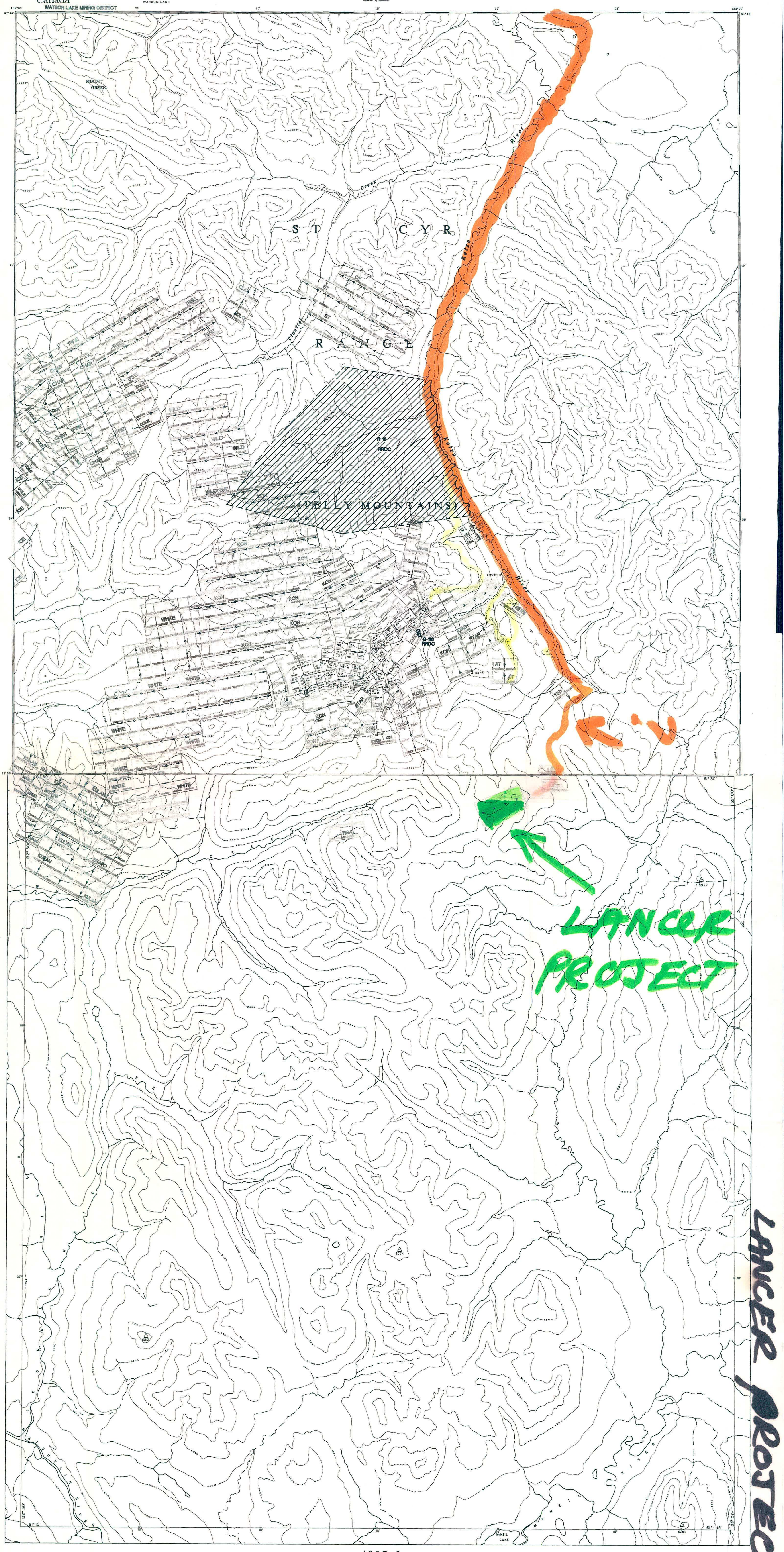
SCALE 1:31,680

DEC 1, 2000

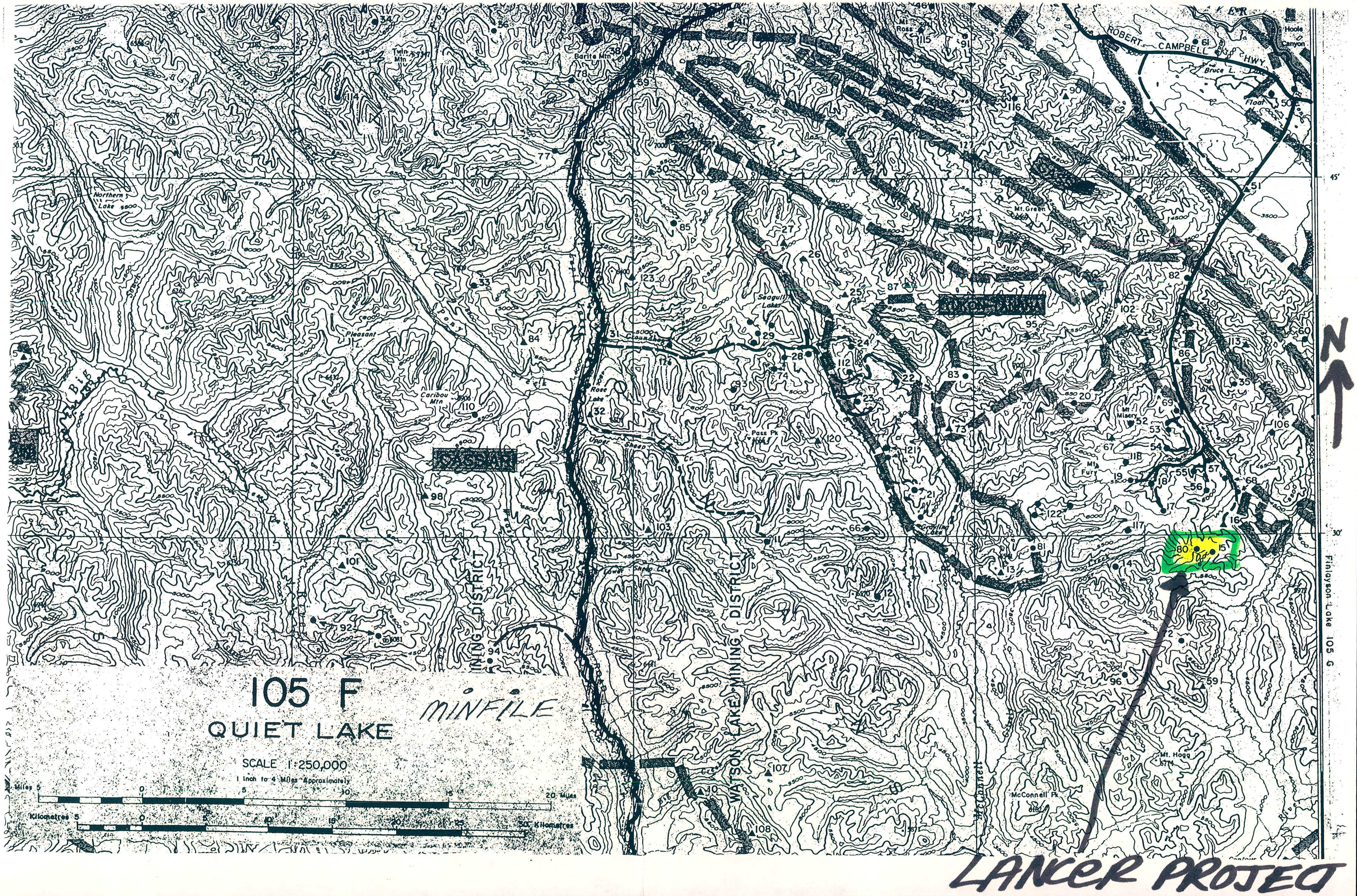
NOTE:
THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS WHATSOEVER.
TOPOGRAPHY COMPILED FROM 1:50,000 NATIONAL TOPOGRAPHIC SERIES.
CONTOUR INTERVAL 500 FEET.
SURVEY INFORMATION COMPILED FROM LEGAL SURVEYS, BY DRAFTING SERVICES.

| 105F-15 | 105F-16 | 105G-13 |
| --- | --- | --- |
| 105F-10 | 105F-9 | 105G-12 |
| 105F-7 | 105F-8 | 105G-5 |

Canada
WATSON LAKE MINING DISTRICT




105F-8



105 F
QUIET LAKE
SCALE 1:250,000
1 Inch to 4 Miles Approximately
Miles
20 Miles
Kilometres
30 Kilometres
MINFILE
ROBERT CAMPBELL HWY
Hoole Canyon
Bruce L.
Mt. Green
YUKON-TANANA
CASSIAR
Seagull Lake
Northern Lake
Pleasant
Caribou Mtn
Rose Lake
Twin Mtn
Barite Mtn
Pass Pk
Mt. Misery
Mt. Fury
Grayling Lake
Mt. Hogg
McConnell Pk
MINING DISTRICT
WATSON LAKE MINING DISTRICT
Finlayson Lake 105 G
N
LANCER PROJECT

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Sonny
**MINFILE #:** 105F 014
**MAJOR COMMODITIES:** Ag,Pb,Au
**MINOR COMMODITIES:** Cu
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 8
**LATITUDE:** 61°29'00"N
**LONGITUDE:** 132°17'00"W
**DEPOSIT TYPE:** Vein
**STATUS:** Showing

## CLAIMS

RAIN, GREY, CALCO, SONNY, SUNNY, SHARON, PH, REO, JO, PIZZA, ST PETER, JESSIE, GP, RIBA

## WORK HISTORY

Staked as Rain cl (71341) in Sep/55 by British Yukon EL, which conducted mapping, rock trenching and sampling in 1956-57. Restaked by P. Versluce as Grey cl (79545) in Jul/62, as Calco and Sonny cl (88979) in Oct/64, and as Sunny cl (Y13292) in Jul/66. The Sharon cl (Y17688) were tied on to the east side by Northwest EL (International Utilities and Hudson's Bay O & GCL) in Apr/67, which performed prospecting and geochem sampling in Aug/67. Versluce added the PH cl (Y28688) to the west and southeast in Oct/68.

Restaked as Reo 1-12 cl (YA46895) in Feb/80 by I. Jacobsen, who added a second group of Reo 25-32 cl (YA46919) 3.2 km to the east, and as Jo cl (YA70320) in Aug/83 by M. Tremblay. Restaked as Pizza cl (YA90283) in Sep/85 by Cruiser Mls L, and as St Peter, Jessie, Sonny, GP, etc (YA99516) in Oct/87 by Golden Pavilion Res L, which carried out mapping, geochem, mag and VLF EM surveys, and hand trenching in 1987.

Restaked as Riba cl 1-6 (YB60978) by R. Berdahl in Aug/95.

## GEOLOGY

Rich tetrahedrite float assaying 17 800 g/t Ag is rumoured to have been found in this vicinity in 1955. The area is underlain by Cambrian limestone and dolomite. No mineralization was found in 1967 although a small, well defined lead anomaly was outlined on the Chalco 4 and 5 claims. The 1987 work located 35 showings, 25 of which are mantos.

The main zone is 1.2 km long and averages about 8 m wide. It is marked by conspicuous gossans and covers a string of showings, including the Ridley, Main, Gray and Young showings. The mineralogy changes along strike from siderite, pyrite and pyrrhotite with high gold values at the Ridley and Main showings, to pyrite, arsenopyrite, pyrrhotite and galena with high silver values at the Young and Gray Showings.

Trenching on the Main Showing exposed material grading up to 9.9 g/t Au, while samples from the Gray Showing returned up to 274.3 g/t Ag and 1.5% Pb.

Other showings consist mostly of massive quartz veins, some of which return elevated gold values or are mineralized with copper.

## REFERENCES

NORTHWEST EXPLORATION LTD, Nov/67. Assessment Report #018888 & 018889 by A.R. Archer.

YUKON EXPLORATION 1987, p. 151-152.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Kay
**MINFILE #:** 105F 015
**MAJOR COMMODITIES:** Pb,Zn,Ag
**MINOR COMMODITIES:** Cu,F,Ba,REE,Sb
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 8
**LATITUDE:** 61°29'15"N
**LONGITUDE:** 132°08'57"W
**DEPOSIT TYPE:** Mississippi Valley
**STATUS:** Prospect

## CLAIMS (PREVIOUS AND CURRENT)

KAY, PYRITE, SHARON, KATZ, PESCOD, FRED

## WORK HISTORY

Staked as Kay cl (69843) in Oct/54 by H. Versluce for British Yukon ECL, which performed mapping and minor trenching in 1955 and added Pyrite cl (71410) on the southwest side in Sep/55. Restaked as part of a large block of Sharon cl (Yl7657) staked to the east in Apr/67 by Northwest EL (International Utilities L & Hudson's Bay O & GCL), which conducted geochem surveys and prospecting in Aug/67.

Restaked as Katz cl (YA90571) in Feb/86 by Noranda, which performed mapping and soil sampling in 1986. S. Patnode tied on Pescod cl (YA90287) to the east in Nov/85 and transferred them to Fairfield Mls L, which performed soil sampling in 1986 and mapping and road work in 1987. Fairchild optioned the claims to Cons Rio Plata Res L, which added Fred cl (YB12079) to the west in May/88.

## GEOLOGY

Galena and sphalerite occur with chalcopyrite and tetrahedrite in quartz-barite-fluorite veins, fracture zones and breccia zones, and disseminated in wall rock. The veins and breccia zones cut Early Cambrian limestone and dolomite and overlying Devonian carbonates and Mississippian phyllite and mafic volcanic rocks.

Chip samples across a 2.5 m wide, ESE-trending galena-quartz vein averaged 1210 g/t Ag, 27% Pb, 16.5% Zn, 0.5% Cu and 0.4% Sb, while a specimen from a secondary structure returned 40 g/t Ag, 1.0% Pb and 0.7% Zn across 0.5 m.

## REFERENCES

BRITISH YUKON EXPLORATION CO. LTD, Jan/56. Assessment Report by A.E. Aho & W.A. Padgham.

GEOLOGICAL SURVEY OF CANADA, Paper 68-68, p. 76-77.

NORTHWEST EXPLORATION LTD, Nov/67. Assessment Report #018892 by A.R. Archer.

YUKON EXPLORATION 1985-86, p. 221-222.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Sharon
**MINFILE #:** 105F 016
**MAJOR COMMODITIES:** Ag,Pb
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 9
**LATITUDE:** 61°30'00"N
**LONGITUDE:** 132°08'00"W
**DEPOSIT TYPE:** Vein
**STATUS:** Prospect

## CLAIMS

SLOCO, BEAR, MAC, JANET, SHARON, KET, REO, KETZA

## WORK HISTORY

Staked as Sloco cl (70232) in Mar/55 by E. Brooke, and Bear cl (70415) in May/55 by R.J. Lindsay & I. Goulter. Hand trenching was done on both properties. Restaked as Mac cl (75677) in May/61 by Dualco Synd, and as Janet, etc cl (Y17322) in Feb/67 by E. Brodhagen. The Janet group was optioned in April to Northwest EL (International Utilities and Hudson's Bay O & GCL), which added the Sharon cl (Y17579) in Apr/67 and explored with geochem sampling and prospecting in 1967 and bulldozer trenching in 1968. The claims were transferred to E.R. Mead in Oct/71.

Restaked as Ket cl (YA388) in Aug/76 by Noranda, which explored with geochem sampling, mapping and an EM survey in 1976; and as Reo 17-24 cl (YA46911) in Feb/80 by I. Jacobsen. Restaked as Ketza cl (YA72455) in Oct/84 by a joint venture between Quillo Res Inc and High River Res L, which performed mapping and geochemical sampling in 1986 and transferred the property to Canamax Res in 1986. Canamax explored with an airborne mag survey and geochemical and VLF EM surveys in 1987 before transferring the claims back to High River and Quillo in Dec/89.

## GEOLOGY

Most geochemical anomalies on the property were found to be caused by weakly mineralized quartz lenses in phyllite, but bulldozer trenching exposed two north-trending veins about 460 m apart. The veins cut Middle Cambrian phyllite and thin-bedded quartzite with intermixed tuffaceous lenses. The first vein returned 202.3 g/t Ag and 5.5% Pb over a width of 0.6 m for a length of 21 m, and the second returned 476.6 g/t Ag and 20.6% Pb over a width of 1.8 m and length of 21.3 m.

Noranda found two small showings of possible replacement mineralization.

## REFERENCES

GEOLOGICAL SURVEY OF CANADA, Paper 68-68, p. 76-77.

NORTHWEST EXPLORATION LTD, Nov/67. Assessment Reports #018888 & 9 by A.R. Archer.

NORTHWEST EXPLORATION LTD, May/1968. Assessment Report #092932 by A.R. Archer

NORTHWEST EXPLORATION LTD, Dec/1968. Assessment Report #092914 by A.R. Archer.

YUKON EXPLORATION 1985-86, p. 217-218.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Young
**MINFILE #:** 105F 072
**MAJOR COMMODITIES:** Cu
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 8
**LATITUDE:** 61°25'33"N
**LONGITUDE:** 132°11'50"W
**DEPOSIT TYPE:** Skarn
**STATUS:** Showing

---

## CLAIMS (PREVIOUS AND CURRENT)

MUMS

## WORK HISTORY

Staked as Mums cl (YA537) in Aug/76 by Utah ML, which performed mapping and geochem sampling in 1976.

## GEOLOGY

Chalcopyrite and pyrrhotite occur at the contact between a Cretaceous granodiorite stock and shale, carbonate and volcanic rocks of Cambro-Ordovician age.

## REFERENCES

MINERAL INDUSTRY REPORT 1977, p. 80.

# YUKON MINFILE
## CANADA YUKON ECONOMIC DEVELOPMENT PLAN
## MINERAL RESOURCES SUBAGREEMENT

**NAME(S):** Guano
**MINFILE #:** 105F 081
**MAJOR COMMODITIES:** Th,REE,Nb
**MINOR COMMODITIES:** U,F
**TECTONIC ELEMENT:** Yukon Tanana Terrane

**NTS MAP SHEET:** 105 F 8
**LATITUDE:** 61°29'00"N
**LONGITUDE:** 132°25'00"W
**DEPOSIT TYPE:** Skarn
**STATUS:** Prospect

## CLAIMS

GUANO, WHITE, PS

## WORK HISTORY

Staked as Guano, etc. cl (YA242) in Jul-Sep/76 by Ukon JV (Chevron and Kerr Addision), which explored with mapping, geochem and radiometric surveys in 1976 and 1977 and wide-spaced rock sampling in 1979.

Restaked as White and PS cl (YB978) in Aug/87 by Mountain Province Mining Inc, which performed mapping and sampling later in the year and in 1988. Mountain Province conducted a 14 hole (1100 m) diamond drill program on the White claims in 1993.

## GEOLOGY

A skarn containing serpentine, actinolite, tremolite, idocrase, magnetite and radioactive and rare earth minerals occurs at the contact of a Mississippian syenite stock which intrudes Lower Paleozoic carbonate rocks. Widely scattered, 5 to 30 cm wide quartz veins are found within all units. Disseminated purple fluorite is abundant in the syenite.

The best chip sample collected in 1979 contained 0.13% rare earth elements and 0.09% niobium across 50 m. Grab samples from the skarn and veins assayed up to 0.675% $U_3O_8$, 1.30% $ThO_2$, 5.5% rare earth elements and 2.15% $Nb_2O_5$. The samples were also analysed for W, Sn, Ta and Au but returned only background values.

## REFERENCES

CRONIK, F., May/79. Geology of the Guano-Guayes rare earth element bearing skarn property. Unpublished M.Sc. thesis, University of British Columbia.

MINERAL INDUSTRY REPORT 1976, p. 192.

UKON JOINT VENTURE, Jan/77 and Jan/80. Assessment Reports #090574 & 090577 by A.R. Archer.

YUKON GEOLOGY & EXPLORATION 1979-80, p. 5-59, 175.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Amerlin
**MINFILE #:** 105F 117
**MAJOR COMMODITIES:** Au
**MINOR COMMODITIES:** Ag, Pb, Cu
**TECTONIC ELEMENT:** Cassiar Platform

**NTS MAP SHEET:** 105 F 9
**LATITUDE:** 61°30'12"N
**LONGITUDE:** 132°16'27"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Showing

## CLAIMS (PREVIOUS AND CURRENT)

KETZA, HR, BRAULT

## WORK HISTORY

Staked as Ketza & HR cl (YA74202) in Oct/84 by a joint venture between Quillo Res Inc and High River Res L, which performed mapping and geochem sampling in 1985 and transferred the property to Canamax Res L, which carried out mapping, geochem and mag surveys in 1987 and road construction in 1988. The claims were returned to Quillo and High River in Dec/89.

R. Rivet tied on Brault cl (Y99835) to the west and south in Mar/87 and transferred them to Quillo Res Inc in Oct/88.

## GEOLOGY

Two showings of massive sulphide float were found. One is a 7 by 0.8 m lens of pyrrhotite and arsenopyrite at the footwall contact of an ENE-trending quartz vein. This showing occurs at the top of a bed of Lower Cambrian limestone which is unconformably overlain by shale. A grab sample assayed 10.3 g/t Au, 0.24 g/t Ag, 1.7% As and 0.2% Pb.

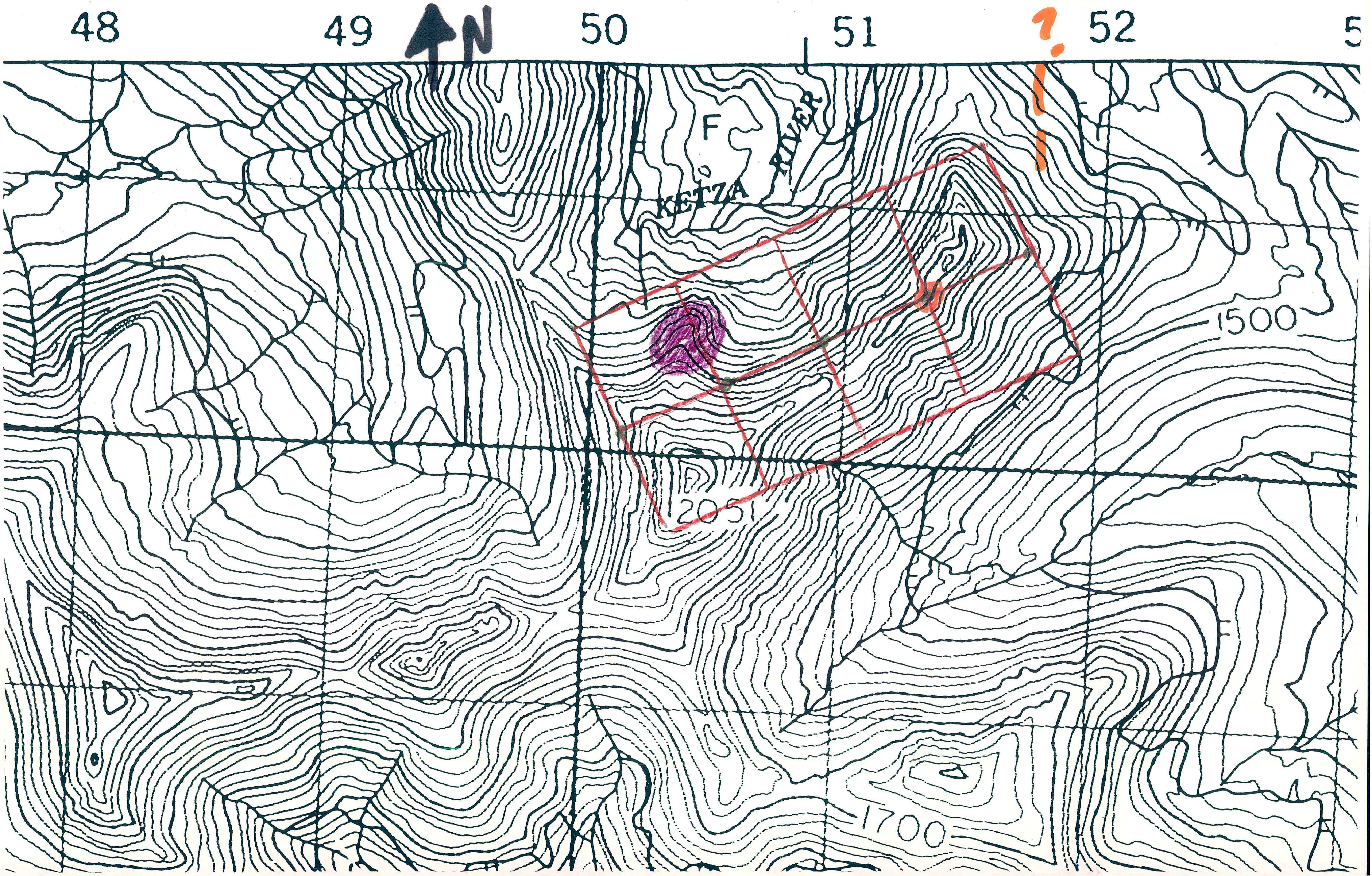
The other showing consists of pyrrhotite-pyrite talus along a northwest-trending fault that cuts carbonate rocks. A grab sample assayed 17.1 g/t Ag, 0.03 g/t Au, 0.5% Pb and 0.1% Cu.

## REFERENCES

QUILLO RESOURCES INC., AND HIGH RIVER RESOURCES LTD, Mar/86. Assessment Report #091688 by C.G. Verley.

YUKON EXPLORATION 1985-86, p. 227-228; 1987, p. 153.

YUKON GEOLOGY VOL. 2, p. 8-26.


48
49
N
50
51
52
F
KETZA
RIVER
1500
2051
1700

OLD POSTS FROM LANCER 1-8

---

2001 PROPOSED NEW CLAIMS

---

OLD LANCER #1 POSTS (7+8) + 2 POSTS (5+6) SITS ON FLAT + ON TOP OF 3m REE VEIN.

---

SYENITE PLUG

---

Road ?

---

??? now

2001 PLANS FOR FIRST TRIP

---

stake 8 claims

prospect along claim line

check out road

② 10

2001-066

# [2B] HENRY CREEK PROJECT

U and Th are present in small plutons of porphyritic granite that have intruded older granites and are exposed along the banks of Clear Creek and its drainages. To the north and south is a lot of overburden and exposures of unit 4 - YUKON group - schist, quartzite, phyllite, limestone (PROTEROZOIC Age)

GRANITES enriched in U + Th can produce a zonation of pegmatites around them. (p. 510-11 GEOLOGY OF CAN. #8)

In the area is also a F anomoly which ~~can be~~ CAN BE associated with pegmatites.

I plan to go to the area by truck, camp in the truck and prospect the area + take silt + heavy pan conc. in the streams. I will use Acmes' rare earth package

Be 0.1 ppm
Cs 0.02
Li 0.1 ppm
→ Ta 0.05 ppm
Nb 0.02 ppm

Perhaps Ta anomolies can be found that will be more heavily explored later.

(2) 11

Upon completion of the project and season I will give to the YMIP a journal with all data, assays, conclusions, maps, receipts, etc and a TECHNICAL REPORT. All work will be done to "INDUSTRY STANDARDS" and all bills will be paid.

Reclamation and environmental work (PITS, CAMPS, TRENCHES, ACCESS, etc) will be done to "INDUSTRY STANDARDS" and as regulations are stated. Campsites will be cleaned up; all garbage will be removed + taken out.

(2) 12

REFERENCES


- MINFILE McQUESTION 115P
  ~~CLEAR CREEK 115 P014~~
  115P060, 115P029, 115P014,
  115P015
- GEOPHYSICAL SUMMARY REPORT on the RUSS CLAIM GROUP 1970 #060619
- OPEN FILE 1650 (1988) GEOCH SURVEY 115P part of 105M
- MAP 1143A GEOLOGY McQUESTION BOSTOCK
- GRANITE PEGMATITES WD SINCLAIR p. 503 - 512 GEOLOGY OF CAN. MIN DEPOSIT TYPES

(2) 13 2001 GRASSROOTS

**BUDGET** (2B) HENRY CREEK

| | | |
|---|---|---|
| DIEM 1 → Henry Cr (9) | | $305 |
| 1 → WH + 7 days | | |
| GAS 800 KM × $.42/km | | 336 |
| TRUCK $1450 × 1/2 × 25% | | 181 |
| Radio $150 × 1/2 × 25% | | 19 |
| ASSAYS 15 SILTS × $25 | 375 | 465 |
| 3 Pan conc × $30 | 90 | |
| misc | | 100 |
| TOTAL | | $1406 |

Geological Survey of Canada

**Geology of Canada, no. 8**

# GEOLOGY OF CANADIAN MINERAL DEPOSIT TYPES

**edited by**

O.R. Eckstrand, W.D. Sinclair, and R.I. Thorpe

1995

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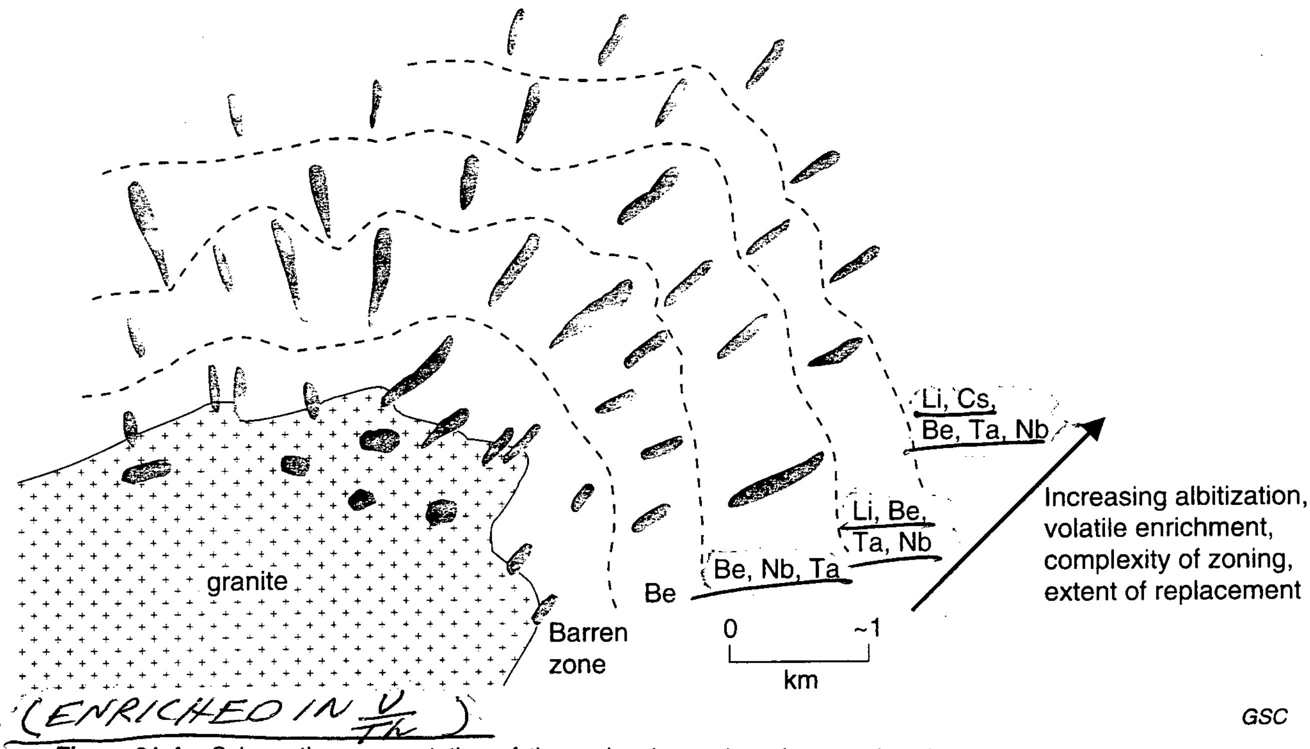



**Figure 21-4.** Schematic representation of the regional zonation of pegmatites (red) around a granite intrusion (modified from Trueman and Černý, 1982).

siliceous and volatile-rich, but the pegmatites they produced are not as highly fractionated and have no appreciable content of lithophile elements and rare metals.

According to Jahns and Burnham (1969), crystallization of pegmatite-producing melts takes place mainly under closed-system conditions, from the contacts of the pegmatite inward to produce concentric mineral zones. Some of these zones are sufficiently enriched in rare elements to be of commercial interest. Progressive evolution of a coexisting supercritical aqueous phase during this crystallization facilitates the growth of large crystals and provides a means to concentrate elements not easily incorporated in silicate minerals. This aqueous phase can react with earlier-formed minerals at various stages of pegmatite formation to produce metasomatic zones that are enriched in lithophile elements and rare metals. Fracture fillings may also form at various stages, and represent intermittent open-system conditions that probably occur briefly during pegmatite crystallization. As a further modification of this model, London (1990, 1992) has shown that highly fractionated pegmatites of the Tanco type crystallized largely from homogeneous melts enriched in B, P, F, and Li, and extremely enriched in $H_2O$. He also suggested that many "metasomatic" units are possibly primary, and that separation of aqueous fluid may, in fact, be very late in the consolidation history of pegmatites.

## RELATED DEPOSIT TYPES

Pegmatites appear to represent a transitional phase between granitic intrusions and quartz veins. For example, zones of pegmatitic texture occur in several types of granite-related deposits, such as "stockscheider" associated with tin- and tungsten-bearing stockworks and greisens, and pegmatitic zones in felsic intrusions associated with porphyry copper and porphyry molybdenum deposits. Such pegmatitic zones, however, generally do not host significant mineralization.

Geochemical characteristics of tin- and tungsten-bearing granites (e.g. "specialized" granites of Tischendorf, 1977) and of felsic intrusions associated with porphyry molybdenum deposits resemble those of fertile granites that generate rare element pegmatites (Černý and Meintzer, 1988); intrusions associated with most porphyry copper deposits, however, are more mafic in composition and are substantially different geochemically.

Peraluminous to subalkaline rare metal granites with associated lithium, beryllium, niobium, and tantalum, as well as tungsten and tin mineralization (Pollard, 1989), are the closest relatives to pegmatite deposits. Some rare metal granites display pegmatitic cupolas that suggest an origin from pegmatitic melts that did not separate from their plutonic parent (Černý, 1992).

## EXPLORATION GUIDES

Exploration guidelines for rare element pegmatites (Trueman and Černý, 1982; Černý, 1989b, 1991c) include the following:

1. Geological setting: rare element pegmatites typically occur in rock suites of medium grade Abukuma-type metamorphic facies, along fault systems and lithological boundaries, or closely associated with anorogenic granitoid plutons.

2. Regional zoning: identification of zonal patterns of pegmatite distribution can help isolate specific areas of interest.
3. Fractionation: mineral assemblages and chemistry of individual minerals in pegmatites indicate fractionation levels and economic potential.
4. Geochemical approaches: primary dispersion aureoles in host rocks (e.g. Li, Rb, Cs, Be, B), secondary dispersion halos in overburden, and light plus heavy minerals in stream sediments (e.g. beryl, spodumene, tourmaline, columbite-tantalite) help identify target areas at both regional and local scales.
5. Geophysical approaches: radiometric surveys may be useful for identifying parent granites and/or associated pegmatites that are enriched in U and Th. Gravity surveys can be used to outline pegmatites in host rocks of contrasting density.

## ACKNOWLEDGMENT

P. Černý reviewed the paper and provided many constructive comments.

## SELECTED BIBLIOGRAPHY

References marked with asterisks (*) are considered to be the best sources of general information on this deposit type.

**Bellasis, J.W.M. and van der Heyde, C.**
1962: Operations at Kamativi Tin Mines Ltd., Southern Rhodesia; Chamber of Mines Journal, v. 4, no. 9 (Sept.), p. 36-41.

**Breaks, F.W. and Moore, J.M., Jr.**
1992: The Ghost Lake batholith, Superior Province of northwestern Ontario: a fertile, S-type, peraluminous granite - rare-element pegmatite system; The Canadian Mineralogist, v. 30, p. 835-875.

***Cameron, E.N., Jahns, R.H., McNair, A., and Page, L.R.**
1949: Internal structure of granitic pegmatites; Economic Geology, Monograph 2, 115 p.

**Carter, T.R. and Colvine, A.C.**
1985: Metallic mineral deposits of the Grenville Province, southeastern Ontario; The Canadian Institute of Mining and Metallurgy Bulletin, v. 78, no. 875, p. 95-106.

**Černý, P.**
1982a: Anatomy and classification of granitic pegmatites; in Granitic Pegmatites in Science and Industry, (ed.) P. Černý; Mineralogical Association of Canada, Short Course Handbook, v. 8, p. 1-39.
1982b: The Tanco pegmatite at Bernic Lake, southeastern Manitoba; in Granitic Pegmatites in Science and Industry, (ed.) P. Černý; Mineralogical Association of Canada, Short Course Handbook, v. 8, p. 527-543.
*1982c: Granitic Pegmatites in Science and Industry, (ed.) P. Černý; Mineralogical Association of Canada, Short Course Handbook, v. 8, 555 p.
1989a: Characteristics of pegmatite deposits of tantalum; in Lanthanides, Tantalum and Niobium, (ed.) P. Möller, P. Černý, and F. Saupé; Society for Geology Applied to Mineral Deposits, Special Publication No. 7, Springer-Verlag, Berlin, p. 192-236.
1989b: Exploration strategy and methods for pegmatite deposits of tantalum; in Lanthanides, Tantalum and Niobium, (ed.) P. Möller, P. Černý, and F. Saupé; Society for Geology Applied to Mineral Deposits, Special Publication No. 7, Springer-Verlag, Berlin, p. 274-302.
1990: Distribution, affiliation and derivation of rare-element pegmatites in the Canadian Shield; Geologische Rundschau, Band 79, Heft 2, p. 163-226.
1991a: Fertile granites of Precambrian rare-element pegmatite fields: is geochemistry controlled by tectonic setting or source lithologies?; Precambrian Research, v. 51, p. 429-468.
*1991b: Rare-element pegmatites, Part I: anatomy and internal evolution of pegmatite deposits; Geoscience Canada, v. 18, no. 2, p. 49-67.

**Černý, P.** (cont)
*1991c: Rare-element pegmatites, Part II: regional to global environments and petrogenesis; Geoscience Canada, v. 18, no. 2, p. 68-81.
1992: Geochemical and petrogenetic features of mineralization in rare-metal granitic pegmatites in the light of current research; Applied Geochemistry, v. 7, p. 393-416.

**Černý, P. and Meintzer, R.E.**
1988: Fertile granites in the Archean and Proterozoic fields of rare-element pegmatites: crustal environment, geochemistry and petrogenetic relationships; in Recent Advances in the Geology of Granite-Related Mineral Deposits, (ed.) R.P. Taylor and D.F. Strong; The Canadian Institute of Mining and Metallurgy, Special Volume 39, p. 170-207.

**Černý, P., Meintzer, R.E., and Anderson, A.J.**
1985: Extreme fractionation in rare-element granitic pegmatites: selected examples of data and mechanisms; The Canadian Mineralogist, v. 23, p. 381-421.

**Crouse, R.A., Černý, P., Trueman, D.L., and Burt, R.O.**
1984: The Tanco pegmatite, southeastern Manitoba; in The Geology of Industrial Minerals in Canada, (ed.) G.R. Guillet and W. Martin; The Canadian Institute of Mining and Metallurgy, Special Volume 29, p. 169-176.

**Evans, R.K.**
1978: Lithium reserves and resources; Energy, v. 3, p. 379-385.

**Flanagan, J.T.**
1978: Lithium deposits and potential of Quebec and Atlantic provinces, Canada; Energy, v. 3, p. 391-398.

**Ginsburg, A.I.**
1984: The geological condition of the location and the formation of granitic pegmatites; Proceedings of the 27th International Geological Congress, v. 15 (Non-metallic Mineral Ores), VNU Science Press, Utrecht, The Netherlands, p. 245-260.

**Hatcher, M.I. and Bolitho, B.C.**
1982: The Greenbushes pegmatite, south-west Western Australia; in Granitic Pegmatites in Science and Industry, (ed.) P. Černý; Mineralogical Association of Canada, Short Course Handbook, v. 8, p. 513-525.

**Hutchinson, R.W.**
1955: Regional zonation of pegmatites near Ross Lake, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Bulletin 34, 50 p.

**Jahns, R.H.**
1955: The study of pegmatites; in Economic Geology, Fiftieth Anniversary Volume, (ed.) A.M. Bateman; p. 1025-1130.

***Jahns, R.H. and Burnham, C.W.**
1969: Experimental studies of pegmatite genesis: I. A model for the derivation and crystallization of granitic pegmatites; Economic Geology, v. 64, p. 843-864.

**Knight, N.D.**
1986: Lithium; in Australian Mineral Industry Annual Review for 1983, Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia, p. 181-182.

**Knight, N.D. and Wallace, D.A.**
1982: Tantalum and niobium; in Australian Mineral Industry Annual Review for 1980, Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia, p. 253-256.

**Kunasz, I.**
1982: Foote Mineral Company - Kings Mountain operation; in Granitic Pegmatites in Science and Industry, (ed.) P. Černý; Mineralogical Association of Canada, Short Course Handbook, v. 8, p. 505-511.

**Lasmanis, R.**
1978: Lithium resources in the Yellowknife area, Northwest Territories, Canada; Energy, v. 3, p. 399-407.

**London, D.**
1986: Magmatic-hydrothermal transition in the Tanco rare element pegmatite: evidence from fluid inclusions and phase-equilibrium experiments; The American Mineralogist, v. 71, p. 376-395.
*1990: Internal differentiation of rare-element pegmatites; a synthesis of recent research; in Ore-Bearing Granite Systems; Petrogenesis and Mineralizing Processes, (ed.) H.J. Stein and J.L. Hannah; Geological Society of America, Special Paper 246, p. 35-50.
1992: The application of experimental petrology to the genesis and crystallization of granitic pegmatites; The Canadian Mineralogist, v. 30, p. 499-540.

**Martin, H.J.**
1964: The Bikita tinfield; Southern Rhodesia Geological Survey Bulletin, no. 58, p. 114-132.

**Martin, R.F. and Černý, P. (ed.)**
*1992: Granitic pegmatites; The Canadian Mineralogist, v. 30, p. 497-954.

**NOTICE**

THIS MAP IS ISSUED AS A PRELIMINARY GUIDE FOR WHICH THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT WILL ACCEPT NO RESPONSIBILITY FOR ANY ERRORS, INACCURACIES OR OMISSIONS WHATSOEVER.

**SEE ADJACENT MAP SHEET(S) EDGES FOR ADJOINING MINERAL CLAIMS NOT SHOWN ON THIS MAP**

TOPOGRAPHY COMPILED FROM 1:50,000 NATIONAL TOPOGRAPHIC SERIES.
CONTOUR INTERVAL 500 FEET
SURVEY INFORMATION COMPILED FROM LEGAL SURVEYS, BY DRAFTING SERVICES 1982.

# 115-P-13

## QUARTZ & PLACER

LATITUDE 63°45' TO 64°00'
LONGITUDE 137°30' TO 138°00'

CANADA
DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
NORTHERN ADMINISTRATION AND LANDS BRANCH
MINING AND LANDS DIVISION

SCALE 1:31,680

ISSUED UNDER THE AUTHORITY OF THE MINISTER OF NORTHERN AFFAIRS AND NATIONAL RESOURCES

NOV 30, 2000

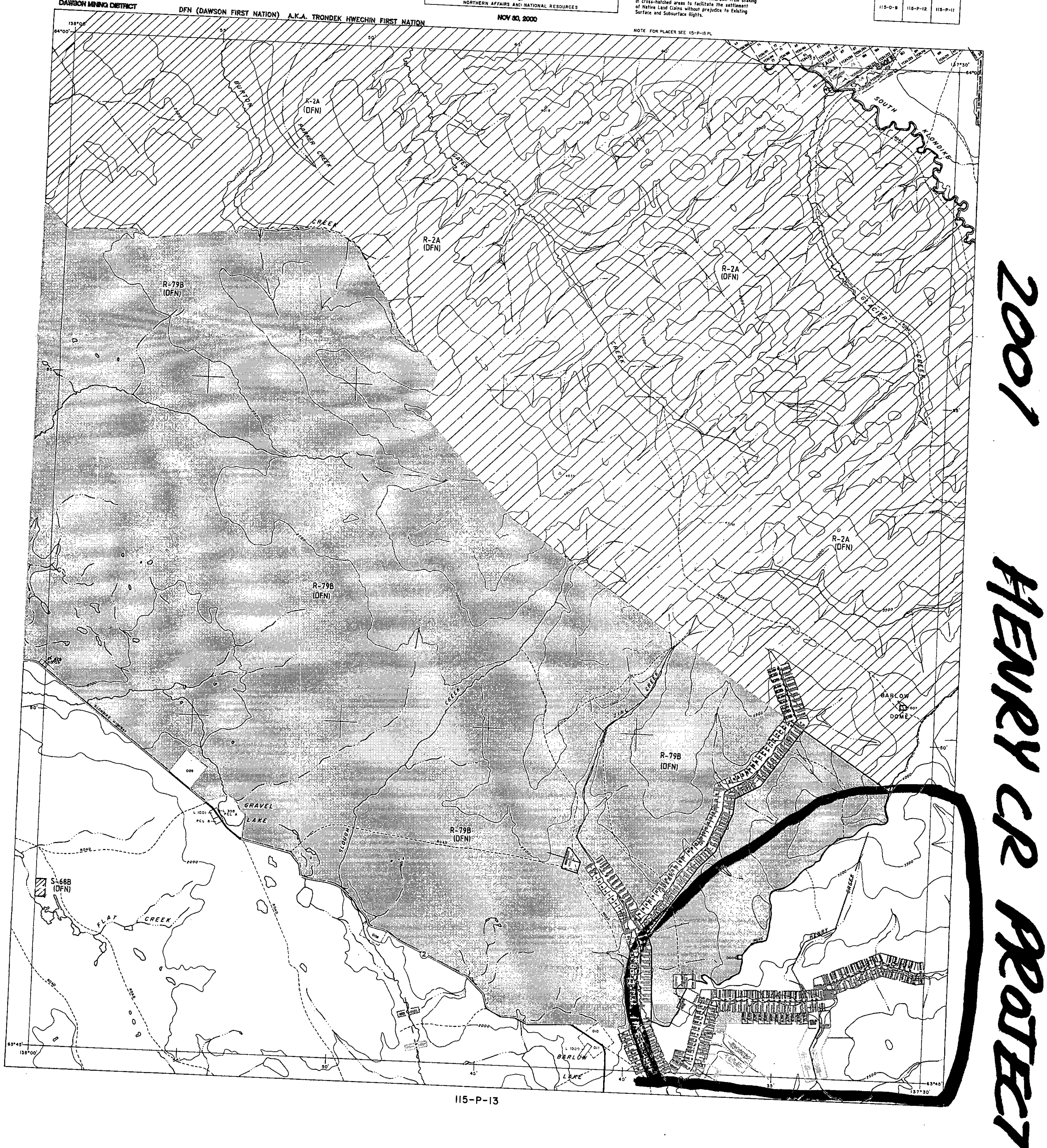
Note: Entry on certain lands is withdrawn from staking in cross-hatched areas to facilitate the settlement of Native Land Claims without prejudice to Existing Surface and Subsurface Rights.

NOTE FOR PLACER SEE 115-P-13 PL

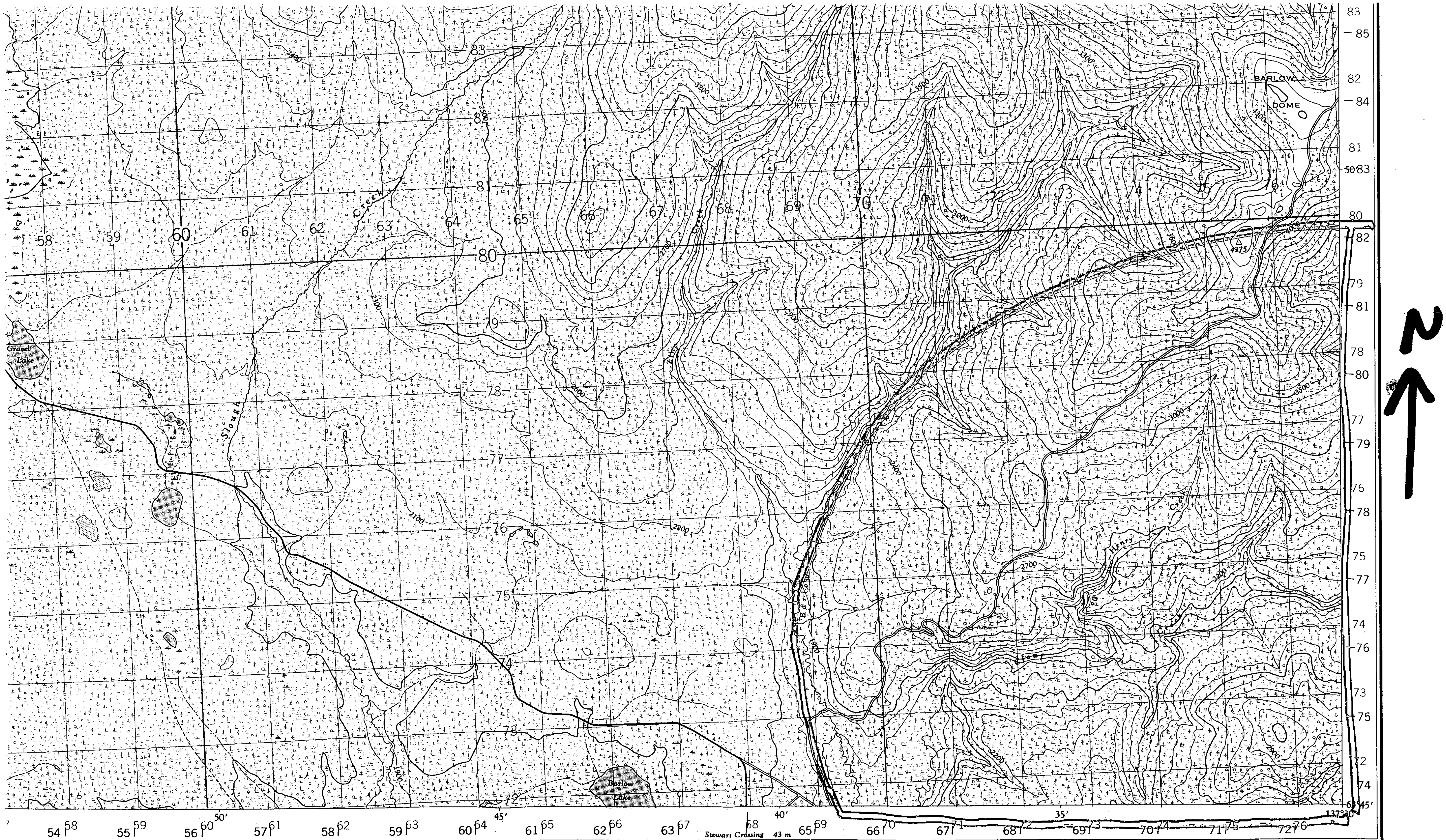
| | | |
|---|---|---|
| 116-B-1 | 116-A-4 | 116-A-3 |
| 115-O-16 | 115-P-13 | 115-P-14 |
| 115-O-9 | 115-P-12 | 115-P-11 |

DAWSON MINING DISTRICT

DFN (DAWSON FIRST NATION) A.K.A. TRONDEK HWECHIN FIRST NATION




115-P-13




# GRAVEL LAKE
YUKON TERRITORY

Établie et imprimée par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DES MINES ET DES RELEVÉS TECHNIQUES en 1961, d'après les photographies aériennes prises en 1949 et 1950

HENRY CR PROJECT

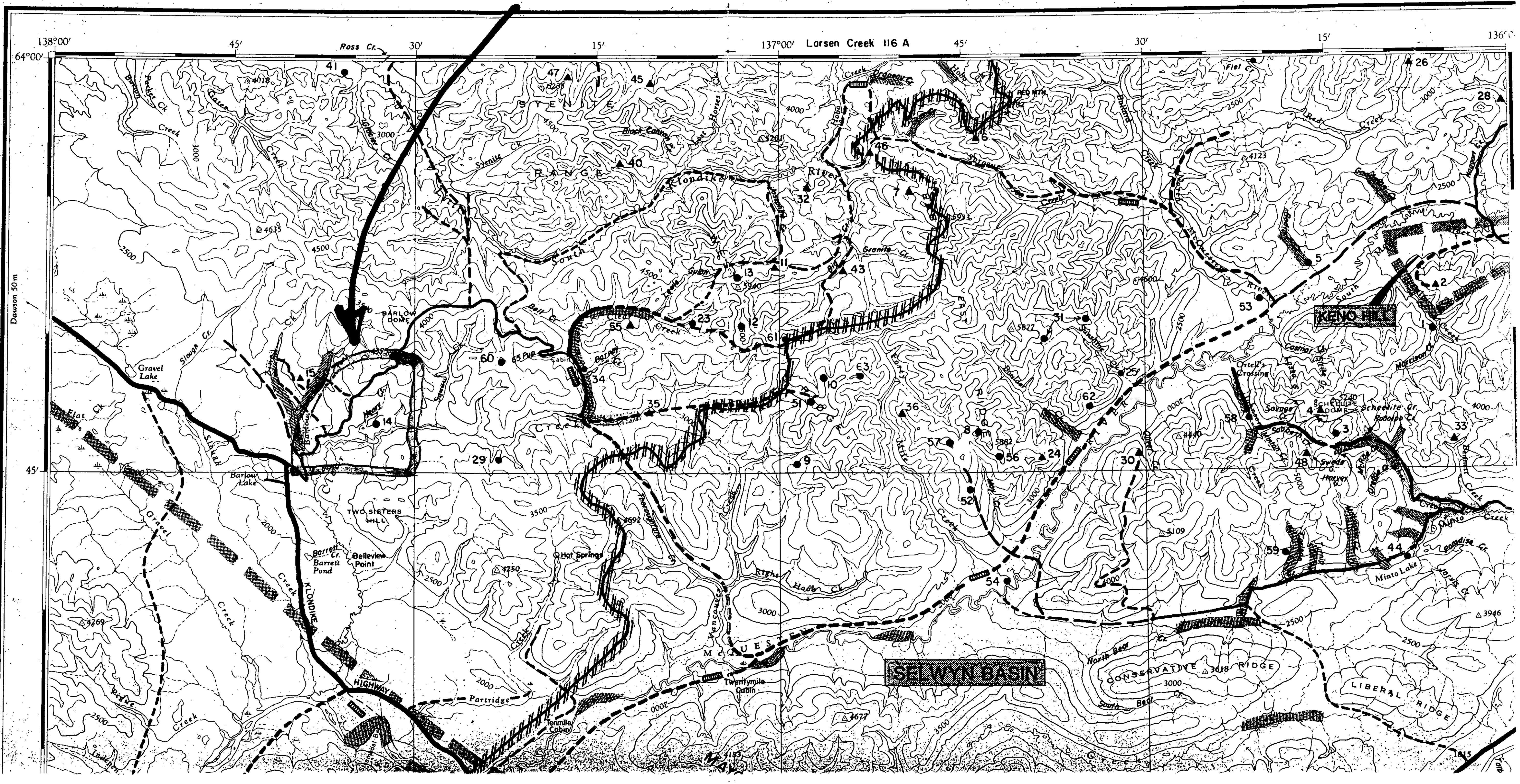
MINFILE
McQUESTION
115 P

N

Canada

HENRY CR PROJECT

Yuk



**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Clear Creek
**MINFILE #:** 115P 014
**MAJOR COMMODITIES:** U,Th
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Selwyn Plutonic Suite

**NTS MAP SHEET:** 115 P 13
**LATITUDE:** 63°46'46"N
**LONGITUDE:** 137°33'09"W
**DEPOSIT TYPE:** Porphyry
**STATUS:** Showing

**CLAIMS (PREVIOUS AND CURRENT)**

HKW, RUSS, URA, DAD, CUT

**WORK HISTORY**

First staked in Jun/55 by J. Hanna and G. Karens as HKW cl (57989), which were surrounded by fringe stakers later in the year. Karens restaked the property in Oct/66 as Russ cl (Y15O92), which were hand trenched by R. Newsom and J. Snell in 1967 under option, and reoptioned in 1969 to a group of Whitehorse businessmen who added more Russ cl (Y37897) in May/69 and transferred the option briefly to Newmont, which conducted airborne and ground scintillometer surveys and bulldozer trenching in 1970. Karens added more Russ cl in Jul/71 (Y56089) and Dec/72(Y65830).

Restaked as 448 URA, etc. cl (Y90349) in Apr-Oct/75 by R.G. Hilker & P. Hammond. The property was optioned by Beach Gold ML, which carried out ground and airborne radiometric surveys and drilled 4 holes (288.0 m) in 1975. Restaked by Hilker as Dad cl (YA31746) in Aug/78 and optioned to Jewel Res L, which performed geochem and radiometric surveys in 1979 and added more Dad cl in May/86.

Restaked as Cut cl (YB23859) in Mar/89 by R. Stack.

**GEOLOGY**

The presence of the rare earth silicate allanite was recognized in a placer concentrate from Clear Creek in 1951. The staking covers a fractured, slightly gossaned, feldspar porphyry phase within a granitic intrusion that cuts Paleozoic? metamorphic rocks. Radiometric response is about four times background within an area 180 m square.

Samples of porphyritic granite assayed in 1955 returned up to 0.12% $U_3O_8$ but more recent sampling has failed to reveal more than 0.01% $U_3O_8$, although slightly higher thorium assays have been obtained. The 1975 drilling gave disappointing results.

**REFERENCES**

GEOLOGICAL SURVEY OF CANADA Paper 51-10, p. 14.

WESTERN MINER, Apr/56, p. 56.

ACE R. PARKER AND ASSOC. LTD, Jun/70. Assessment Report #060619 by A.R. Parker & D.G. Mark.

BEACH GOLD MINES LTD, May/75. Vancouver Stock Exchange Open File Report by J.W. MacLeod.

MINERAL INDUSTRY REPORT, 1975, p. 81-82

JEWEL RESOURCES LTD, Sep/78. Prospectus Report #061853 by J.R. Poloni.

NORTHERN MINER, 31 May/79.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Lost Horses
**MINFILE #:** 115P 060
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Selwyn Basin

**NTS MAP SHEET:** 115 P 14
**LATITUDE:** 63°49'03"N
**LONGITUDE:** 137°22'56"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

LOST HORSES, HP

## WORK HISTORY

Staked as Lost Horses cl (YB23480) in Jun/89 by 6176 Yukon L. In Dec/94 L. Hart staked the HP cl 1-30 (YB53028) 3 km northwest of the occurrence.

## GEOLOGY

The claims are underlain by schist, quartzite and limestone of the Late Proterozoic-Early Cambrian Hyland Group, some 1 km east of the Barney stock, a granite intrusion of mid Cretaceous age.

## REFERENCES

MURPHY, D.C., HEON, D., AND HUNT, J., 1993a. Geological overview of Clear Creek map area, western Selwyn Basin (NTS 115P/14). In: Yukon Exploration and Geology 1992, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

MURPHY, D.C., HEON, D., AND HUNT, J., 1993b. Geological map of Clear Creek map area, western Selwyn Basin (NTS 115P/14). In: Yukon Exploration and Geology 1992, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1993-1(G), 1:50 000.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Thoroughfare
**MINFILE #:** 115P 029
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Selwyn Plutonic Suite

**NTS MAP SHEET:** 115 P 14
**LATITUDE:** 63°45'31"N
**LONGITUDE:** 137°23'08"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

## CLAIMS (PREVIOUS AND CURRENT)

C.C.

## WORK HISTORY

Staked as C.C. cl (YA29785) in May/78 by Norman Burmiester.

## GEOLOGY

The claims are underlain by medium to coarse grained granite of the mid Cretaceous Twin Sisters batholith, and thick Pleistocene stream gravels.

## REFERENCES

MURPHY, D.C., HEON, D., AND HUNT, J., 1993a. Geological overview of Clear Creek map area, western Selwyn Basin (NTS 115P/14). In: Yukon Exploration and Geology 1992, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada.

MURPHY, D.C., HEON, D., AND HUNT, J., 1993b. Geological map of Clear Creek map area, western Selwyn Basin (NTS 115P/14). In: Yukon Exploration and Geology 1992, Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1993-1(G), 1:50 000.

# YUKON MINFILE
# YUKON GEOLOGY PROGRAM
# WHITEHORSE

**NAME(S):** Clear Creek
**MINFILE #:** 115P 014
**MAJOR COMMODITIES:** U,Th
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Selwyn Plutonic Suite

**NTS MAP SHEET:** 115 P 13
**LATITUDE:** 63°46'46"N
**LONGITUDE:** 137°33'09"W
**DEPOSIT TYPE:** Porphyry
**STATUS:** Showing

## CLAIMS (PREVIOUS AND CURRENT)

HKW, RUSS, URA, DAD, CUT

## WORK HISTORY

First staked in Jun/55 by J. Hanna and G. Karens as HKW cl (57989), which were surrounded by fringe stakers later in the year. Karens restaked the property in Oct/66 as Russ cl (Y15O92), which were hand trenched by R. Newsom and J. Snell in 1967 under option, and reoptioned in 1969 to a group of Whitehorse businessmen who added more Russ cl (Y37897) in May/69 and transferred the option briefly to Newmont, which conducted airborne and ground scintillometer surveys and bulldozer trenching in 1970. Karens added more Russ cl in Jul/71 (Y56089) and Dec/72(Y65830).

Restaked as 448 URA, etc. cl (Y90349) in Apr-Oct/75 by R.G. Hilker & P. Hammond. The property was optioned by Beach Gold ML, which carried out ground and airborne radiometric surveys and drilled 4 holes (288.0 m) in 1975. Restaked by Hilker as Dad cl (YA31746) in Aug/78 and optioned to Jewel Res L, which performed geochem and radiometric surveys in 1979 and added more Dad cl in May/86.

Restaked as Cut cl (YB23859) in Mar/89 by R. Stack.

## GEOLOGY

The presence of the rare earth silicate allanite was recognized in a placer concentrate from Clear Creek in 1951. The staking covers a fractured, slightly gossaned, feldspar porphyry phase within a granitic intrusion that cuts Paleozoic? metamorphic rocks. Radiometric response is about four times background within an area 180 m square.

Samples of porphyritic granite assayed in 1955 returned up to 0.12% $U_3O_8$ but more recent sampling has failed to reveal more than 0.01% $U_3O_8$, although slightly higher thorium assays have been obtained. The 1975 drilling gave disappointing results.

## REFERENCES

GEOLOGICAL SURVEY OF CANADA Paper 51-10, p. 14.

WESTERN MINER, Apr/56, p. 56.

ACE R. PARKER AND ASSOC. LTD, Jun/70. Assessment Report #060619 by A.R. Parker & D.G. Mark.

BEACH GOLD MINES LTD, May/75. Vancouver Stock Exchange Open File Report by J.W. MacLeod.

MINERAL INDUSTRY REPORT, 1975, p. 81-82

JEWEL RESOURCES LTD, Sep/78. Prospectus Report #061853 by J.R. Poloni.

NORTHERN MINER, 31 May/79.

**YUKON MINFILE**
**YUKON GEOLOGY PROGRAM**
**WHITEHORSE**

**NAME(S):** Barlow
**MINFILE #:** 115P 015
**MAJOR COMMODITIES:** -
**MINOR COMMODITIES:** -
**TECTONIC ELEMENT:** Selwyn Basin

**NTS MAP SHEET:** 115 P 13
**LATITUDE:** 63°48'25"N
**LONGITUDE:** 137°39'29"W
**DEPOSIT TYPE:** Unknown
**STATUS:** Uncertain

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## CLAIMS (PREVIOUS AND CURRENT)

CARMELA, LUCKY STRIKE

## WORK HISTORY

Staked as Carmela cl (15183) in Aug/27 by M. Pavisic. The Lucky Strike cl (39179) was staked somewhere nearby in Jan/40 by T. Gergich.

## GEOLOGY

The claims are staked on alluvium that could include gold-bearing "White Channel" gravel, overlying Paleozoic? metasedimentary rocks.

# LEGEND

**CENOZOIC**

**QUATERNARY**
**POST-GLACIAL**

20 — *Stream deposits, alluvium*

**TERTIARY AND LATER**
**PLIOCENE (?) AND LATER**

19 — *Stream deposits, alluvium;* 19a, *"White Channel gravel"*

21 — *Surficial deposits undivided*

**SELKIRK GROUP**

18 — *Basalt, andesite*

**TERTIARY**
**LATE TERTIARY**

17 — 17a, *rhyolite, trachyte;* 17b, *granite and syenite porphyries, trachyte*

**EOCENE (?) OR LATER**
**CARMACKS GROUP**

16 — *Andesite, rhyolite, trachyte, dacite*

**EOCENE (?)**

15 — *Conglomerate, arkose, sandstone, silt, clay*

**MESOZOIC**

**JURASSIC AND/OR CRETACEOUS**
**COAST INTRUSIONS (13, 14)**

14 — *Granite, granodiorite, quartz monzonite*

13 — *Syenite, monzonite*

12 — *Gabbro, peridotite, serpentine, diorite*

**PALÆOZOIC**

**CARBONIFEROUS (?) TO (?) CRETACEOUS**

11 — *Andesite, trachyte*

10 — 10a, *conglomerate, chert, tuff, slate;* 10b, *phyllite, quartzite;* 10c, *quartzite, chert, phyllite, limestone*

**ORDOVICIAN (?) OR LATER**

9 — *Quartzite, slate, sandstone, conglomerate;* 9a, *conglomerate*

8 — *Limestone, slate, phyllite, quartzite*

**ORDOVICIAN (?) OR EARLIER**

6, 7 — 7. *Varicoloured slate*; 6. *Quartzite, slate, phyllite, limestone*

**KLONDIKE GROUP**

5 — *Schist, orthogneiss*

**PROTEROZOIC**

**YUKON GROUP (1-4)**

4 — *Schist, quartzite, phyllite, limestone*

3 — *Schist, quartzite, limestone*

2 — *Quartzite, schist*

1 — *Paragneiss, quartzite, schist, phyllite, limestone*

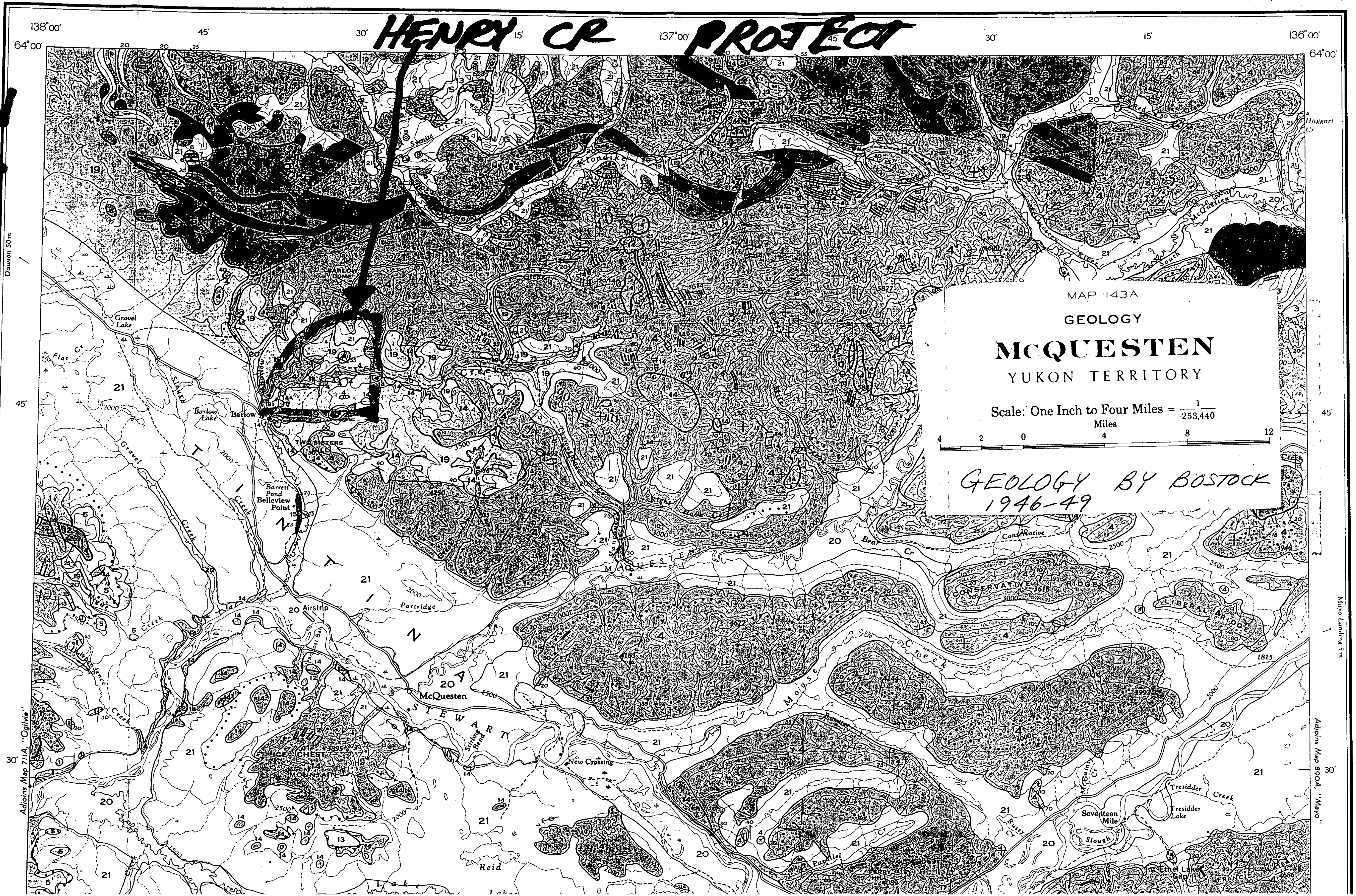
*Geological boundary (approximate, assumed)*
*Limestone of various ages*
*Bedding, tops known (inclined, overturned)*
*Bedding, tops unknown (horizontal, inclined, vertical)*
*Schistosity, foliation (inclined, vertical)*
*Fault (defined, approximate, assumed)*
*Anticline*
*Glacial striæ*
*Drumlin (direction of ice movement known)*
*Limit of last glacial advance (defined, approximate)*

*Geology by H. S. Bostock, 1946-1949*

*Cartography by the Geological Survey of Canada, 1963*


*Main road*

SHEET 115P



HENRY CR PROJECT
N
MAP 1143A
GEOLOGY
McQUESTEN
YUKON TERRITORY
Scale: One Inch to Four Miles = 1/253,440
Miles
4 2 0 4 8 12
GEOLOGY BY BOSTOCK 1946-49
138°00′
64°00′
137°00′
136°00′
45′
30′
15′
Dawson 50 m
Mayo Landing 5 m
Adjoins Map 711A, "Ogilvie"
Adjoins Map 890A, "Mayo"
Haggart Cr
Klondike
McQuesten
South
River
Gravel Lake
Flat Cr
Barlow Lake
Barlow
BARLOW DOME
TWO SISTERS
Barrett Pond
Belleview Point
Gravel
Creek
Sixtymile
TINTINA
Airstrip
Partridge
McQuesten
STEWART
Stirling Bend
New Crossing
Bear Cr
Conservative
CONSERVATIVE RIDGE
LIBERAL RIDGE
Moose
Creek
Independence
Tresidder Creek
Tresidder Lake
Seventeen Mile
Slough
Rusty Cr
McGuinty Cr
Reid
Lakes
Ethel Lake
Gap
FRANCIS
CHICKEN CHEST MOUNTAIN

# GEOPHYSICAL SUMMARY REPORT

on the

**RUSS CLAIM GROUP**

**(AN ASSESSMENT REPORT)**

**Dawson Mining District, Yukon**
**(YCS #115-P-13)**



**Latitude 63° 32'N**
**Longitude 137° 47'W**

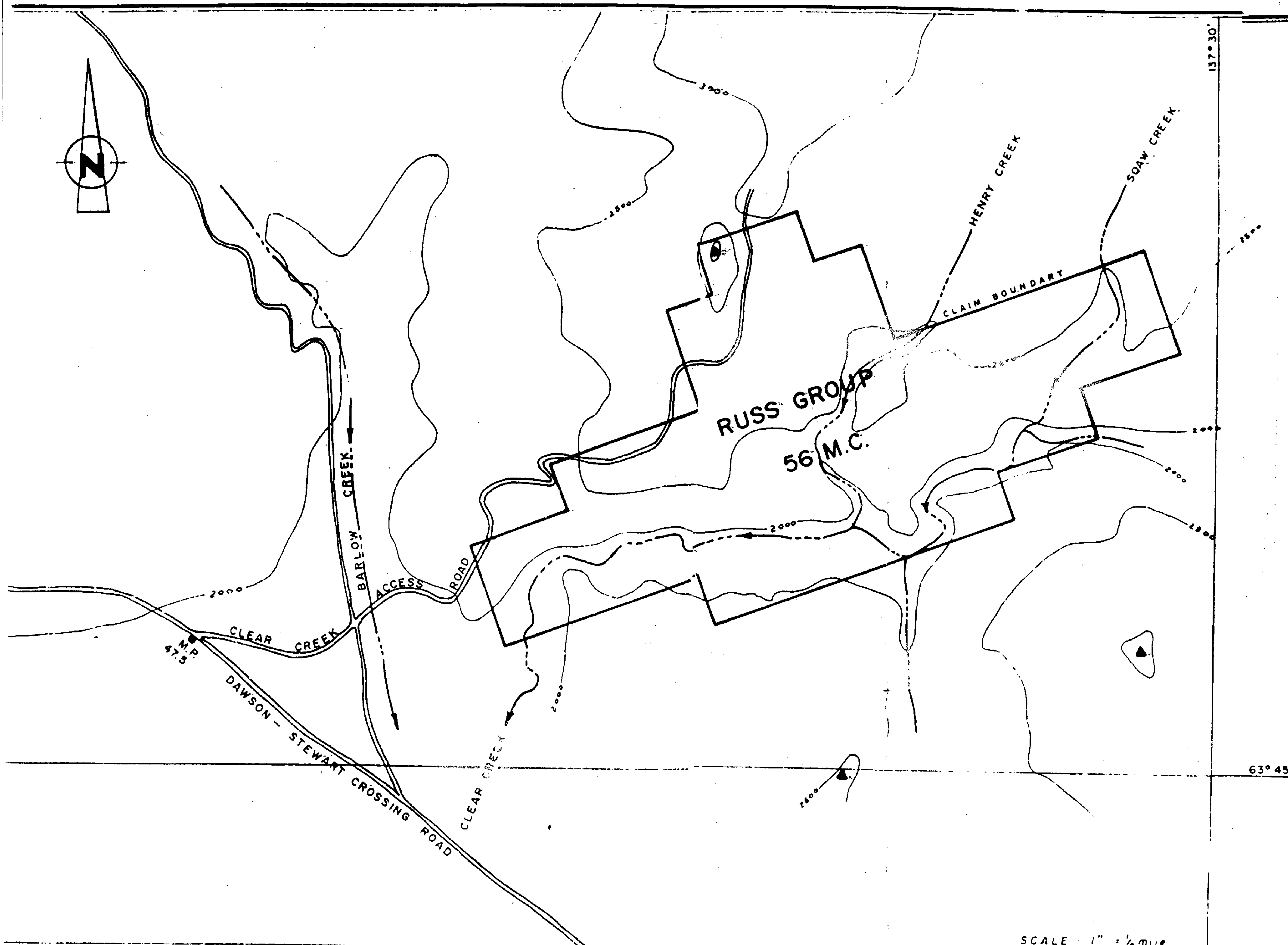
by

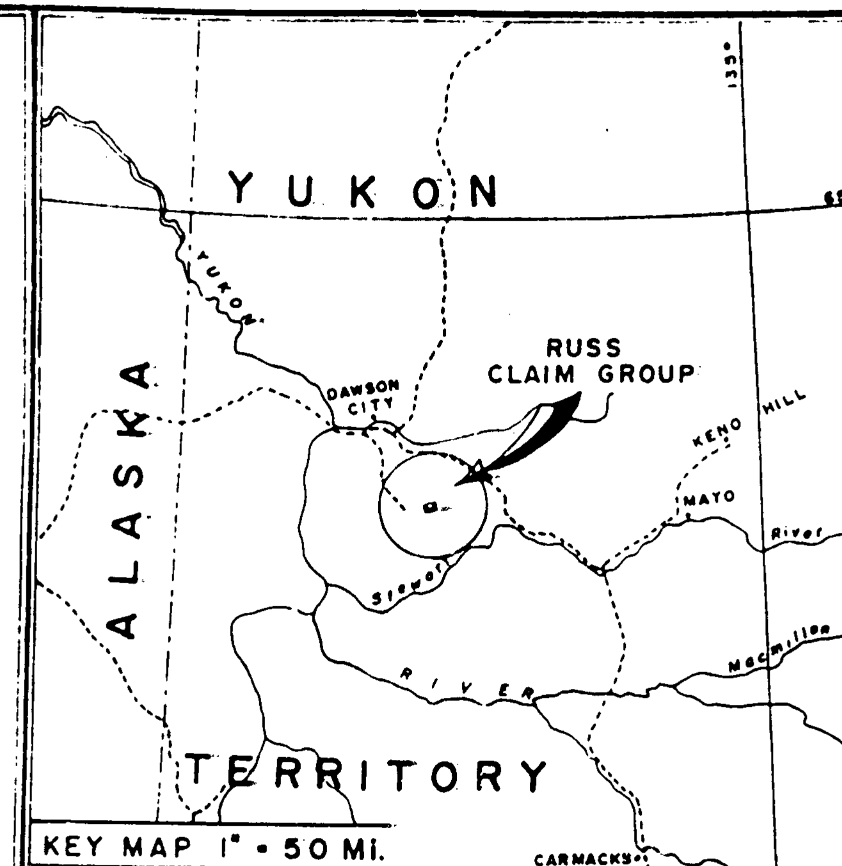
**ACE R. PARKER & ASSOCIATES LIMITED**
**MINERAL INDUSTRY CONSULTANTS & CONTRACTORS**
**Whitehorse, Yukon**



Dated
at
Whitehorse, Yukon
this
1st Day of June, 1970

Work Conducted
Between
July 1969 & June 1970
Intermittently




# PROPERTY LOCATION MAP

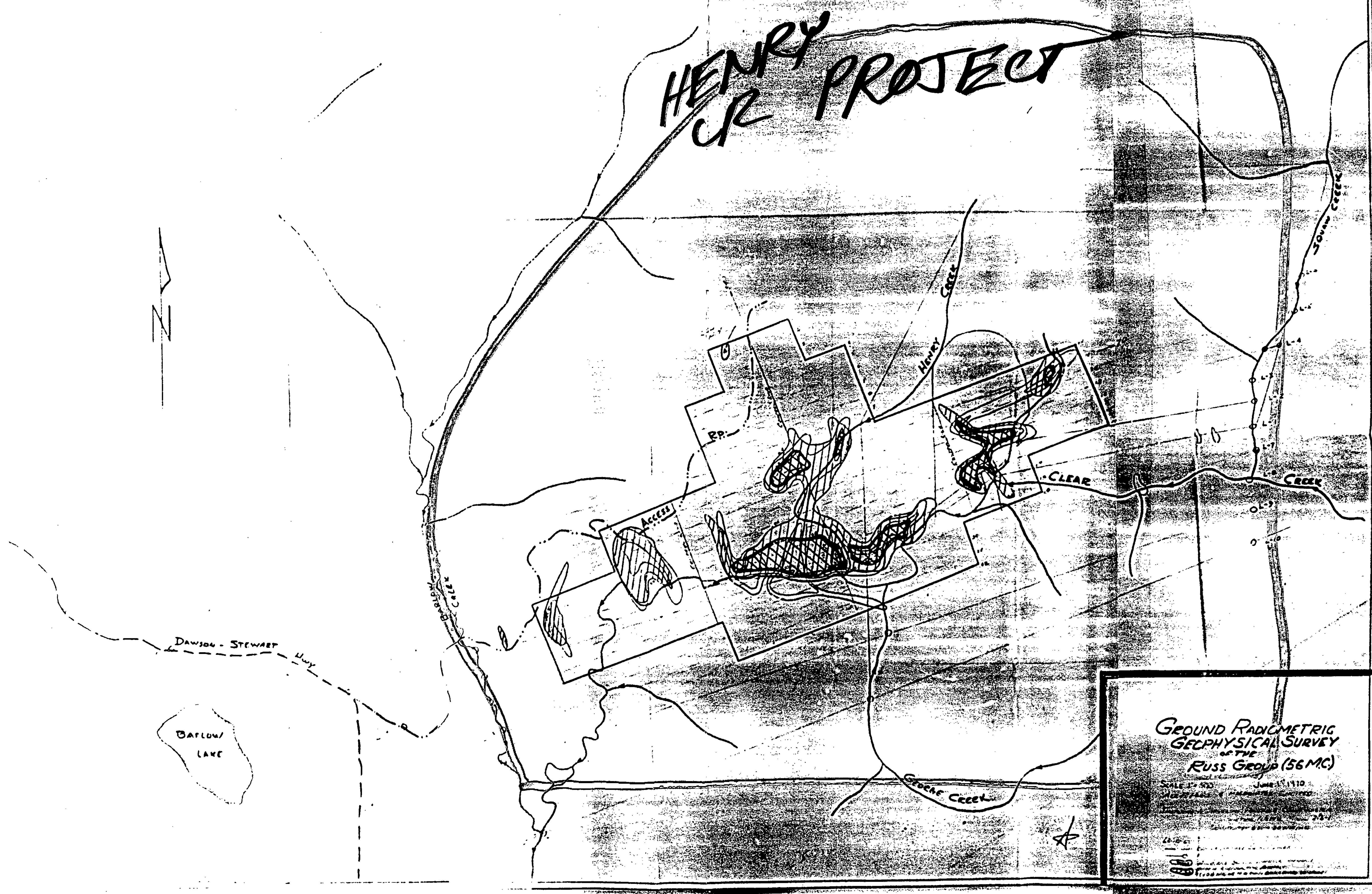
of the

# RUSS CLAIM GROUP

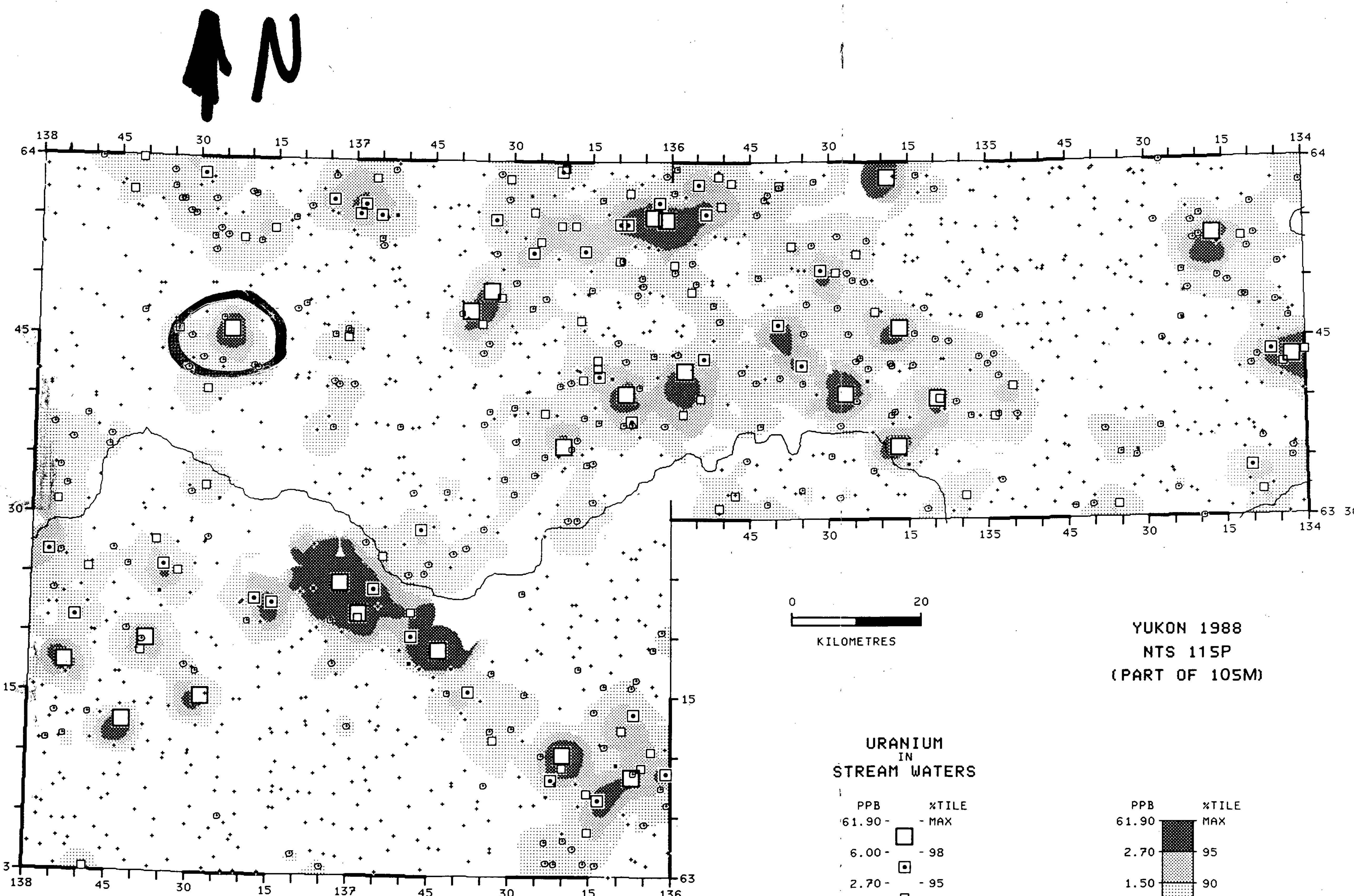
DAWSON CITY MINING DISTRICT
YUKON TERRITORY

*ACE R. PARKER & ASSOCIATES LTD.*
MINERAL INDUSTRY CONSULTANTS & CONTRACTORS

| | | |
|---|---|---|
| DATE | JUNE - 1 - 1970 | SEAL |
| SCALE | as noted | |
| DRAWN BY | [signature] | |
| DRWG No | | |



HENRY CR PROJECT
N
Dawson - Stewart Hwy
Barlow Lake
Barlow Creek
Access
R.P.
Henry Creek
Clear Creek
Jovan Creek
George Creek
Ground Radiometric Geophysical Survey of the Russ Group (56 M.C.)




URANIUM IN STREAM WATERS

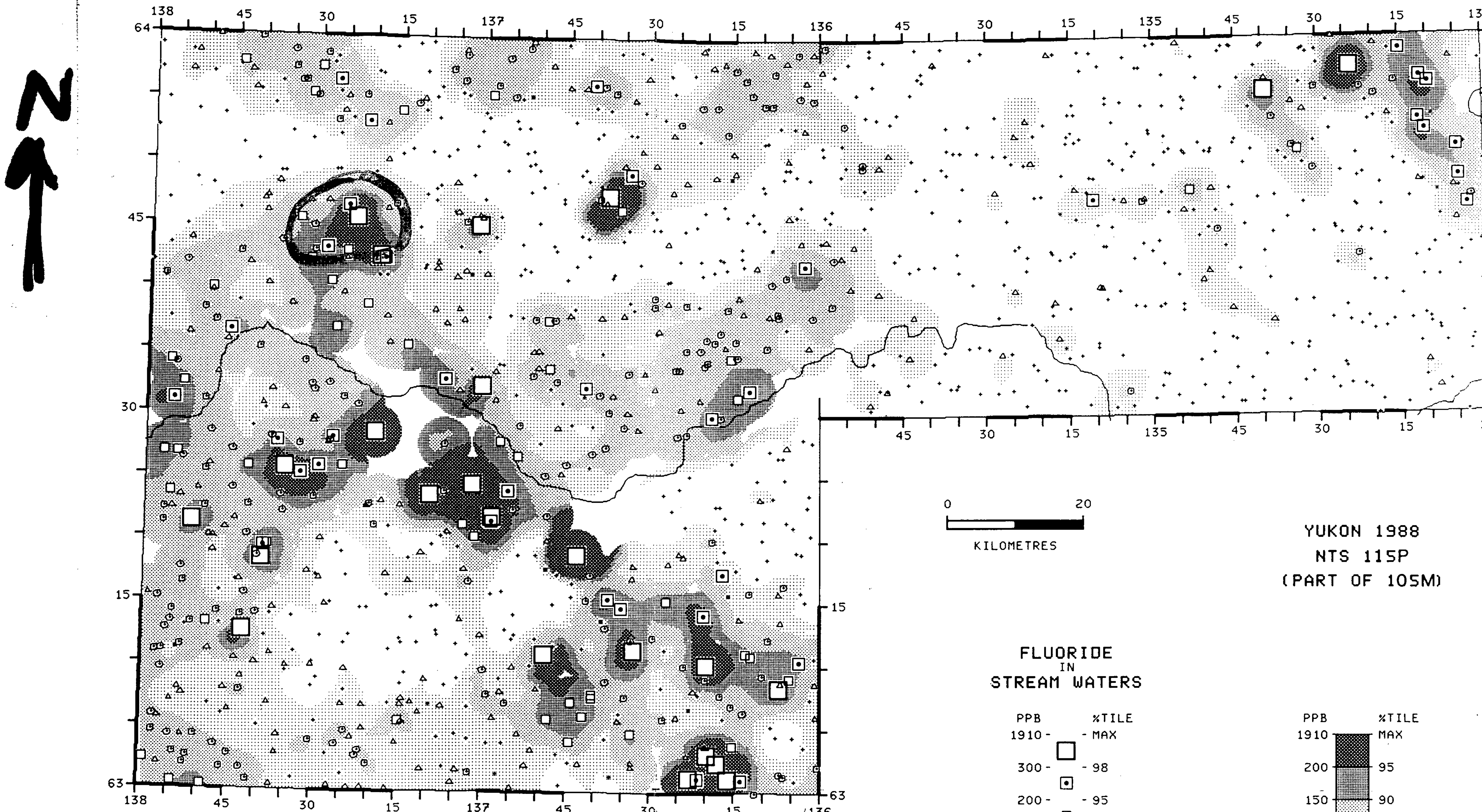
| PPB | %TILE |
|---|---|
| 61.90 | MAX |
| 6.00 | 98 |
| 2.70 | 95 |
| 1.50 | 90 |
| 0.44 | 70 |
| 0.03 | MIN |

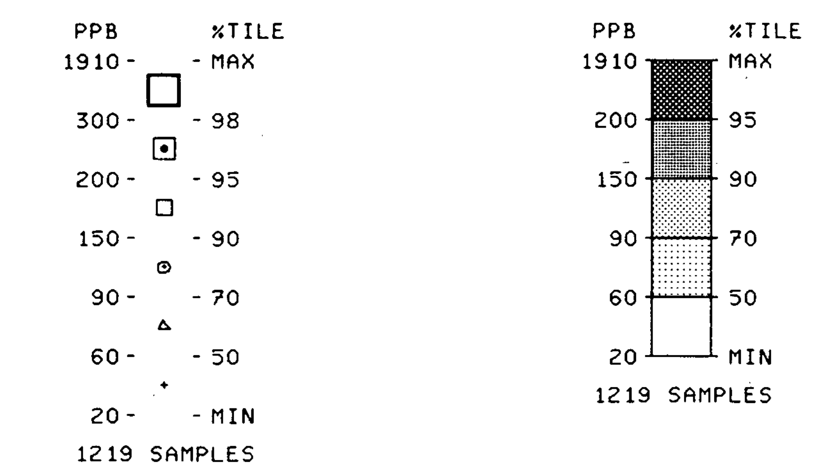
1219 SAMPLES

| PPB | %TILE |
|---|---|
| 61.90 | MAX |
| 2.70 | 95 |
| 1.50 | 90 |
| 0.44 | 70 |
| 0.03 | MIN |

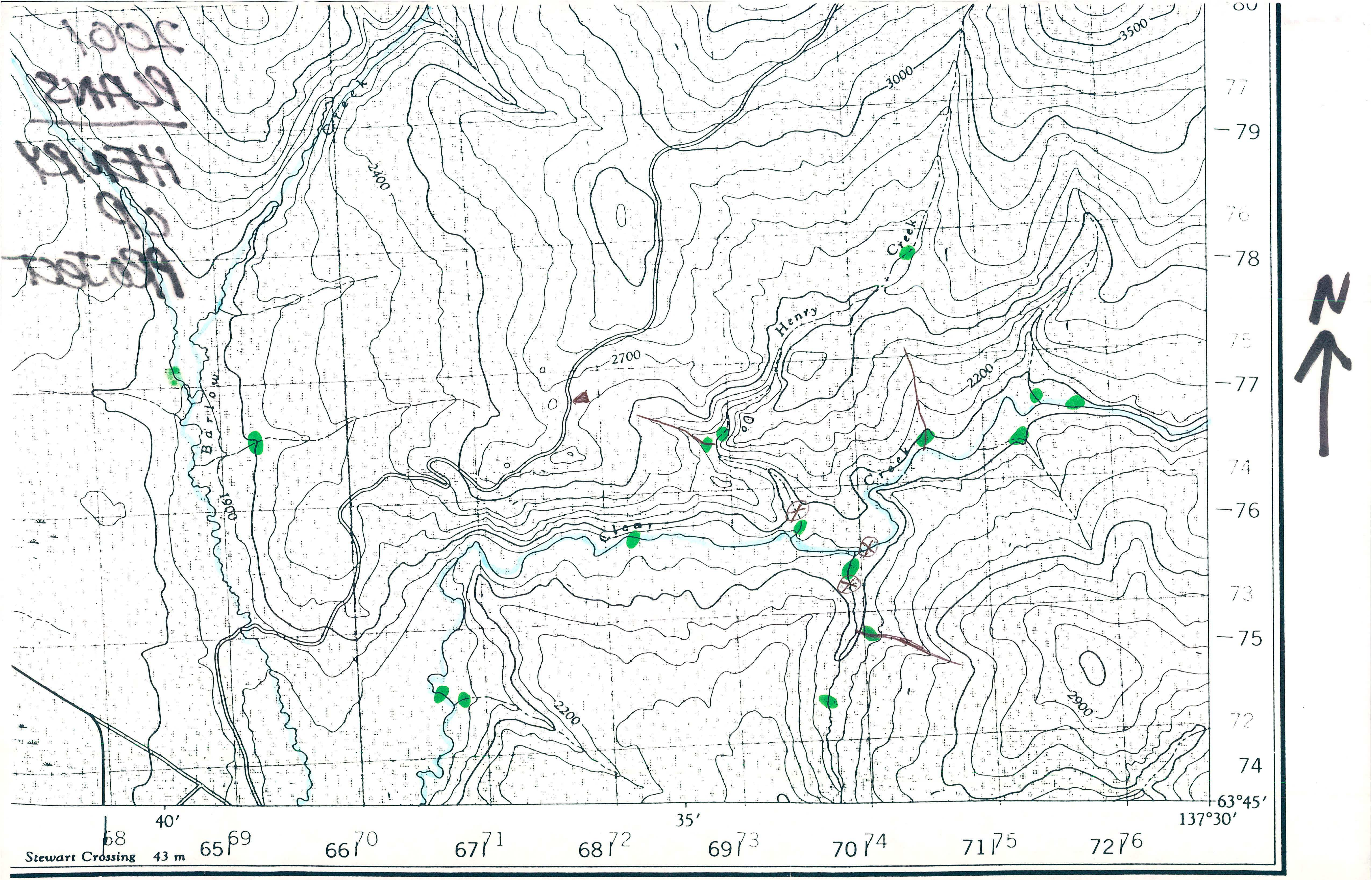
1219 SAMPLES

GSC OPEN FILE 1650
CANADA - YUKON
MINERAL DEVELOPMENT
AGREEMENT (1984-1989)




GSC OPEN FILE 1650
CANADA - YUKON
MINERAL DEVELOPMENT
AGREEMENT (1984-1989)


Creek
2400
3000
3500
Henry
Creek
2700
2200
Barlow
1900
Clear
Creek
2200
2900
79
78
77
76
75
74
63°45′
137°30′
40′
35′
68
65 69
66 70
67 71
68 72
69 73
70 74
71 75
72 76
Stewart Crossing 43 m
N

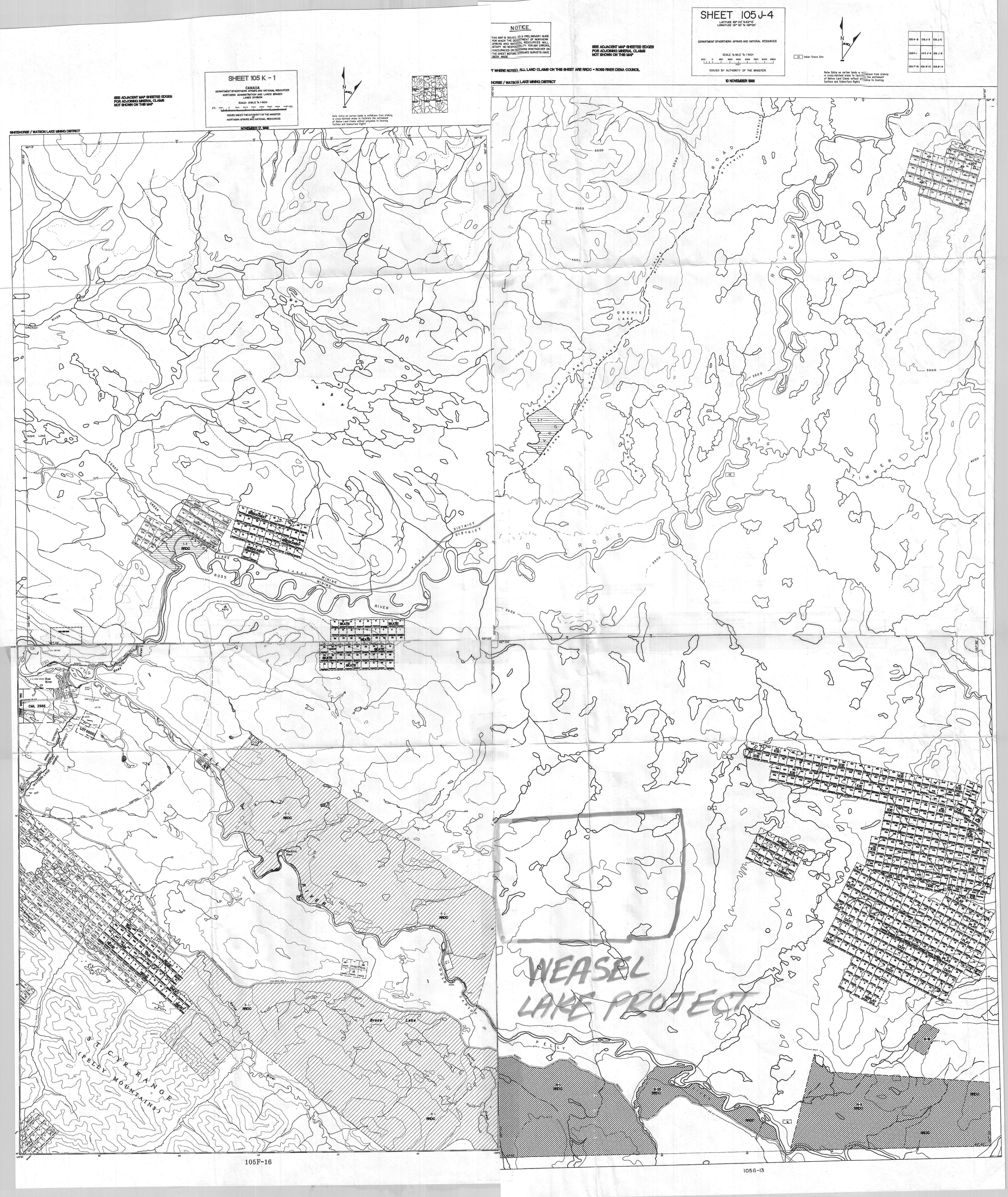
# 2001 PLANS

# HENRY CP PROJECT

● PROPOSED SILT SAMPLES

⊗ PROPOSED PAN CONC

▲ CAMPSITE


SHEET 105 K - 1
CANADA
DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
NORTHERN ADMINISTRATION AND LANDS BRANCH
LANDS DIVISION
SCALE: /2 MILE To 1 INCH
ISSUED UNDER THE AUTHORITY OF THE MINISTER OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
NOVEMBER 17, 1999
SEE ADJACENT MAP SHEET(S) EDGES FOR ADJOINING MINERAL CLAIMS NOT SHOWN ON THIS MAP
Note Entry on certain lands is withdrawn from staking in cross-hatched areas to facilitate the settlement of Native Land Claims without prejudice to Existing Surface and Subsurface Rights
WHITEHORSE / WATSON LAKE MINING DISTRICT
SHEET 105 J-4
LATITUDE 62° 00' To 62° 15'
LONGITUDE 131° 30' To 132° 00'
DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES
SCALE ½ MILE To 1 INCH
FEET
ISSUED BY AUTHORITY OF THE MINISTER
10 NOVEMBER 1998
NOTICE
Indian Grave Site
105 K-8
105 J-5
105 J-6
105 K-1
105 J-4
105 J-3
105 F-16
105 G-13
105 G-14
ALL LAND CLAIMS ON THIS SHEET ARE RRDC = ROSS RIVER DENA COUNCIL
ROSS
RIVER
ORCHIE LAKE
TIMBER
PELLY
RRDC
SKATE
LOT 00002
Bruce Lake
ST. CYR RANGE
(PELLY MOUNTAINS)
105F-16
105G-13
WEASEL LAKE PROJECT