

# UMEX

UNION MINIERE EXPLORATIONS  
AND MINING CORPORATION LIMITED

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# 3206

## GEOCHEMICAL SOIL SURVEY

Agnes 1-28, Agnes 32  
Sand 1-2, and Sand 4-6  
Mineral Claims

Liard Mining Division  
N.T.S. 1041/7W  
58°28'N, 128°50'W

By

Alfred A. Burgoyne, P.Eng., M.A.E.G.

Owners: Gerald Davis and Agnes Davis  
Optioned by: Union Miniere Explorations  
and Mining Corporation Limited

Work Dates: Agnes Claims, July 29 to August 10, 1971  
Sand Claims, August 8-10, 1971

September 10, 1971

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## INTRODUCTION

A geochemical soil survey on the Agnes Mineral Claim Group for total copper, nickel and cobalt, and for nickel and cobalt bound in the sulphide phase was completed in the period of July 29 to August 10, 1971. A geochemical soil survey on the Sand 1-2 and 4-6 mineral claims for total copper, nickel and cobalt, and for nickel bound in the sulphide phase was completed in the period of August 8-10, 1971. The Agnes Claim Group and the Sand Claims are located 2 miles northeast of the confluence of the Turnagain River and Flat and Hard Creeks at  $58^{\circ}28'N$ ,  $128^{\circ}50'W$  (N.T.S. 1041/7W) in the Cassiar Mountains of Northern British Columbia, 40 air miles east of the village of Dease Lake. The location of the property is indicated on Figure 1. The property ranges from less than 3,500 to 5,500 feet in elevation. The Sand Claims are located in rather flat country with meadow and timbered areas adjacent to the Turnagain River. The Agnes Claim Group straddles in part a west-northwest trending mountain that is in part above timber line and in part on the slopes and valley of the Turnagain River.

Access to the property is by fixed wing or helicopter from either Dease or Watson Lake.

## GENERAL GEOLOGY

The central portion of the claim block not covered by the soil survey is composed entirely of well-jointed massive dunite and is expressed by a prominent mountain of essentially 100 percent outcrop. Peripheral and to the west, the dunite is fringed and has been intruded by fine to medium-grained orange to red-stained blocky pyroxene-rich peridotite and pyroxenite. This area has been covered by a soil geochemical survey. On the northwestern and western fringes of the claims (Agnes 2, 20), metasediments consisting of argillite, shale, and metasilstones are present.

The eastern half of the Agnes Claim Group wherein a soil geochemical survey was also completed is probably underlain almost completely by metasediment, of mainly shale composition, and by lesser dunite on its western edge. Overburden is very extensive but not thick on this portion of the claim block.

The Sand Claims are largely covered by overburden and it is possibly quite thick although small and scarce outcrop indicate that pyroxenite is present.

The ultrabasics are thought to be of Devonian-Upper Mississippian Age while the metasediments are probably of Jurassic Age.

## LINES AND SOIL SAMPLING

A sample grid was placed on the Agnes Claim block by first placing base lines at  $302^{\circ}$  and  $290^{\circ}$  respectively by utilisation of the claim location lines. These base lines were chained and ribboned every 200 feet. Cross lines were

placed at 400 foot intervals in directions at  $90^{\circ}$  to the base lines. The cross lines were put in by pace and compass and stations were located and marked with orange flagging tape at 200 foot intervals.

On the Sand Claims a base line was placed in a  $290^{\circ}$  direction by utilisation in part of a previous claim location line. Cross lines were placed at 400 and 500 foot intervals.

Soil sampling was done simultaneously to placement of cross lines.

Approximately 25 line miles were placed on the claims with a corresponding 813 soil samples being taken. This includes some detailed soil sampling on the western portion of the Agnes Claim block.

At each soil sample location a pit or hole was dug with a shovel to a depth of 4-16 inches depending on the soil development and the depth to bedrock. On the western portion of the claims a residual C soil (weathered bedrock) horizon was sampled almost exclusively as overburden thickness is negligible. This portion of the claim block is above timber line and outcrop is abundant. The B soil horizon is poorly represented. On the eastern portion of the Agnes Claim block and on the Sand Claims both the B and C soil horizons were sampled almost exclusively.

At each sampling site 4-6 ounces of the soil were taken with a chromium-plated trowel. The soil was placed in a Kraft soil sample bag and appropriately marked. The soils, exclusive of parts of the Sand Claims, for the most part, are thought to be largely residual in nature. The soil development for the areas underlain by the Claims is:

- A<sub>0</sub> : Organic litter, undecayed leaves, twigs, 0-1 inch thick above timber line and 2-14 inches thick below timber line.
- A<sub>1</sub> : Partially decomposed organic debris, organic rich humus horizon, black in color. Almost completely above timber line and from 0-2 inches thick below timber line.
- B : Brown to orange in color, loose structure, accumulation of clay and iron minerals and of organic matter. Almost completely absent above timber line and from 0-4 inches thick below timber line.
- C : Weathered bedrock.

The writer was in the field from July 29 to August 2 to organize the survey, locate the base and cross lines, and to study soil development and geology. The soil sampling was undertaken by T. Hammell and B. Hughes in the period July 29 to August 10, 1971.

#### ANALYTICAL TREATMENT OF SOIL SAMPLES

The soil samples were analysed by Bondar and Clegg in North Vancouver and the analyst was Ken Bright. The samples were dried in their respective sample bags at a temperature of  $120^{\circ}\text{F}$  and then sieved to -80 mesh through

a nylon screen. For total nickel, copper and cobalt, one-half gram portions of these screened soils were placed in culture tubes and then digested in aqua regia for 1 to 2 hours. The resulting digested samples were bulked to a specific volume in dilute hydrochloric acid and then aspirated into a Techtron Atomic Absorption Spectrophotometer. Soil samples analysed (one-half gram portions) for sulphide nickel and cobalt were digested in cold hydrogen peroxide-ascorbic acid for 18 hours and then aspirated into the atomic absorption spectrophotometer. Calibration of the spectrophotometer is done by preparation of respective metal standards.

### RESULTS

Copper values in parts per million have been plotted on Figure 2, nickel on Figure 3, and cobalt on Figure 4, and are located in the end pocket. Statistical plots of cumulative frequency versus concentration have been plotted on Figures 5, 6, and 7 for copper, nickel, and cobalt respectively.

#### COPPER

Discussion of copper results has been broken into 3 areas, the Agnes West, Agnes East, and the Sand.

##### Agnes West

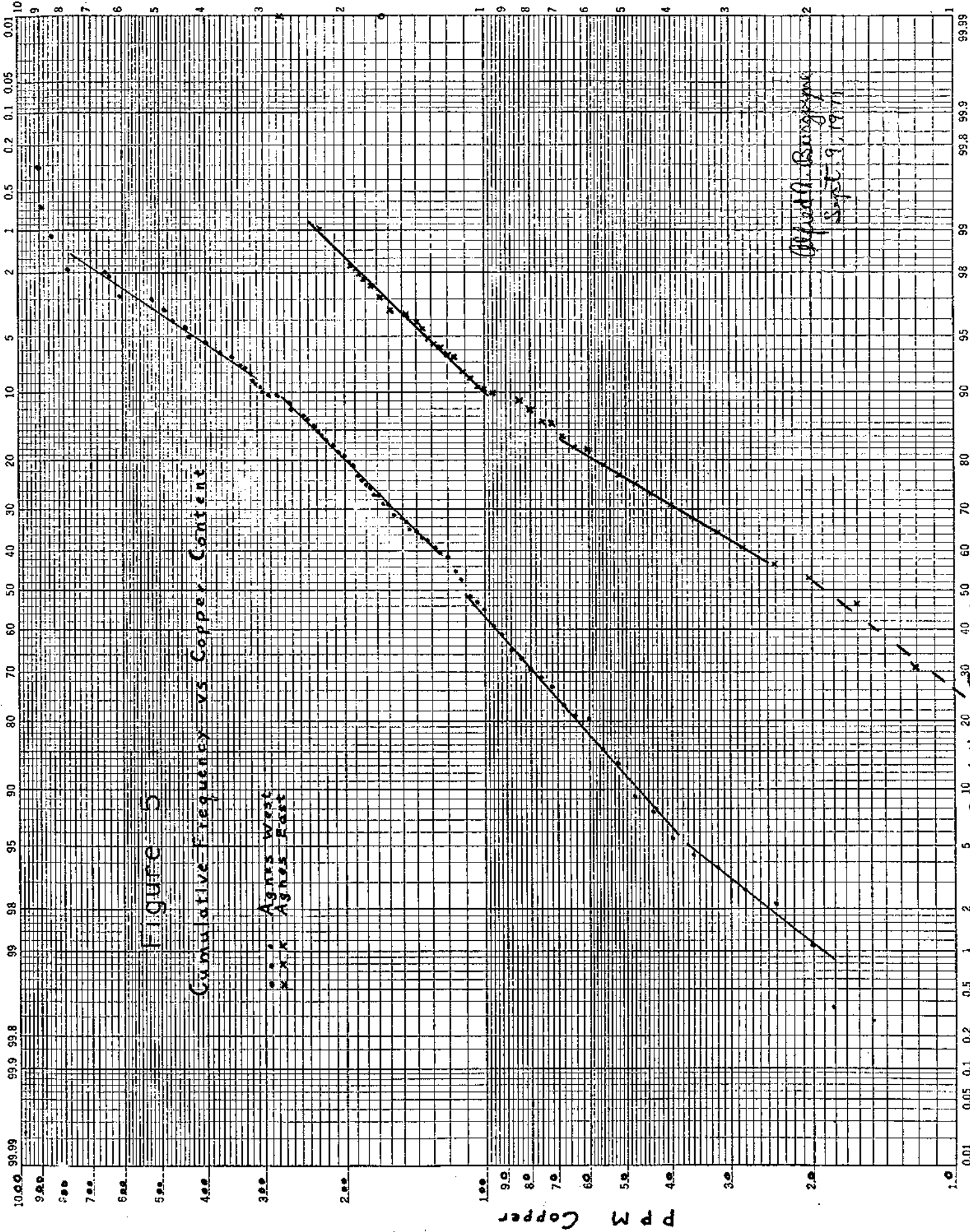
From a knowledge of the geology of the area and from the results of the statistical treatment as illustrated in Figure 5, the following population ranges characterize the data:

< 20 to 40-50 ppm	--mostly background values over meta-sediments (shale, argillite, siltstone).
50 to 110-125 ppm	--background values over ultrabasics (dunite, peridotite, pyroxenite).
+125 to 300 ppm	--probably anomalous values representing copper mineralization.
+300 ppm	--distinctly anomalous values representing copper mineralization.

On Figure 2 copper values in excess of 300 ppm describe a distinct elliptical zone some 3,500 feet by at least 100-800 feet wide. Peripheral to this above zone, values from 125 to 299 ppm occur over a larger area. The total areal extent of the probable and distinct anomalous zone(s) is 4,000 feet long by 500-1,600 feet wide. Physical dispersion has no doubt extended the anomalous area to some extent, at least in the width (downhill) dimension.

##### Agnes East

The following population ranges below are thought to characterize the data. The statistical treatment is probably not as meaningful as



for Agnes West because of the different soil horizons sampled and because of the variable overburden thickness.

<10 to 20-25 ppm	--mostly background values over metasediments.
25 to 70 ppm	--background values over ultrabasics.
70 to 100 ppm	--zone of overlap.
+100 ppm	--possible anomalous values representing weak copper mineralization.

On Figure 2 copper values on the Agnes East do not cluster into any groupings to produce any significant anomalous area. There appears to be a direct relationship between anomalous copper values and organic rich soils.

#### Sand

No statistical treatment has been done for these samples. From inspection, perhaps seven samples are anomalous ( $\geq 50$  ppm) and no significant anomalous areas of any extent are present.

#### Nickel

It was realized initially that the use of nickel geochemistry in the search for nickel mineralization in ultrabasic rocks posed certain serious problems. In an attempt to resolve some of these problems, and specifically, to resolve nickel tied up in the silicate lattice versus the sulphide lattice, four supposedly representative rock samples were analysed geochemically for aqua regia (total) and sulphide nickel and copper. The results were:

	<u>Total</u>	<u>Sulphide</u>	<u>Total</u>	<u>Sulphide</u>
	ppm	ppm	ppm	ppm
	<u>Ni</u>	<u>Ni</u>	<u>Cu</u>	<u>Cu</u>
(#17d) dunite	1500	700	12	8
△ 2 pyroxene rich peridotite	325	290	105	95
△ 8 pyroxenite	300	300	88	90
△ 12 pyroxenite (?)	1255	1450	38	38

It is seen that for copper there is little difference, as would be expected, in the values obtained by the different analytical methods. However, for nickel it is seen that in the peridotite and pyroxenite most of the nickel is tied up in a sulphide phase whereas in the dunite, a major percentage is tied up presumably in the silicate lattice. It was decided to analyse every second soil sample on the Agnes West and Agnes East and every

soil sample on the Sand Claims for sulphide nickel; in addition, every soil sample taken was analysed for total (aqua regia extractable) nickel. It was hoped that the sulphide nickel in the soil would serve as some guide in an attempt to better resolve potential nickel sulphide mineralization.

#### Agnes West

From inspection of the plan of the nickel values on Figure 3 and of the statistical treatment on Figure 6, and from a knowledge of the geology, the following population ranges characterize the data for aqua regia extractable nickel:

< 50 to 160 ppm	--background values over metasediments.
160 to 220 ppm	--some of mixing, values from meta-sediments and ultrabasics.
220 to 650 ppm	--background values over ultrabasics
+650 ppm	--possible anomalous values representing mineralization.

The total nickel to sulphide nickel ratios vary from 1.1 to 4.0 but most fall in the 1.5 to 2.5 range. It would appear that, as a general relation over the ultrabasic rocks, high aqua regia extractable nickel in soils are followed by a high sulphide nickel.

Values greater than or equal to 650 ppm are given an orange coloration on Figure 3. The total nickel to sulphide ratio contour of 2.0 is superimposed on this map; this value encloses a majority of the possible anomalous total nickel values. The ratio contour is not continued on Agnes 2 and 20 mineral claims as this area is largely underlain by metasediments.

The nickel plan when compared to the copper plan shows a general coincident of anomalous zones. The relative chemical dispersions of nickel and copper should also be kept in mind when comparing areal extent of these various anomalies.

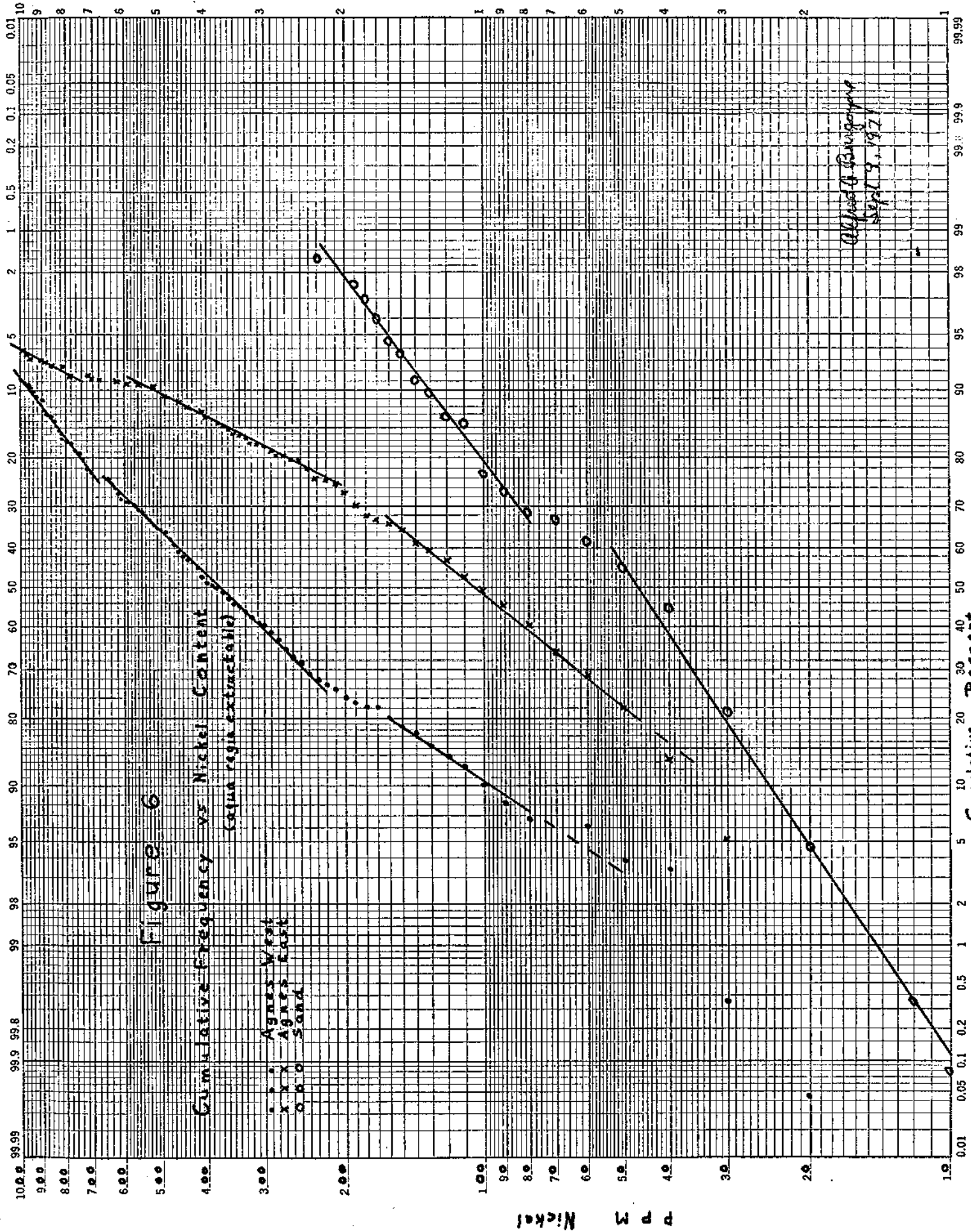
#### Agnes East

The population ranges below are thought to characterize the data for aqua regia extractable nickel. Again as for copper the statistical treatment is probably not as meaningful as for the Agnes West because of the variable soil horizon development and the variable overburden thickness. The ranges given below are merely a guide.

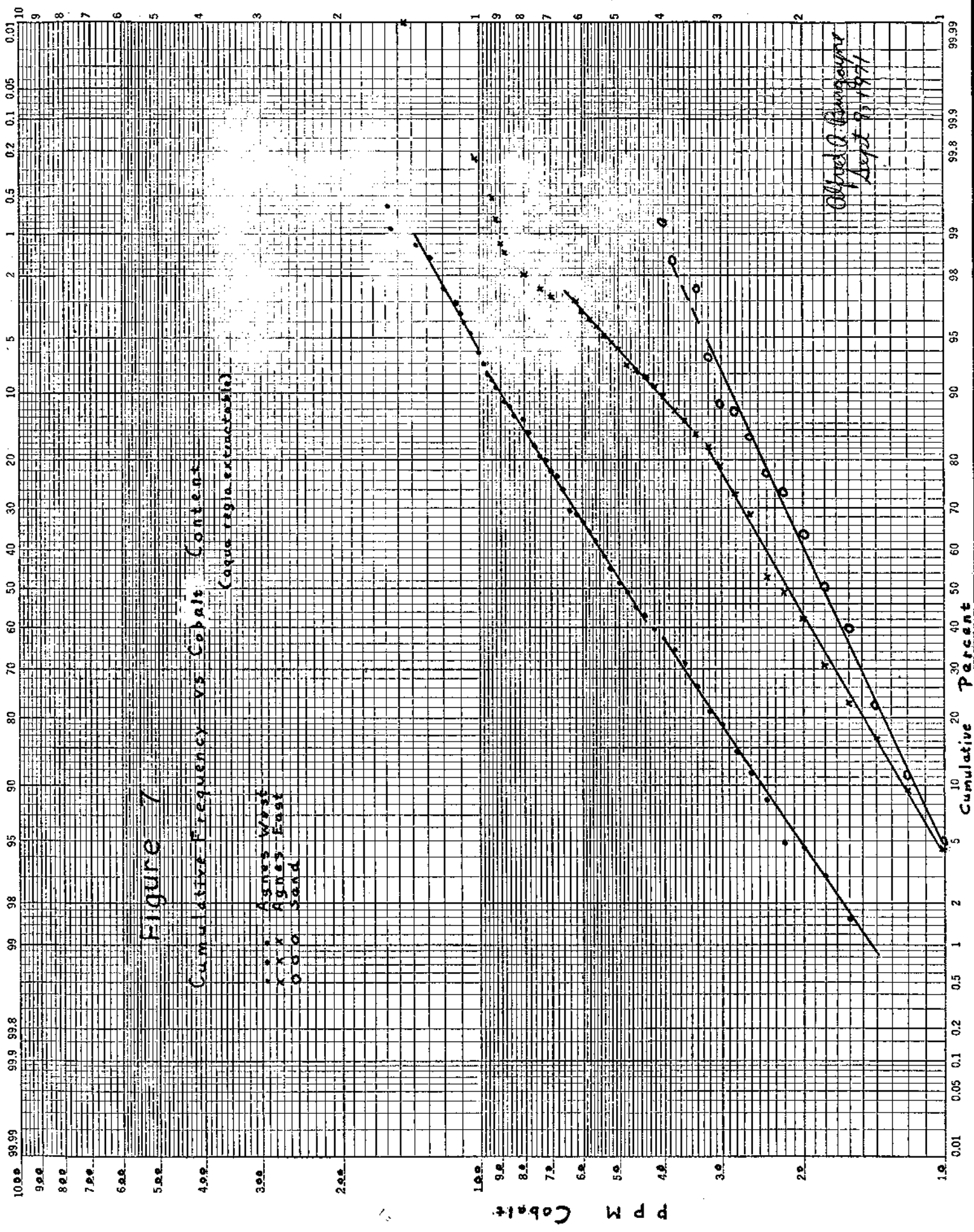
< 40 to 160 ppm	--background values over metasediments.
160 to 200 ppm	--some of mixing of values from meta-sediments and dunite.
200 to 520 ppm	--background values over dunite.







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As illustrated on Figure 4, several possible anomalous areas of cobalt have been outlined that are small and erratic in distribution; however, when these values are compared to distribution of possible anomalous nickel and anomalous copper areas, there is usually a coincidence or near coincidence. The ratio of aqua regia extractable to sulphide extractable cobalt varies from 0.7 to 2.0 with a majority of the values in the 1.1 to 1.6 range. In certain cases, the sulphide cobalt value is greater than the aqua regia extractable cobalt value; this can only be explained by some suppression or complexing effect compounded during the analysis of the samples.

#### Agnes East

The population ranges below are thought to characterize the data for aqua regia extractable cobalt. Again, as for copper and nickel, the statistical data is not clear because of the variable soil horizon development and thickness of the overburden.

< 10 to 30 ppm	--background values over metasediments.
30 to 65 ppm	--background values over dunite.
+65 ppm	--possible anomalous values but also possible end point effects.

On Agnes 25 mineral claim a small area (6 values) of possible anomalous cobalt values occur coincidental to possible anomalous nickel. This small possible anomalous area is not thought to be significant in terms of Ni-Co mineralization as for the reasons discussed under nickel.

#### Sand

Statistically the cobalt (aqua regia extractable) for the Sand Claims describes one log-normal distributed population. Only one value of 296 ppm on Sand 6 mineral claim is clearly anomalous. This is coincidental to copper and nickel anomalous values.

### CONCLUSIONS

A geochemical soil survey on the Agnes Mineral Claim group for total (aqua regia extractable) copper, nickel and cobalt, and for nickel and cobalt bound in the sulphide phase was completed in the period of July 29 to August 10, 1971. A geochemical soil survey on the Sand 1-2 and 4-6 mineral claims for total (aqua regia extractable) copper, nickel and cobalt, and for nickel bound in the sulphide phase was completed in the period August 8-10, 1971.

The purpose of the survey was to define potential areas of copper-nickel mineralization in or adjacent to ultrabasic rocks which underlie a significant portion of the Agnes Claim group and an unknown portion of the Sand Claims.

On the Agnes West probable and distinct copper anomalies have been defined statistically at +125 and +300 ppm respectively. Here a significant area comprising probable and distinct anomalous values defines a zone(s) some 4,000 feet by 500-1,600 feet. On the Agnes East a possible copper anomaly has been defined statistically at +100 ppm. Here copper values do not cluster into any groupings to reveal any significant anomalous areas. On the Sand Claims, from inspection of the data, seven values in excess of 49 ppm are considered anomalous but no significant anomalous area has been defined.

On the Agnes West a possible nickel anomaly (total or aqua regia extractable) has been defined statistically at +650 ppm. Values in excess of this threshold show an irregular though general correspondence to the anomalous copper zone described above. It would appear that, as a general relationship, high aqua regia extractable nickel values correspond to high sulphide nickel values over ultrabasic rocks. On the Agnes East a possible total nickel anomaly has been defined statistically at +700 ppm. In this portion of the claim block possible anomalous values define three distinct clusterings of small areal extent. These possible anomalous areas are not thought to be significant in terms of potential sulphide mineralization. On the Sand Claims two values in excess of 1,000 ppm are clearly anomalous and are coincidental to copper anomalous values. No significant anomalous zone(s) have been defined.

On the Agnes West a possible cobalt anomaly (total or aqua regia extractable) has been defined statistically at +95 ppm. Values in excess of this threshold define several small and erratic zones which are coincident or near coincident to anomalous copper and nickel zones. On the Agnes East a possible cobalt (total) anomaly is defined at +65 ppm. No significant zones have been defined. On the Sand Claims only one value of 296 ppm is anomalous.

Respectfully Submitted,

*Alfred A. Burgoyne*

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**Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT**

NO. 3206 MAP \_\_\_\_\_



M-2

3206

FIGURE 2

To accompany Report on Geochemical Soil Survey  
 Agnes 1-28,32, Sand 1, 2, 4, 5, 6 Mineral Claims by  
 A. A. Burgoyne P. Eng.

Alfred G. Burgoyne  
 Sept. 9, 1971

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 3206 MAP #2

LEGEND

- ⊙ A Soil horizon with metal value in parts per million
- B Soil horizon with metal value in parts per million
- ⊙ C Soil horizon with metal value in parts per million

Note: Aqua regia extractable Copper

DAVIS PROPERTY

Agnes 1 to 28, 32 and Sand 1, 2, 4, 5, 6 mineral claims  
 Liard Mining Division NTS 104.1/7W  
 Soil Geochemistry Copper

Scale: 800' 0 800'

UMEX CORPORATION LTD.

DRAWN BY: K. Michels  
 DATE: August 1971  
 SURVEYED BY: DWG. No.



To accompany Report on Geochemical Soil Survey  
 Agnes 1-28, 32, Sand 1, 2, 4, 5, 6 Mineral Claims by  
 A. A. Burgoyne P. Eng.

Alfred A. Burgoyne  
 Sept. 9, 1971

SAND CLAIMS

AGNES CLAIMS

FIGURE 3

Department of  
 Mines and Petroleum Resources  
 ASSESSMENT REPORT  
 NO. 8206, MAP #3

DAVIS PROPERTY

Agnes 1 to 28, 32 and Sand 1, 2,  
 4, 5, 6 mineral claims  
 Liard Mining Division NTS 1041/7W  
 Soil Geochemistry total Nickel  
 and cold extractable Nickel

Scale: 800' 0 800'  
 UMEX CORPORATION LTD.

DRAWN BY: K. Michals  
 DATE: August 1971  
 SURVEYED BY: DWG. No.

LEGEND

- ⊙ A Soil horizon with metal value in parts per million
- B Soil horizon with metal value in parts per million
- ⊙ C Soil horizon with metal value in parts per million

Note: All samples analyzed for total (aqueous extractable)  
 Nickel and represented by top or only value adjacent  
 to sample location. Lower value is cold extractable  
 (hydrogen peroxide - ascorbic acid) nickel.





To accompany Report on Geochemical Soil Survey  
 Agnes 1, 2, 3, 28, Sand 1, 2, 4, 5, 6 Mineral Claims by  
 A. A. Burgoyne P. Eng.

Alfred A. Burgoyne  
 Sept. 9, 1971

**SAND CLAIMS**

**AGNES CLAIMS**

Department of  
 Mines and Petroleum Resources  
**ASSESSMENT REPORT**  
 NO. 3206 MAP #4

**FIGURE 4**

**LEGEND**

- ⊙ A Soil horizon with metal value in parts per million
- B Soil horizon with metal value in parts per million
- ⊙ C Soil horizon with metal value in parts per million

**Note:** All samples analyzed for total (aqueous extractable) Cobalt and represented by top or only value adjacent to sample location. Lower value is cold extractable (hydrogen peroxide-ascorbic acid) nickel.

**DAVIS PROPERTY**

Agnes 1 to 28, 32 and Sand 1, 2, 4, 5, 6 mineral claims  
 Liard Mining Division NTS 104 1/7 W

Soil Geochemistry total Cobalt and cold extractable Cobalt

Scale: 800' 0 800'  
**UMEX CORPORATION LTD.**

DRAWN BY: K. Michels  
 DATE: August 1971  
 SURVEYED BY: DWG. No.

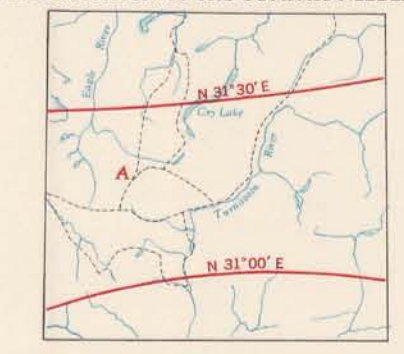


3206 M-1

GRID ZONE DESIGNATION		TO GET A STANDARD REFERENCE IN THIS SHEET TO NEAREST 1000 FEET	
VR	WR	1	07
VQ	WQ	2	08
30			

TEN THOUSAND METRE  
UNIVERSAL TRANSVERSE MERCATOR GRID  
ZONE 9  
Department of  
Mines and Petroleum Resources  
ASSESSMENT REPORT  
NO. 3206 MAP #1

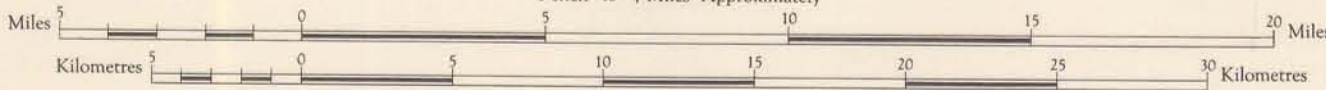
THE DECLINATION OF THE COMPASS NEEDLE, 1952



The declination of the compass needle on any place along a red line is the declination given on that red line. At other places the declination is between those given on the neighboring red lines. At the place marked A, the declination is between N. 31° 00' E. and N. 31° 30' E. The annual declinations of the compass needle are decreasing 2 minutes annually.

Surveyed, compiled, drawn and printed by the ARMY SURVEY ESTABLISHMENT R.C.E., 1949-52.  
Aerial photography by the R.C.A.F. 1949.  
Universal Transverse Mercator Projection.

Scale 1 : 250,000  
1 Inch to 4 Miles Approximately



REFERENCE

Road, Lane Surface, All Weather	More than 2 Lanes	2 Lanes
.. Lane Surface, Less than 2 Lanes	All Weather	On Weather
Cart Track		
Trail		
Railways, Multiple Track		
.. Single Track		
Boundary, International		
.. Province or State		
.. County or District		
.. Reservations, Indian, Military, Park, etc.		

Contour Interval 500 Feet.  
All Elevations in Feet above Mean Sea Level.

REFERENCE

Triangulation Station	Spot Elevation, in Feet	257
Contours, Elevation	Wooded Area	
.. Depression	Swamp or Marsh	
.. Approximate		
Stream, Intermittent	Ferry	W.L. 241
Dam	Navigation Light	
.. Fall	.. Sand	
Armedness, on Land	Elevation in Feet 250	
Main Electric Power Line	.. on Water	

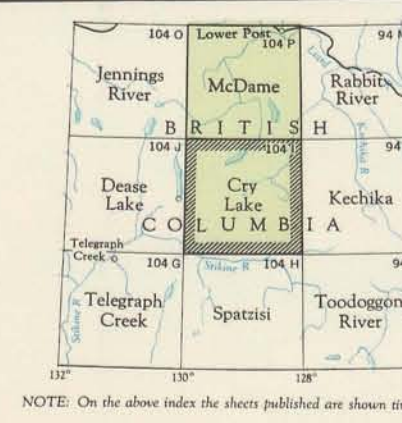


Figure 1  
LOCATION - DAVIS PROPERTY

Alfred A. Bergamini  
Sept 9, 1971

CRY LAKE  
BRITISH COLUMBIA

SHEET 104 I  
FIRST EDITION