

1968

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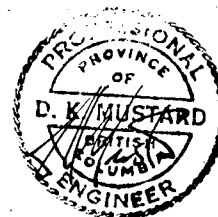
**GEOCHEMICAL SURVEY
of the**

Rusty Group of Claims

Greenwood Mining Division

82 E 7

June 1969



D.K. Mustard, BSc. P.Eng. (B.C.)

TABLE OF CONTENTS

SUMMARY AND RECOMMENDATIONS----- 1
INTRODUCTION----- 2
 General Statement----- 2
 Location and Access----- 2
 Topography and Drainage----- 2
 Property----- 3

GEOLOGY----- 3

GEOCHEMISTRY----- 3
 Soil Samples----- 4
 Rock Chip Samples----- 4
 Results----- 4
 Interpretation of Results----- 5

SUMMARY OF WORK

APPENDIX I _ Geochemical Sample Handling Procedures

II Analysis of Geochemical Soil and Rock Chip Samples

ILLUSTRATIONS

Figure 1 - Location Map-----After Page 2
2 - Claim and Geochemical Survey Map-----In pocket
3 - Frequency Diagram - Cu in Soils-----After Page 4

SUMMARY AND RECOMMENDATIONS

A geochemical reconnaissance survey was made in 1968 on the Rusty Group of Claims in the Greenwood Mining Division, British Columbia.

A total of 65 soil samples and 36 rock chip samples were collected on the property and analysed in the Amax Laboratory at North Burnaby. Samples were tested for molybdenun, copper and nickel. No extensive area of soil with continuously anomalous amounts of copper was recognized on the property. Additional sampling would be required to define more local areas of soil with an anomalous content of copper.

INTRODUCTION

General Statement

On August 22nd, 1968 Mr. D.K. Mustard P.Eng. and Mr. R.E. Elliott visited the Rusty Group of sixteen claims in the Greenwood Mining Division, British Columbia.

From August 31 - September 3rd, 1968 and on November 16th, 1968 Mr. B.A. Fenwick-Wilson and R.E. Elliott collected a total of 65 soil and 36 rock chip geochemical samples on the Rusty Group under the supervision of D.K. Mustard, P.Eng.

Location and Access

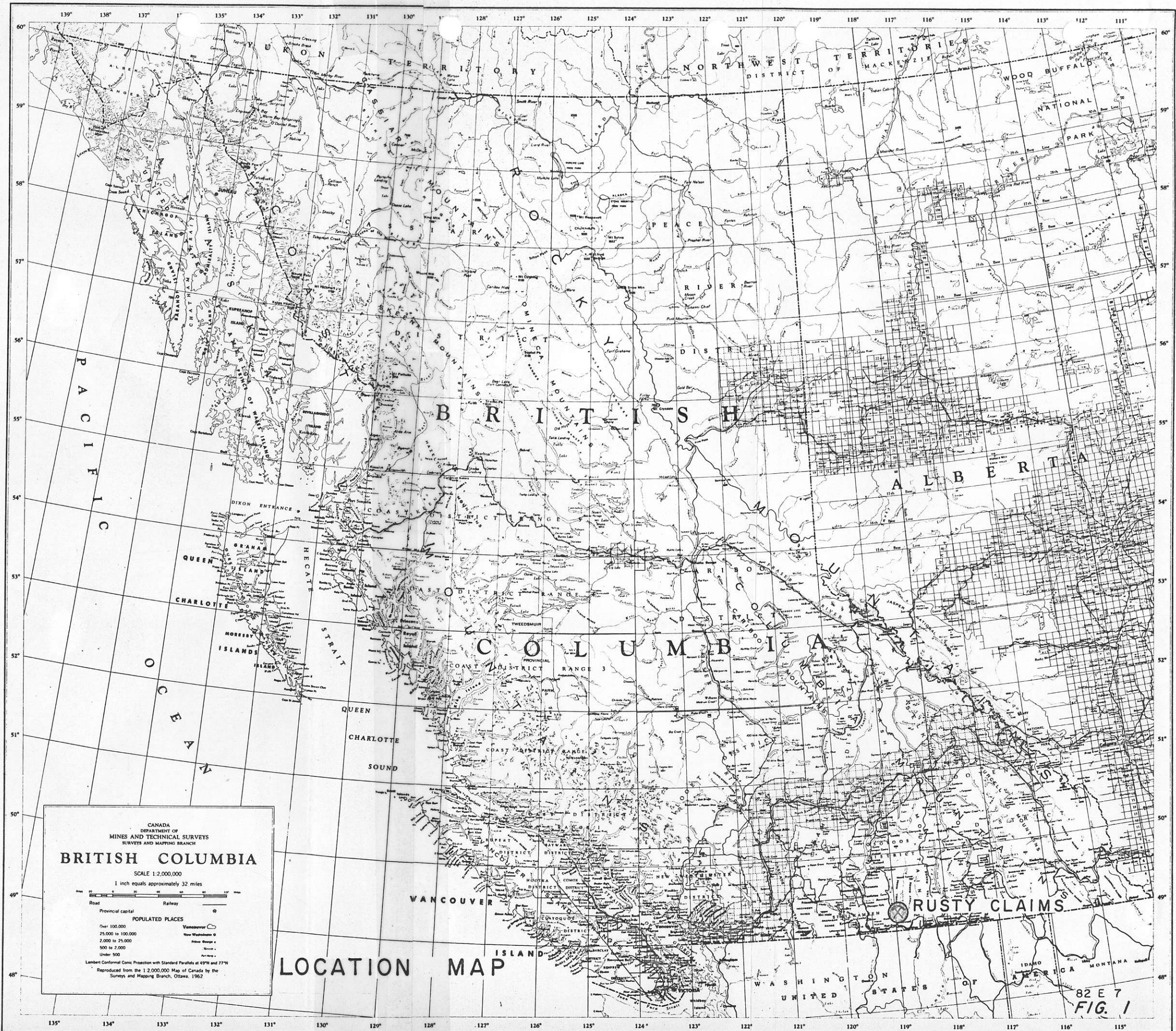
The property lies approximately 20 miles north of Westbridge and three miles west of the main road up the valley of the East Kettle River. It is reached by an old logging road which branches west from the main road, $1\frac{1}{2}$ miles north of the Buckhaven hunting camp on sub-lot 6 S.D.Y.D.

Topography and Drainage

The Rusty claims are on the crest and east side of a ridge which lies between the Kettle River and Crouse Creek. Elevations are from 3400 feet to 4500 feet and the ground rises over a series of benches of glacial alluvium. Slopes are moderate to steep.

Drainage is west to Crouse Creek; north to Canyon Creek and east to the Kettle River. Two small swampy lakes lie in a small valley on the Rusty #6 and #7 claims.

The area was logged over 10 - 20 years ago and in places



CANADA
 DEPARTMENT OF
 MINES AND TECHNICAL SURVEYS
 SURVEYS AND MAPPING BRANCH

BRITISH COLUMBIA

SCALE 1:2,000,000
 1 inch equals approximately 32 miles

POPULATED PLACES
 Over 100,000
 75,000 to 100,000
 25,000 to 75,000
 5,000 to 25,000
 Under 5,000

Lambert Conformal Conic Projection with Standard Parallels at 49°N and 77°N
 Reproduced from the 1:2,000,000 Map of Canada by the
 Surveys and Mapping Branch, Ottawa, 1962

LOCATION MAP

82 E 7
 FIG. 1

there is a heavy secondary growth of timber on lower slopes.

Property

The Rusty Group of claims consists of 16 located claims, staked by R. Rutherglen, as follows: (See Figure 2).

Rusty #1 - #14 inclusive, A and B

GEOLOGY

The geology of the region was mapped by H.W. Little 1953-1956 (G.S.C. Map 6-1957 Kettle River East-Half).

Little shows the area of the Rusty claims to be occupied by Paleozoic Anarchist Group rocks with Cenozoic sedimentary and volcanic rocks lying to the east and Cretaceous Valhalla batholithic rocks to the west. Crouse Creek appears to follow a large fault striking west of north.

On the property, exposures are mainly of fine to medium grained, dark grey to green volcanic rocks which resemble descriptions by Reinecke of Wallace Group rocks (Reinecke, Ore Deposits of the Beaverdell Map-Area, Memoir No. 79 - 1915).

Dykes of feldspar porphyry and diorite cut the volcanic rocks. A number of old pits were excavated on a narrow breccia zone striking northwest with associated massive and disseminated sulphides.

GEOCHEMISTRY

A total of 65 soil samples and 36 rock chip samples were collected on the property. The locations of these samples are shown in Figure 2 .

Soil Samples

Soils were mainly fine-medium grained light brown sandy loam. Soil samples were collected by scraping off the surface forest litter and digging a hole 6" x 6" x 12" deep using a light cast iron mattock. The "B" horizon was identified and approximately 1/4 lb. of soil collected in a yellow, kraft paper, wet strength envelope. Notes were made of the sample location, depth, soil type and characteristics, slope drainage and vegetation at each sample site.

Rock Chip Samples

A geological pick was used to break ten to twelve small chips (< 1") of rock from as fresh and unweathered outcrop surfaces as could be discovered. Obvious, high grade mineralization was avoided. Chips were collected in yellow, wet strength Kraft paper envelopes.

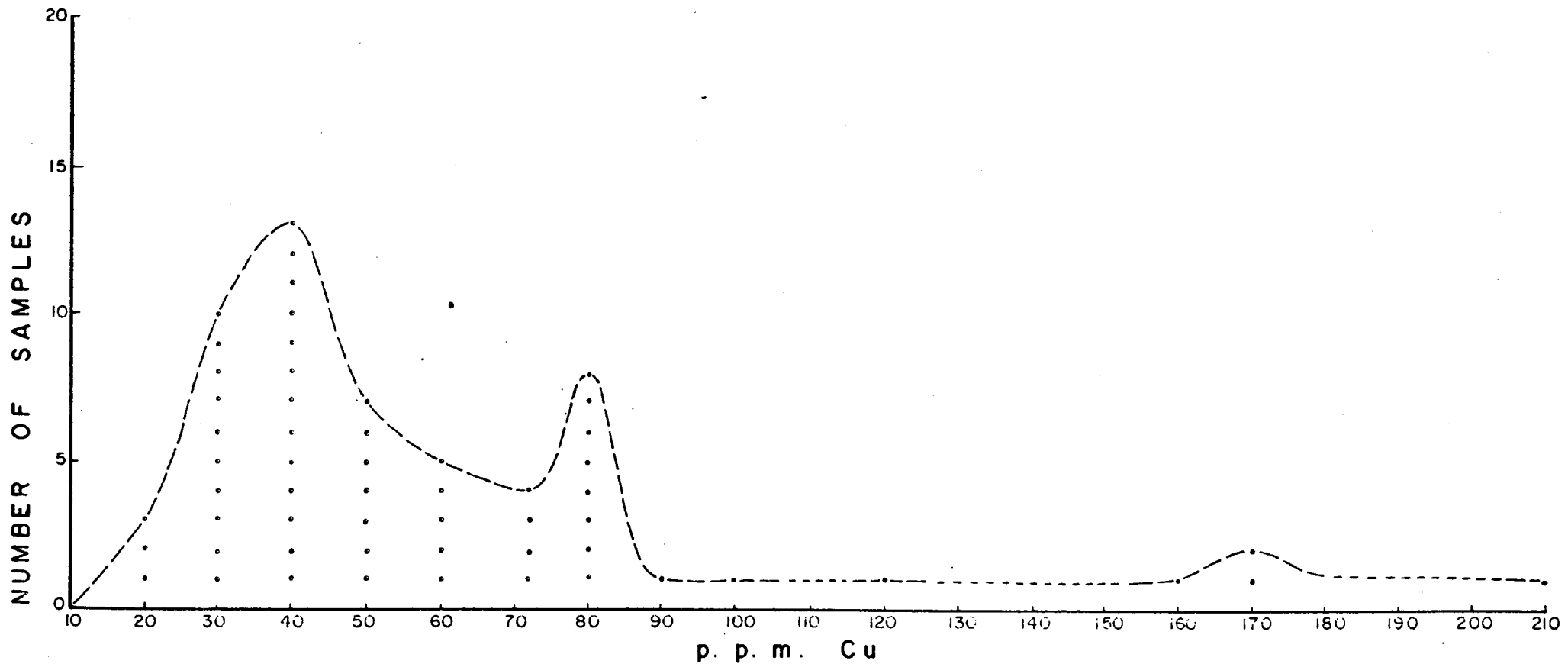
Samples were analysed for copper and molybdenum at the Amax Geochemical Laboratory, 2225 Springer Ave., North Burnaby, B.C. by the methods shown in Appendix I.

Results

Sample results are listed in Appendix II and illustrated in Figure 2.

Copper

Data relating to amount of copper in soil shows a range of from 15 ppm to 4000 ppm. The frequency distribution is bimodal with the main population having a mean of about 40 ppm. Values greater than 120 ppm are clearly anomalous and 16% of the



RUSTY CLAIMS
 FREQUENCY DIAGRAM — Cu IN SOILS

FIG. 3

results fall about 120 ppm.

Molybdenum

The majority of soil samples tested for molybdenum fall below the level of detection (1 ppm). No strongly anomalous values were represented.

Nickel

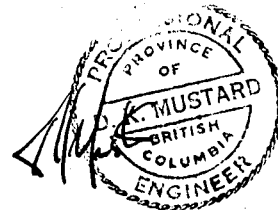
The amount of nickel in soil samples varied from 7 - 60 ppm. No anomalous values were present.

pH

Soil pH values are in the range of 5.3 to 6.9 with a mean of 6.3.

Interpretation of Results

No extensive areas of highly anomalous copper content were recognized. Scattered copper soil anomalies would require additional close and regular sampling for adequate definition.



June 1969

D.K. Mustard, BSc. P.Eng. (B.C.)

SUMMARY OF WORKPersonnel

D.K. Mustard - Geologist I/C - 1430 9th Street, West Vancouver, B.C.
 B.A. Fenwick-Wilson - Prospector - Box 241, Osoyoos, B.C.
 R.E. Elliott - Senior Assistant - Box 89, Huntingdon, Quebec.

Salaries

D.K. Mustard - August 22, 1968	1 day @ \$52.70 =	\$ 52.70
B.A. Fenwick-Wilson - August 31 - Sept 3, 1968 and November 16, 1968	5 days @ \$18.81 =	94.05
R.E. Elliott - August 22, 31 - Sept 3, 1968 and November 16, 1968	6 days @ \$14.51 =	87.06

Board and Accomodation

12 man days @ \$7.50/day	90.00
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Sample Analysis

65 samples @ \$2.00/sample (soil)	
36 samples @ \$3.50/sample (rock chip)	256.00

Preparation of Report

Map drafting, typing, copies etc.	<u>50.00</u>
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\$629. 81

APPENDIX I

SAMPLE HANDLING PROCEDURE

Procedures for Collection and Processing
of Geochemical Samples

Amax Exploration, Inc.

Vancouver Office

December 1968

R.F. Horsnail

SAMPLE COLLECTION

Soils

B horizon material is sampled and thus organic rich topsoil and leached upper subsoil are avoided. Occasionally organic rich samples have to be taken in swampy depressions.

Samples are taken by hand from a small excavation made with a cast iron mattock. Approximately 200 gms of finer grained material is taken and placed in a numbered, high wet-strength, Kraft paper bag. The bags are closed by folding and do not have metal tabs.

Observations as to the nature of the sample and the environment of the sample site are made in the field on standard forms, examples of which are shown overleaf.

Drainage Sediments

Active sediments are sampled with stainless steel trowels from tributary drainages which are generally of five square miles catchment or less. Composite samples are taken of the finest material available from as near as possible to the centre of the drainage channel thus avoiding collapsed banks. More than one sample is taken if marked mineralogical or textural segregation of the sediments is evident.

Some 200 gm of finer material is collected unless the sediment is unusually coarse in which case the weight is increased to 1 kg. Samples are placed in the same type of Kraft paper bag as are employed in soil sampling.

RECCE SAMP DATA SHEET

Camp _____

Collector _____

Project _____

Area (lake,highway,etc) _____

Date _____

Plotted (map, photo) _____

m000	Number		Type					Location			Environment		Sample Description		Analytical Results			Remarks (Geology, Geomorph, Culture, Float)
	Sample Number		Rock	Soil	Water	Silt	Veg.	General	Sample	Site	TOPO. Terrain TYPE	DIRECTION Drainage TYPE	SIZE Texture TYPE	TONE Colour BASE	pH	Mo	Cu	
1						a b c		N		E								
2						a b c		N		E								
3						a b c		N		E								
4						a b c		N		E								
5						a b c		N		E								
6						a b c		N		E								
7						a b c		N		E								
8						a b c		N		E								
9						a b c		N		E								
10						a b c		N		E								
11						a b c		N		E								

General Remarks:

REFERENCE FOR COMPLETING RECCE SAMPLE DATA SHEET

- Code Number - Year, project, samplers initial and type of sample
- Sample Number - Each sampler is to number consecutively irrespective of sample type or area.
- Sample Type
 Rock - Put check mark in appropriate column. In case of silt (stream sediment) more than one sample is commonly taken at given site, therefore, identify different samples by subscript a,b,c, and check accordingly. If only one sample, check "a" and add subscript to number on sample envelope.
 Soil
 Water
 Silt
 Veg.
- Location - Location information is used to assist accurate plotting and re-locating site in field:
- | | |
|---|--|
| <u>General</u> | <u>Sample Site</u> |
| Given with reference to plot on map or photo, e.g., highway, lake, river, creek, mountain, traverse, etc. | Detailed location of actual sample site; e.g., side of road, mountain slope, distance from lake, stream junction, bridge, swamp, culture, etc. |
- | | |
|------------------|------------------|
| <u> N </u> | <u> E </u> |
|------------------|------------------|

 - The "N" and "E" spaces refer to some numerical coordinate, i.e., latitude or longitude, leave blank in field, for office use later.
- Environment Terrain - Topo - mountainous, hilly, rolling, flat, dissected, (other) (specify other)
 - Type - deciduous, coniferous, grassland, swamp, cultivated, grazing, orchard, jungle, rock, (other)
- Drainage - Direction - N, NE, E, SE, S, SW, W, NW, ?
 - Type - groundwater, sheetwash: for streams-mature or meandering, youthful or eroding; PLUS size in actual feet at water level - seepage, 1 ft, 1-5 ft, 5-15 ft, over 15 ft.
- Sample Description Texture - Size - very fine, fine, medium, coarse, very coarse, unsorted, mixed, (other)
 - Type - Rock -- acid granitic, intermed. granitic, basic granitic, acid volc., basic volc., sandstone, carbonate, shale, metamorphic, (other)
 Soil -- A₀, A₁, B₁, B, C (if recognized) PLUS clay, loam, silt, sand, and approximate proportion of organic content - 1/4, 1/2, 3/4, if any
 Silt -- clay, loam, silt, sand, (other); PLUS amount of organic material-1/4,1/2,3/4, if any
- Colour - Tone - pastel, light, medium, dark, deep, speckled, spotted, (other)
 - Base - white, gray, black, brown, yellow, orange, red, mixed, (other)

NOTE: In describing Environments and Samples pick one word only for each section; (put any additional comments under the "Remarks" column).

Remarks - Any additional information not covered by other columns that may be pertinent to interpretation of results, e.g., geological features such as faults, dikes, quartz veining, geology of float, use of fertilizers on cultivated soils, sample below culvert, old mine, etc.

General Remarks - Any comments worth noting either with respect to area in general or taking and handling of samples including analytical remarks noted in lab report.

Water samples are taken at all sites where appreciable water is present. Approximately 100 mls are sampled and placed in a clean, screw sealed, polythene bottle.

Observations are made at each site regarding the environment and nature of the sample. The same standard sheet that is used for soil sampling is employed.

Rock Chips

Composite rock chip samples generally consist of some ten small fragments broken from unweathered outcrop with a steel hammer. Each fragment weighs some 50 gms. Samples are placed in strong polythene bags and sealed with non-contaminating wire tabs. Samples are restricted to a single rock type and obvious mineralization is avoided.

Soil, sediment and rock samples are packed securely in cardboard boxes or canvas sacks and dispatched by road to the AMAX geochemical laboratory in Vancouver.

SAMPLE PREPARATION

Packages of samples are opened as soon as they arrive at the laboratory and the bags placed in numerical sequence in an electrically heated sample drier (maximum temperature 70°C).

After drying soil and sediment samples they are lightly pounded with a wooden block to break up aggregates of fine particles and are then passed through a 35 mesh stainless steel sieve. The coarse material is discarded and the minus 35 mesh fraction replaced in the original bag providing that this is undamaged and

not excessively dirty.

Rock samples are exposed to the air until the outside surfaces are dry; only if abnormally wet are rocks placed in the sample drier. Rock samples are processed in such manner that a fully representative $\frac{1}{2}$ g sample can be obtained for analysis. The entire amount of each sample is passed through a jaw crusher and thus reduced to fragments of 2 mm size or less. A minimum of 1 kg is then passed through a pulverizer with plates set such that 95% of the product will pass through a 100 mesh screen. Where samples are appreciably heavier than 2 kg the material is split after jaw crushing by means of a Jones splitter. After pulverizing the sample is mixed by rolling on paper and is then placed in a Kraft paper bag.

WEIGHING AND DIGESTION FOR Cu and Mo ANALYSIS

Digestion tubes (100 x 16 mm) are marked at the 5 ml level with a diamond pencil. Tubes are cleaned with hot water and concentrated HCl. 0.5 g samples are weighed accurately, using a Fisher Dial-O-Gram balance, and placed in the appropriate tubes.

To each of the samples thus prepared are added 2 ml of an acid mixture comprising 15% nitric and 85% perchloric acids. Racks of tubes are then placed on an electrical hot plate, brought to a gentle boil ($\frac{1}{2}$ hour) and digested for $4\frac{1}{2}$ hours. Samples unusually rich in organic material are first burned in a porcelain crucible heated by a bunsen burner before the acid mixture is

added. Digestion is performed in a stainless steel fume hood.

After digestion tubes are removed from the hot plate and the volume is brought up to 5 ml with deionized water. The tubes are shaken to mix the solution and then centrifuged for one minute. The resulting clear upper layer is used for Cu and Mo determination.

MOLYBDENUM DETERMINATION

1. Transfer a 1 ml aliquot of digestion solution into a clean test tube.
2. Add 2 ml of a freshly prepared mixture comprising 1:1 5% KSCN solution and 15% SnCl₂ solution.
3. Make up to 10 mls with demineralized water.
4. Add 1 ml isopropyl ether, cork tube and shake for 45 minutes.
5. Estimate Mo content by matching intensity of amber-yellow colour in solvent phase with a standard series.

Standard Molybdenum Solutions

Stock Standard Solution (100 µg/ml) - Dissolve .015 gms of MoO₃ in 5 ml conc. NaOH and make up to 100 ml with demineralized H₂O. This solution must be made up bi-monthly.

Working Standard Solution (10 µg/ml) - Pipette 10 ml of 100 gamma/ml stock solution in a 100 ml volumetric flask and make up to 100 ml with demineralized H₂O.

Molybdenum Standards of Analyses for Soil, Silt & Rock Chip - To 11 clean 16 x 100 mm test tubes marked at 5 ml mark, pipette the following amounts of standard solution:

<u>mls of 10 µg/ml Mo Solution</u>	<u>ppm</u>
0.2	4
0.4	8
0.8	16
1.2	24
2.0	40

<u>mls of 100 µg/ml Mo Solution</u>	<u>ppm</u>
0.4	80
0.6	120
0.8	160
1.2	240
1.6	320
2.0	400

- then make up to 5 ml

To 16 x 150 ml test tubes pipette 1 ml from each of the 11 standards made above. After the standard solution has been added, the following solutions are to be pipetted in the standard tubes.

- 1) 1 ml of HCl
- 2) 2 drops of FeCl_3 (1% solution)
- 3) 1 ml of 5% KSCN solution
- 4) 1 ml of 15% SnCl_2 solution
- 5) Make up to 10 ml with H_2O
- 6) 1 ml isopropyl ether
- 7) Stopper and shake for 45 seconds.

Molybdenum Determination in Waters

- 1) Measure pH of samples with pH meter
- 2) Transfer 50 mls of sample into 125 ml separatory funnel
- 3) Add 5 mls dilute (1:1) HCl
- 4) Add 4 mls of a mixture comprising 1 part 1% FeCl_3 solution to 3 parts 5% KSCN solution and shake
- 5) Add 3 mls 15% SnCl_2
- 6) Add 2 mls isopropyl ether, shake for 30 seconds and allow phases to settle
- 7) Drain off water layers, retaining organic layer into 13 x 100 mm test tube. Compare with standards.

Molybdenum Standards - Label 10 clean test tubes 0, 4, 10, 16, 20, 40, 50, 60, 70, and 80 ppb, to the respective tubes pipette the following volumes of 1 gamma/ml Mo work solution:

<u>mls of 1 $\mu\text{g}/\text{ml}$ Mo Solution</u>	<u>ppb</u>
.20	4
.50	10
.80	16
1.00	20
2.00	40
2.50	50
3.00	60
3.50	70
4.00	80

After the standard solution has been added, the following solutions are to be pipetted into the standard tubes:

- 1) 1 ml 1:1 HCl solution
- 2) 2 drops of 1% $\text{Fe}_2(\text{SO}_4)_3(\text{NH}_4)_2\text{SO}_4$
- 3) 2 mls of 15% KSCN solution
- 4) 1 ml of 15% SnCl_2 solution
- 5) 1 ml of isopropyl ether
- 6) Stopper and shake for 45 seconds.

COPPER DETERMINATION

The digestion solution is sprayed directly into a Perkin-Elmer 290B atomic absorption spectrophotometer from which the Cu concentration is read on the scale.

Instrument settings are:

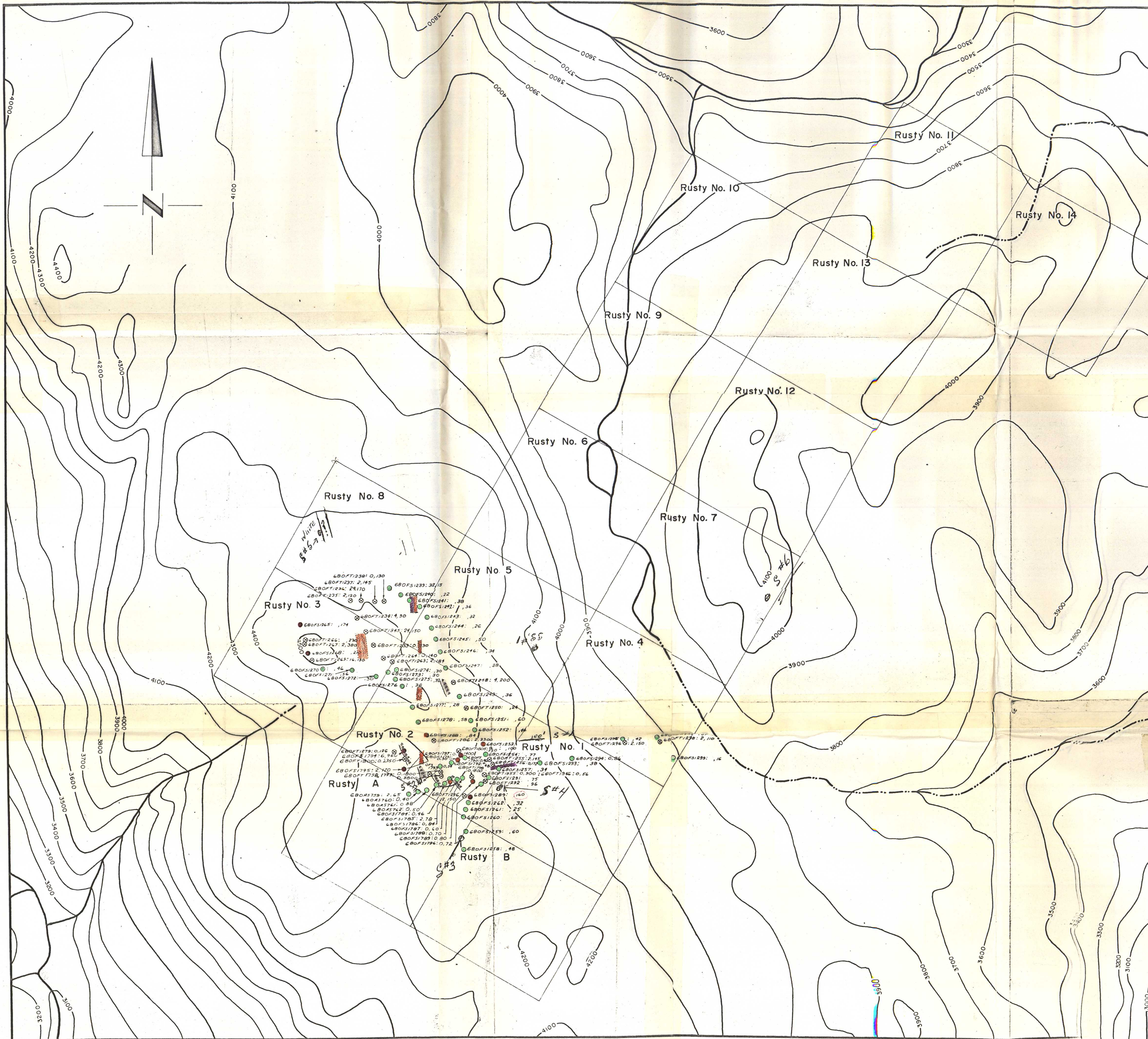
Coarse Wavelength Control	280.1
Slit Width	7 A°
Lamp Current	5 ma
Acetylene Flow	14.0
Air Flow	14.0

The instrument is calibrated such that the maximum scale reading corresponds to 20 ppm in solution ie: 200 ppm in the sample. Samples with Cu contents of over 200 ppm are diluted until a reading is obtained on the scale. It is practical to measure concentrations in the range 5 ppm to 1%.

pH MEASUREMENTS

Soil and drainage sediment samples are dampened with water in a glass beaker to a pasty consistency. Demineralized water is used for this purpose as it has a low buffer capacity and thus does not influence the pH of the sample. Measurement is made with a Fisher Acumet pH meter. Electrodes are stored in buffer overnight. A 30 minute warm up time is allowed for the instrument each morning. A 10 ml aliquot is taken from water samples for pH measurement.

<u>Sample Number</u>	<u>pH</u>	<u>Mo</u>	<u>Cu</u>	<u>Ni</u>
68OFS 1787	-	0	60	21
1788	-	0	70	17
1789	-	0	80	22
1790	-	0	40	23
1791	5.3	0	90	17
1792	-	0	48	15
1793	-	0	54	12
1794	-	6	960	7
1795	-	2	170	25
1796	5.9	0	72	25
1797	-.	0	1460	31
68ORS 759	-	2	65	37
760	-	0	40	37
761	-	0	38	25
762	-	0	50	30
763	6.7	0	115	40



L E G E N D

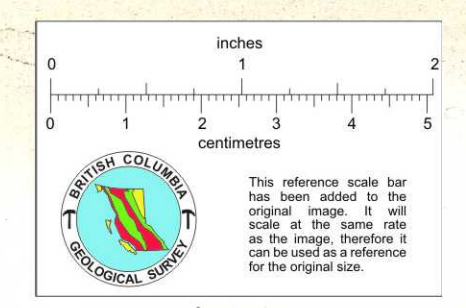
- Meta-volcanic rocks.
- Feldspar porphyry.
- Diorite.

S Y M B O L S

- Claim outline.
- Topographic contour.
- Stream, lake.
- Soil sample; sample number; p.p.m. Mo, Cu.
- Rock chip sample; sample number; p.p.m. Mo, Cu.
- Breccia.
- Fault.

SOIL SAMPLES (p.p.m. Cu)

- 0 - 79 Background.
- 80 - 120 Positive.
- > 120 Anomalous.



RUSTY CLAIMS
GREENWOOD M. D. - B. C.

CLAIM AND GEOCHEMICAL SURVEY MAP

SCALE 1" = 500'

To accompany "GEOCHEMICAL REPORT ON THE RUSTY GROUP" by: D.K. Mustard.