

1979 Geological and Geochemical  
Assessment Report



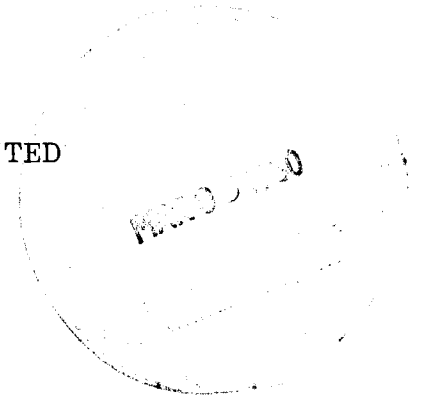
TITLE Red Mountain Property  
CLAIMS HI 1-3, 5-78 and 79-97  
COMMODITY Au

LOCATED 36 miles northwest of Mayo, Y.T.  
Latitude 63°57'N Longitude 136°45'W  
Mayo and Dawson Mining Districts  
115 P 15

BY R.G. Kidlark

FOR AMAX OF CANADA LIMITED

WORK PERIOD June 21 - 27, 1979



AMAX VANCOUVER OFFICE

090559

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

\$ 800.00

J. A. Morris

Regional Geologist or  
Regional Mining Engineer

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

[Signature]  
F. R. BAXTER  
Supervising Mining Recorder

[Signature]  
Commissioner of Yukon Territory

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## SUMMARY

The HI 1-3, 5-78 and 79-97 claims are situated 36 miles northwest of the town of Mayo in the Yukon Territory and were staked in a contiguous block in April of 1979 to cover molybdenum occurrences reported in the Northern Cordillera Mineral Inventory. During the 1979 field season geological mapping and geochemical sampling were carried out.

Auriferous arsenopyrite-bearing quartz veins occur in metasediments at the contact with a granite body. No molybdenite was found.

## CONCLUSIONS AND RECOMMENDATIONS

The granite intrusion has little molybdenum potential. However, a few interesting gold geochemical values were obtained from quartz veins near the granite-metasediment contact and in light of the present price of gold the property merits consideration as a gold property.

A detailed geochemical sampling and geological mapping program with emphasis on gold exploration is recommended.

## INTRODUCTION

### Location and Access

The Red Mountain Property is situated along the western side of Red Mountain between Hobo and Sprague Creeks; at  $63^{\circ}57'$  and  $136^{\circ}45'W$  on the McQueston N.T.S. 115 P 15 Map-sheet.

Access to the property is by helicopter from Mayo, Y.T., which lies 36 miles to the southeast.

### Claims

The property consists of the HI 1-3, 5-78 and 79-97 claims and was staked for AMAX of Canada Limited in April of 1979. The HI 1-3 and 5-78 claims are situated in the Mayo Mining District while the HI 79-97 claims are in the Dawson Mining District.

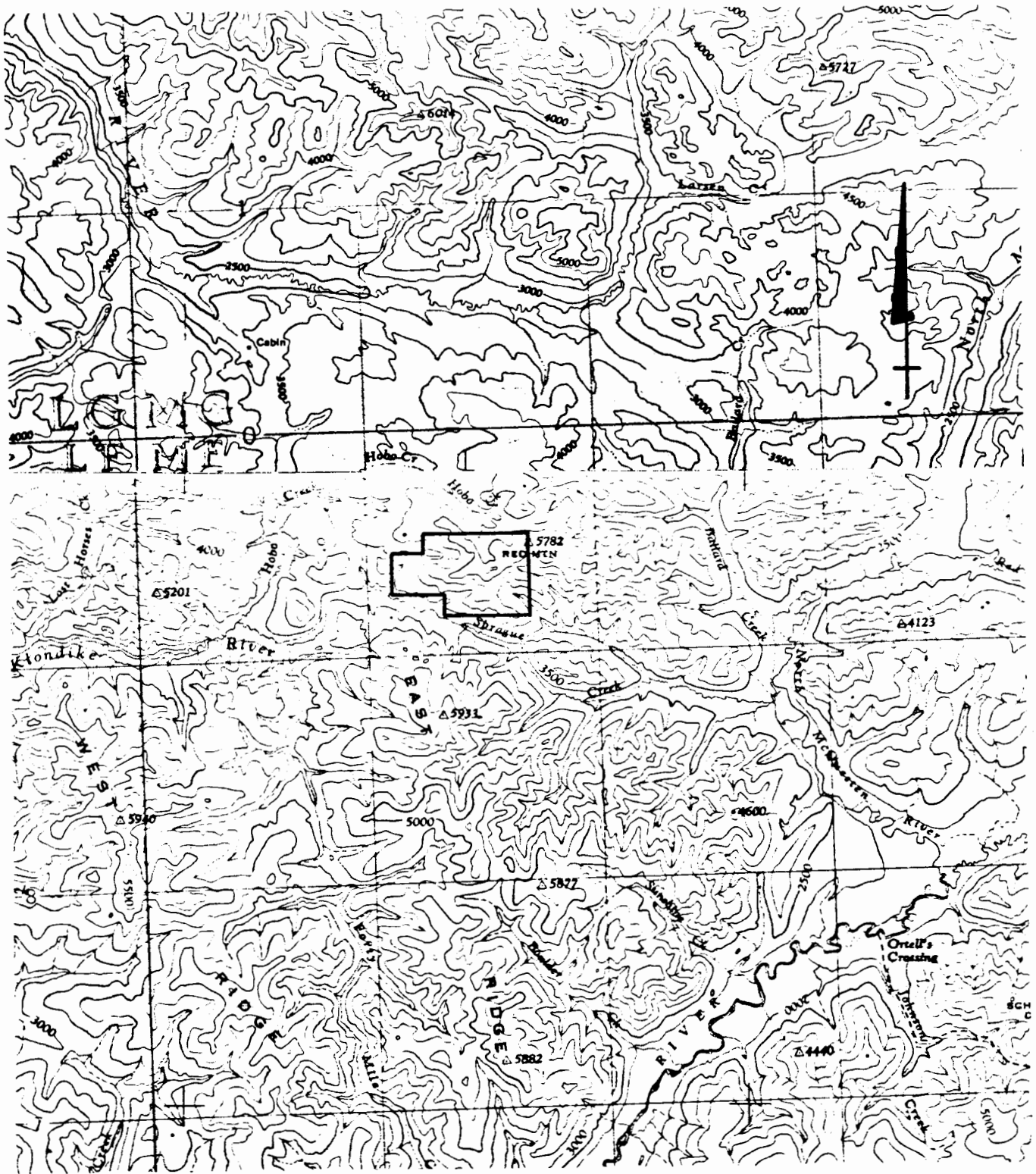
### Physiography and Vegetation

The property lies along a set of ridges trending west and northwest from the flanks of Red Mountain.

Topography and vegetation varies from steep, alpine, moss-covered slopes to barren ridge tops. Elevations range from 5,782 feet at the peak of Red Mountain to 3,500 feet near the closest point to Sprague Creek.

Streams are moderate to fast flowing and for the most part are bottomed by permafrost.

Rock outcrop is restricted to steeper sections of stream valleys and ridge tops. Felsenmeer is abundant along ridges and is probably indicative of underlying bedrock. A cliff exposure occurs along the eastern contact with the granite stock.

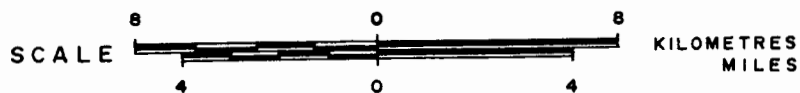


AMAX OF CANADA LIMITED

**RED MOUNTAIN PROPERTY**

DAWSON M.D., MAYO M.D. — YUKON TERRITORY

**LOCATION MAP**



1 : 250,000

N. T. S. Ref. 115 P 15

**FIG. 1**



### Work Done

The area was first mapped for the G.S.C. by H.S. Bostock from 1946-1949 - Map 1143A.

The property was first staked as the Hobnail claims in October, 1923. In the late 1920's, Treadwell Yukon Consolidated put in a few hand dug trenches and a short adit. The property was restaked as the Hobo claims in September, 1933 by A. Abverson and J. Drapeau and again restaked as the Red Mountain claims by C. Poli in July, 1947. In May 1974 Asarco staked the area as the Red claims and carried out geological mapping.

### Present Work

The property was examined by R.G. Kidlark and A.C. Hitchins during the 1979 field season. Seven days from June 21 to June 27, 1979 were spent carrying out a geochemical and geological mapping survey over the claim block. Six days were spent in the Mayo Mining District and 1 day in the Dawson Mining District.

## REGIONAL GEOLOGY

Schists, quartzite, phyllite and limestone of the Ordovician or earlier Yukon Group are the oldest known rocks north of the Tintina Trench. A slightly younger Ordovician or earlier sequence of quartzite and slate occurs in the most northerly section of the map area and is characterized by two or more zones of vari-coloured slates.

Both of these units are unconformably overlain by a complexly faulted and folded Ordovician or younger group of interbedded cherty quartzite, black slate, pebble quartzite and sandstone.

The sedimentary-metasedimentary units are intruded by Jurassic and/or Cretaceous bodies of granite, syenite, diorite and gabbro. The granitic rocks are thought to be the youngest intrusions and are related to the Coast Intrusions.

## PROPERTY GEOLOGY

### Rock Units

Most of the property is underlain by Ordovician(?) quartzite and slates, which have been subdivided into quartzite with minor interbeds of slate (Unit 1a) and vari-coloured slates (Unit 1b). At the eastern end of the property Unit 1 appears to be in faulted contact with a sequence of green slates (Unit 2a) and basic volcanics (Unit 2b). Units 1b and 2a contain up to 3% disseminated pyrite. A prominent gossan is associated with quartzite (Unit 1a) at the eastern margin of the granite.

Four dykes of diorite gabbro (Unit 3) up to 400 feet wide intrude the slates and quartzites. The dykes are slightly magnetic and contain minor disseminated pyrrhotite.

A large sill-like body of biotite granite (Unit 4) intrudes the metasediments along the central portion of the property. The granite is subporphyritic with quartz and orthoclase crystals up to 5 cm. Traces of disseminated pyrite are present. Biotite is locally chloritized. Contact thermal effects are limited to narrow bands of biotite hornfels along the eastern contact and at one small point along the northern contact.

### Structure

The bedding of the Ordovician(?) metasediments strike in an approximate northwest direction and dip  $20^{\circ}$  to  $30^{\circ}$  easterly.

The green slate-volcanic unit is folded into a series of northwest trending synforms and antiforms and appear to be in fault contact with the quartzite and vari-coloured slate unit.

### Mineralization

Small quartz veins occur in the metasediments close to the granite contact and some of the veins contain gold bearing arsenopyrite.

Disseminated arsenopyrite, pyrite and pyrrhotite have been noted along dry fractures in the granite.

PROPERTY GEOCHEMICAL SURVEYIntroduction

Silt samples were collected from streams which drain the property and rock chips were taken from selected outcrops.

Soil samples were collected with a grub hoe at 200 foot intervals along a traverse line run at the southeastern corner of the property.

A total of 55 samples consisting of 10 soil, 9 silt, and 36 rock chip samples were collected and analyzed by Rossbacher Laboratory for Mo,Cu,Ni,Co,Mn,Fe,Ag,Zn,Pb,F, and Au.

Discussion of Results

Sample sites and corresponding values for Au,Ag, and Cu are plotted on a 1:10,000 scale map (Figure 4). Complete geochemical results are present in Appendix III.

Three rock chips collected from arsenopyrite bearing quartz veins gave the following anomalous Au values:

<u>Sample Number</u>	<u>Sample Type</u>	<u>Au (ppb)</u>	<u>Ag (ppm)</u>
79ATT09	0.5" vein (grab)	1,380	1.6
79ATT22	2" vein (grab)	14,200	8.8
79AGT28	float	5,800	10.6

Sample 79ATT22 was collected from an existing adit.

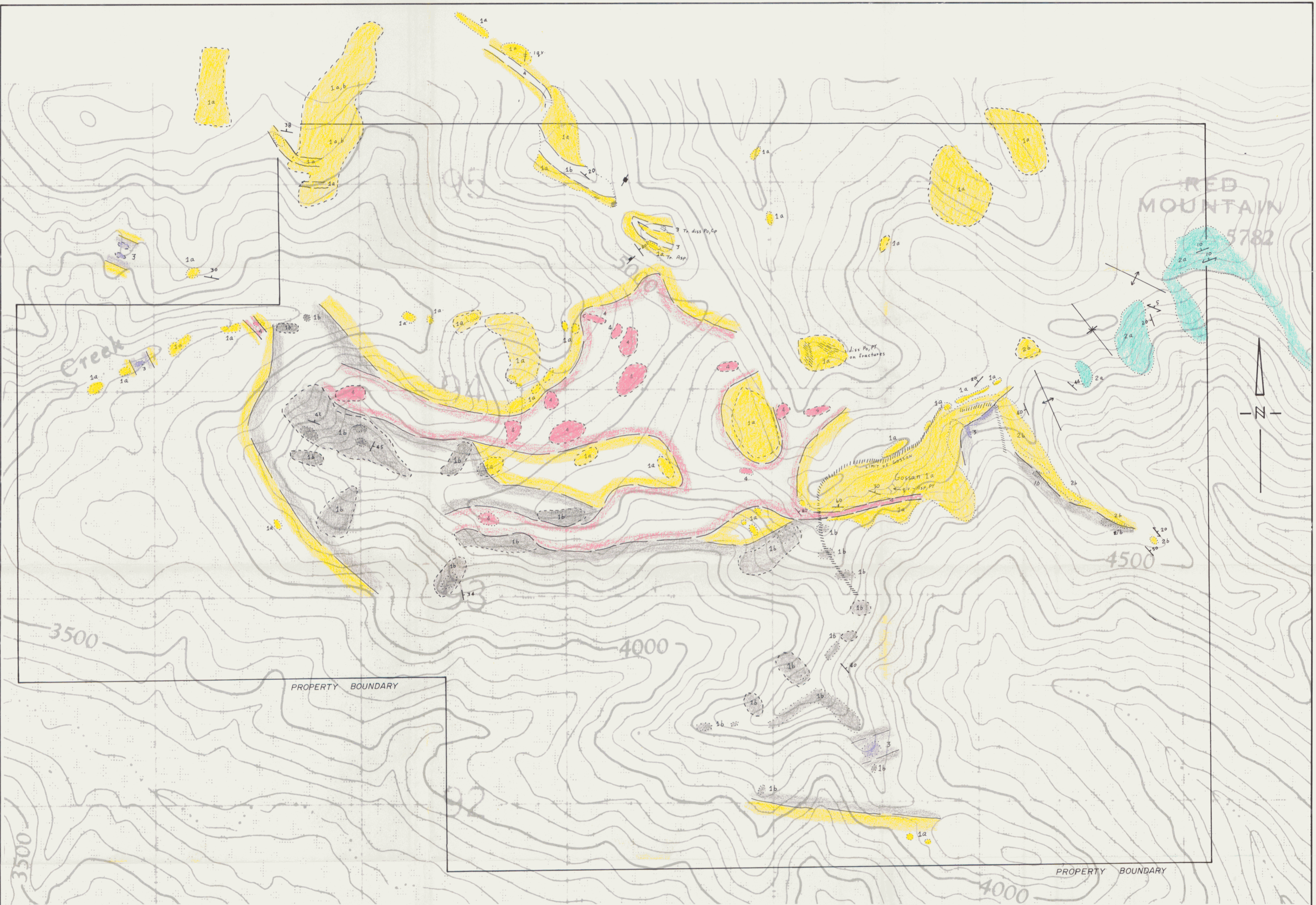
*R Kidlark* Feb 6, 1980

R.G. Kidlark

REFERENCES

BOSTOCK, H.S., 1948: McQueston, Yukon Territory. G.S.C. Paper 48-25

MAP 1143A, 1963: Geology of McQueston



**LEGEND**

**JURASSIC AND/OR CRETACEOUS**

- Biotite granite
  - Diorite, gabbro
- ORDOVICIAN (?)**
- Green slate
  - Basic volcanic breccia and flows
  - Quartzite, slate
  - Varicoloured slate

**SYMBOLS**

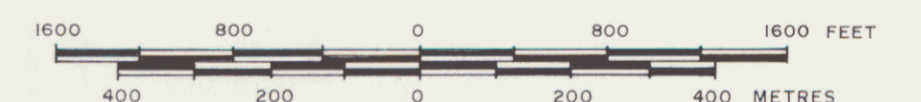
- Outcrop
- Float
- Geological contact: defined, assumed
- Bedding attitude
- Foliation: inclined, vertical
- Jointing attitude: inclined, vertical
- Vein attitude: inclined, vertical
- Gossan
- Major fold axis: anticline, syncline

- Trench
- Adit
- Stream
- Topographic contour (contour interval 100 feet)
- Po Pyrrhotite
- py Pyrite
- Cp Chalcopyrite
- Asp Arsenopyrite

AMAX OF CANADA LIMITED

**RED MOUNTAIN PROPERTY**  
 DAWSON M.D., MAYO M.D. — YUKON

**GEOLOGICAL MAP**



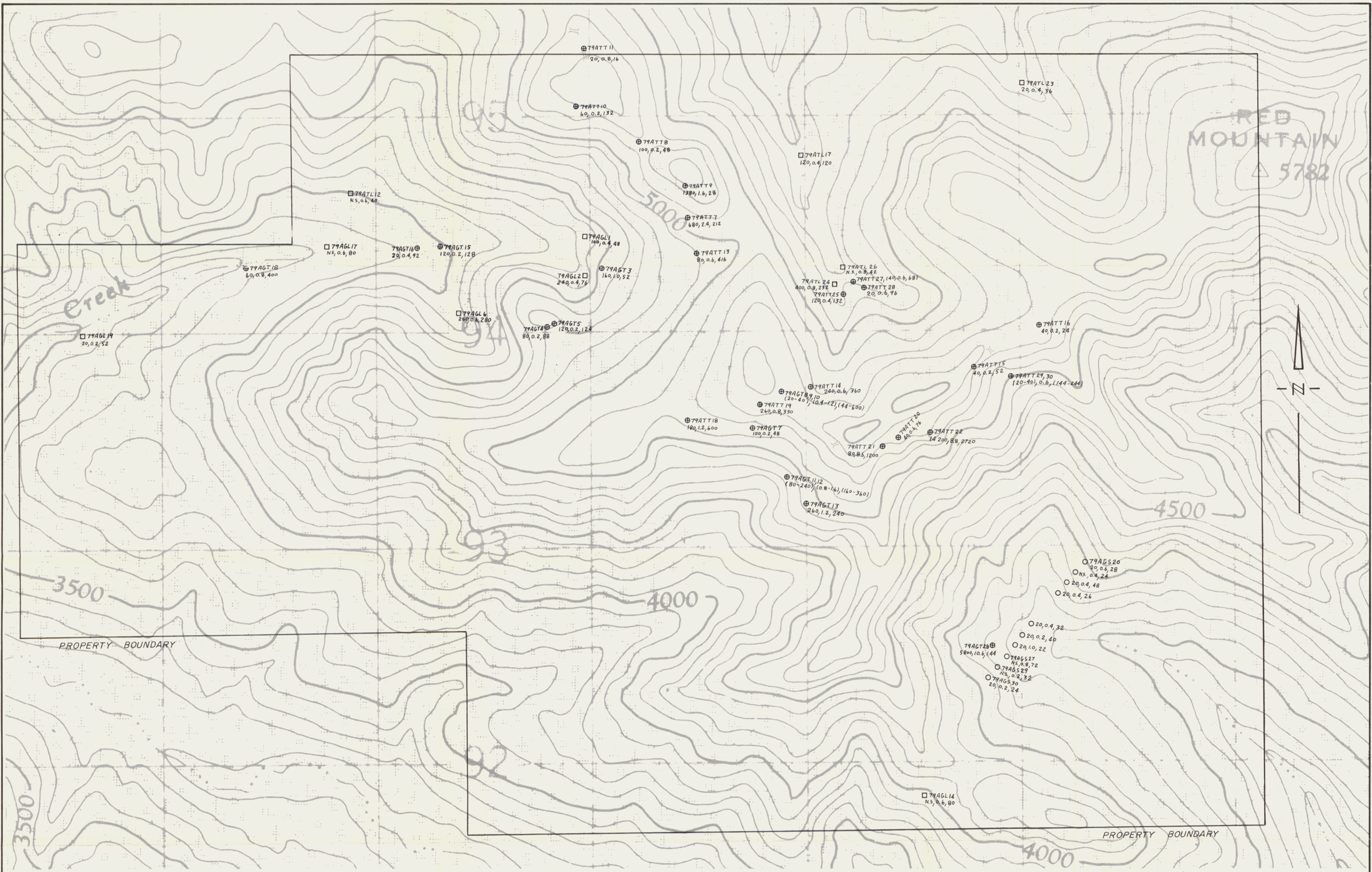
1:10,000

To accompany 1979 Assessment Report by R.G. Kidlark

*R. Kidlark*  
 Feb. 6, 1980

Vancouver - 1979

N.T.S. Ref. 115 P15



RED MOUNTAIN  
 5782



- LEGEND**
- 79AG 20  
 O 20, 0.6, 28 Soil
  - 79AG 6  
 □ 80, 0.2, 88 Silt
  - 79AT 14  
 ⊕ 100, 0.2, 48 Rock chip
  - Trench
  - 300 — Topographic contour ( contour interval 100 feet )
  - Stream
- Sample site, sample number  
 p.p.b. Au, p.p.m. Ag, Cu

AMAX OF CANADA LIMITED  
 RED MOUNTAIN PROPERTY  
 DAWSON M.D., MAYO M.D. — YUKON

**GEOCHEMICAL MAP**

1600 800 0 800 1600 FEET  
 400 200 0 200 400 METRES  
 1:10,000

To accompany 1979 Assessment Report by R.G. Kidlark  
*R. Kidlark* Vancouver — 1979  
 Feb. 6, 1980 N.T.S. Ref. 115 P15

APPENDIX I - STATEMENT OF COSTS

Summary of Work - Geological Mapping & Geochemical Sampling

- HI 1-3 and 5-78 Claims
- Mayo Mining District

Period of Work - June 21 - 27, 1979

Personnel Employed

A.C. Hitchins, Geologist, 601-535 Thurlow Street, Vancouver	
June 21 - June 27    6 days @ \$117.16/day	702.96
R.G. Kidlark, Senior Asst., 972 Birchbrook Place, Coquitlam	
June 21 - July 27    6 days @ \$ 61.15/day	366.90
V.F. Grundy, Junior Asst., 2969 Mathers Ave., West Vancouver	
June 27                    1 day @ \$ 38.45/day	38.45

<u>Room &amp; Board</u> 13 man days @ \$ 30.00/day	390.00
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Transportation - camp move and supply flights

Trans North Turbo Air - Mayo	
Inv. #34137, 34442	2,195.60

<u>Field Supplies</u>	100.00
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Geochemical Analyses

Rossbacher Laboratory - Burnaby	
Inv. #9195 - 47 samples analyzed for Mo,Cu,Ni,Co,Mn,Fe, Ag,Zn,Pb,F,Au	411.25

<u>Report Writing &amp; Drafting Supplies</u>	100.00
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TOTAL    \$4,305.16

Work to be applied as follows:

One year to HI 1-3, 5-6, 8, 13-24, 37-50, 63-70, 72, 74

APPENDIX I - STATEMENT OF COSTS

Summary of Work - Geological Mapping & Geochemical Sampling

- HI 79-97 Claims
- Dawson Mining District

Period of Work - June 26, 1979

Personnel Employed

A.C. Hitchins, Geologist, 601-535 Thurlow Street, Vancouver	
June 26 1 day @ \$117.16/day	117.16
R.G. Kidlark, Senior Asst., 972 Birchbrook Place, Coquitlam	
June 26 1 day @ \$ 61.15/day	61.15
V.F. Grundy, Junior Asst., 2969 Mathers Ave., West Vancouver	
June 26 1 day @ \$ 38.45/day	38.45

<u>Room &amp; Board</u>	3 man days @ \$30.00/day	90.00
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Transportation

Trans North Turbo Air, Mayo	
Inv. #34131	359.50

Geochemical Analyses

Rosbacher Laboratory - Burnaby	
Inv. #9195 - 7 samples analyzed for Mo,Cu,Ni,Co,Mn,Fe, Ag,Zn,Pb,F,Au	61.25

<u>Report &amp; Map Preparation</u>	100.00
-------------------------------------	--------

TOTAL \$ 827.51

Work to be applied as follows:

One year each to HI 79-84, 92-93

APPENDIX III

# Rossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

## CERTIFICATE OF ANALYSIS

TO: AMAX MINERALS EXPLORATION  
601 - 535 THURLOW ST.  
VANCOUVER, B.C.

RED MT.

2225 S SPRINGER AVE.  
BURNABY, B.C.  
CANADA  
TELEPHONE 299-6910  
AREA CODE 604  
CERTIFICATE NO. 9140-1

INVOICE NO.

DATE ANALYSED July 18/79

PROJECT 996 T HITCHINS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe	Ag	Zn	Pb	F	Ba	No.
01	79AGL 1		2	48	28	20	480	3.0	0.4	64	24	700	100	01
02	2		2	76	28	20	500	3.0	0.4	98	26	740	240	02
03	T3		10	52	50	40	280	3.4	1.0	98	22	680	160	03
04	4		9	88	50	30	520	1.6	0.2	70	16	1900	80	04
05	5		3	124	48	24	300	1.8	0.2	60	18	1080	120	05
06	L6		4	280	48	36	600	4.5	0.6	160	22	860	260	06
07	T7		4	48	32	28	460	4.2	0.2	44	12	1650	100	07
08	8		6	1600	94	60	360	4.0	1.2	114	16	420	40	08
09	9		2	44	20	12	100	1.0	0.4	28	14	360	20	09
10	10		2	80	16	12	120	1.3	0.4	34	18	420	20	10
11	11		4	160	28	28	160	2.9	0.8	47	14	640	80	11
12	12		12	360	28	24	320	5.2	1.6	58	20	900	240	12
13	13		8	240	72	40	140	3.4	1.2	74	20	620	260	13
14	L14		2	80	128	16	1200	2.2	0.6	618	48	600	N.S.	14
15	T15		2	128	20	16	260	1.5	0.2	34	14	420	120	15
16	16		2	92	52	32	300	1.6	0.4	16	2	640	20	16
17	L17		6	80	40	28	880	3.0	0.6	146	20	760	N.S.	17
18	T18		4	400	56	48	1160	4.6	0.8	66	16	1030	60	18
19	L19		2	52	36	30	460	3.6	0.2	80	14	620	20	19
20	STD C		18	220	48	16	220	1.6	0.4	126	80	560	-	20
21	T19		2	52	68	36	560	4.9	0.2	44	2	660	20	21
22	S20		2	28	32	20	420	4.5	0.6	96	28	440	20	22
23	21		2	24	28	20	240	3.6	0.4	66	20	440	N.S.	23
24	22		5	48	32	40	360	5.3	0.4	110	16	530	80	24
25	23		1	26	28	24	240	3.0	0.4	56	14	540	20	25
26	24		4	32	24	16	200	3.3	0.4	52	18	400	20	26
27	25		2	40	32	20	300	3.2	0.2	62	12	410	20	27
28	26		2	22	24	20	380	3.4	1.0	90	16	400	20	28
29	27		4	72	28	20	180	4.3	0.8	62	52	420	N.S.	29
30	T28		32	144	180	304	100	>10	10.6	34	23600	270	5800	30
31	79AGT 28		2	124	290	440	80	>10	5.6	114	250	130	3400	31
32	79AG S29		1	32	32	24	600	4.0	0.2	84	16	140	N.S.	32
33	30		2	24	28	20	400	3.3	0.2	66	8	420	20	33
34	STD C		18	196	60	16	220	1.6	0.4	126	80	380	-	34
35														35
36														36
37														37
38														38
39														39
40														40

Certified by

*J. Rossbacher*

# Rossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

## CERTIFICATE OF ANALYSIS

TO: AMAX MINERALS EXPLORATION  
601 - 535 THURLOW ST.  
VANCOUVER, B.C.

2225 S SPRINGER AVE.  
BURNABY, B.C.  
CANADA  
TELEPHONE 299-6910  
AREA CODE 604  
CERTIFICATE NO. 9140-2

INVOICE NO.

DATE ANALYSED July 18/79

PROJECT 996 T. HITCHINS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe	Pb	Zn	Pb	F	BBB Flu	No.
01	79ATT 7		10	212	28	20	40	2.8	2.4	8	26	520	680	01
02	8		6	48	32	28	80	3.5	0.2	4	156	330	100	02
03	9		10	28	20	16	80	1.2	1.6	2	110	820	1380	03
04	10		1	132	20	20	40	2.0	0.2	42	32	460	60	04
05	11		2	16	18	18	40	4.1	0.8	46	54	300	20	05
06	L12		6	40	36	28	540	4.8	0.6	180	20	560	N.S.	06
07	T13		6	416	76	56	220	3.4	0.6	100	12	710	80	07
08	14		6	260	74	48	320	3.0	0.6	134	8	410	240	08
09	15		4	52	80	18	60	2.6	0.2	6	30	340	40	09
10	16		2	24	18	20	40	1.5	0.2	14	20	230	40	10
11	L17		2	120	44	28	460	8.0	0.4	92	30	600	120	11
12	T18		16	600	62	40	200	4.0	1.2	140	12	470	180	12
13	19		8	330	60	54	240	5.0	0.8	78	2	340	260	13
14	20		6	76	124	68	160	3.1	0.6	60	4	600	40	14
15	21		6	1200	26	28	200	4.9	0.6	62	24	400	80	15
16	22		6	2720	94	126	40	2.7	0.8	100	442	450	1420	16
17	L23		2	36	40	32	1100	3.3	0.6	106	28	720	20	17
18	24		4	232	48	34	580	4.4	0.8	102	32	750	400	18
19	T25		9	132	136	74	240	7.2	0.4	26	52	640	120	19
20	L26		3	92	36	24	380	2.5	0.8	88	24	700	N.S.	20
21	T27		4	68	72	38	120	2.9	0.6	46	8	610	40	21
22	28		6	96	108	52	240	2.4	0.6	114	24	640	20	22
23	29		2	204	130	92	560	7.8	0.6	88	12	1650	40	23
24	30		1	144	84	64	400	7.5	0.6	76	16	1300	20	24
25	31		1	84	24	22	320	2.7	0.4	80	18	1050	140	25
26	STD D		2	134		4	80	1.1	3.8	520	100	480	-	26
27														27
28														28
29														29
30														30
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Certified by

*J. Rossbacher*

Procedures for Collection and Processing  
of Geochemical Samples

Analytical Methods for Ag, Mo, Cu, Pb, Zn,  
Fe, Mn, Ni, Co and W in sediments and soils;  
Mo, Cu, Zn, Ni and  $\text{SO}_4^{--}$  in waters.

Amax Exploration, Inc.  
Vancouver Office.

September 1970

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.

Drainage Sediments

Active sediments are taken by hand 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. Water samples are taken at all appropriate sites. 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.

# Kossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

BURNABY, B.C.  
CANADA  
TELEPHONE 299 6910  
AREA CODE: 604

April 30, 1974

## SUMMARY OF SOME ANALYTICAL TECHNIQUES CURRENTLY IN USE AT ROSSBACHER LABORATORY

### A ANALYTICAL TECHNIQUES FOR GEOCHEMICAL SAMPLES

#### 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 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

#### 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 or air.

screen. Where samples are appreciably heavier than 2 g 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.

#### SAMPLE DIGESTION

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-C-Grav 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 15% 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, Mo, Pb, Zn, Ag, Fe, Mn, Ni and Co determination by a Perkin-Elmer 2.0B atomic absorption spectrophotometer. Analytical procedures are given on the following pages.

### ANALYTICAL PROCEDURES

#### Silver

1. Scope - This procedure covers a range of silver in the sample from less than .5 to 1000 ppm
2. Summary of Method - The sample is treated with nitric and perchloric acid mixture to oxidize organics and sulphides. The silver then is present as perchlorate in aqueous solution. The concentration is determined by atomic absorption spectrophotometer
3. Interferences - Silver below 1 gamma/ml is not very stable in solution. Maintaining the solution in 20% perchloric prevents silver being absorbed on the glass container. Determination must be completed on the same day as the digestion.

Samples high in dissolved solids, especially calcium, cause high background absorbance. This background absorbance must be corrected using an adjacent Ag line.

#### Silver AA Settings P.E. 290

Lamp - Ag

Current 4 ma position 3

Slit 7 A

Wavelength 3231A Dial 287.4

Fuel - acetylene - flow - 14

Oxidant - air - flow - 14

Burner - techtron AB 51 in line

Maximum Conc. 3 to 4x

Calibration

1. Set 1 gamma/ml to read 40 equivalent to 20 gamma/gm  
Factor  $\frac{1}{2}$  x meter reading  
Check standards  
4, 10, 20, 40 ppm Ag in sample
2. Set 15 gamma/ml to 100 equivalent to 100 ppm  
Check standards  
40, 100 ppm  
Factor directly in ppm Ag
3. Rotate burner to maximum angle  
Set 10.0 gamma/ml Ag to read 100  
Check standards  
100, 200, 400, 1000 ppm Ag  
Factor 10x scale reading
4. Samples higher than 1000 ppm should be re-analyzed by assay procedure
5. Background correction for sample reading between 1 to 5 ppm  
Calibrate AA in step 1  
Dial wavelength to 300 (peak)  
Read the samples again  
Subtract the background reading from the first reading

Standards

1. 1000 gamma/ml Ag - 0.720 gm  $Ag_2SO_4$  dissolved in 20 mls  $Hx10_3$  and dilute to 500 mls
2. 100 gamma/ml Ag - 10 mls of above + 20 mls  $HClO_4$ , dilute to 100 mls

## 3. Recovery spiked standard

5 gamma/ml Ag - 5 mls 100 gamma/ml dilute to 100 mls with "mixed" acid

Working AA Standards

Pipette .2, .5, 1, 2, 5, 10 mls of 100 gamma/ml and 2, 5 mls 1.000 gamma/ml dilute to 100 mls with 20%  $HClO_4$ . This equivalent to 4, 10, 20, 40, 100, 200, 400, and 1000 ppm Ag in the sample .50 gm diluted to 10 mls.

Recovery Standard

Pipette 2 mls of 5 gamma/ml Ag in mix acids into a sample and carry through the digestion. This should give a reading of 20 ppm Ag + original sample content.

Follow the general geochemical procedure for sample preparation and digestion.

For low assay Ag, the same procedure is used. Ag is then calculated in oz/ton.

$$1 \text{ ppm} = .0292 \text{ oz/ton}$$

conversion factor

$$\text{oz/ton} = .0292 \times \text{ppm Ag}$$

Zn Geochemical AA Setting

Lamp Zn

Current 8 #3 Slit 20A

Wave length 2133 Dial 84.9

Fuel - Acetylene Flow 14

Oxidant - Air Flow 14

Burner - P.E. short path 90°

## Range

0 - 20 gamma/ml Factor 4x - 0 to 400 ppm

0 - 50 gamma/ml Factor 10x - 0 to 1000 ppm

For Waters - Burner AB- 51 in line 1 gamma/ml read 100 to give 0  
to 1000 ppb

High Zn Burner Boling in line. Wavelength 3075. Dial 250 Slit 7A

Fuel 14 Air 14.5

0 to 1000 gamma/ml read 0 to 20 Factor 400 x

Pure Standard 10,000 gamma/ml

1 gm Zn dissolved, H<sub>2</sub>O, HCl, HNO<sub>3</sub>, HClO<sub>4</sub>, fumed to HClO<sub>4</sub> -  
make up to 100 mls H<sub>2</sub>O

1000, 100 gamma/ml and 100 ml by dilution in 20 % HClO<sub>4</sub>

0 to 200 gamma/ml Zn use combined Cu, Ni, Co, Pb, Zn standards

## Pipette

1, 2, 3, 5, 8, 10 mls of 10,000 gamma/ml - dilute to 100 mls  
with 20% HClO<sub>4</sub> to give

100, 200, 300, 500, 800, 1000 gamma/ml Zn for high standards

Co Geochemical AA Setting

Lamp - 5 multi element

Current 10 #4 Slit 2A

Wavelength 2407 Dial 133.1

Fuel - Acetylene Flow 14

Oxidant - Air Flow 14

Burner - AB 51 in line

## Range

0 - 10 gamma/ml read 100 Factor 2 x reading to 200 ppm

0 - 20 gamma ml read 100 Factor 4 x reading to 400 ppm

Burner at maximum angle

0 - 100 gamma/ml read 100 Factor 20 x reading to 2000 ppm

0 - 200 gamma/ml read 100 Factor 40 x reading to 4000 ppm

Standards - 1000 gamma/ml

1.000 gm cobalt metal dissolved in HCl, HNO<sub>3</sub>, and fumed into  
HClO<sub>4</sub>, dilute to 1 liter

## Pipette

1, 2, 10, 20 mls into 100 ml vol flasks diluted to mark  
with 20% HClO<sub>4</sub>

This gives

10, 20, 100, 200 gamma/ml Co

Mixed - combination standards of Cu, Ni, Co, Pb, Zn

of

1, 2, 5, 10, 20, 30, 50, 80, 100, 150, 200 gamma/ml are used  
for calibration

Mn Geochemical AA Setting

Lamp Multi element Ca, Ni, Co, Mn Cr

Current 10 #4 Slit 7A

Wave length 4030.8 Dial 425.2

Fuel - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner - P.E. short path (or AB 50)

## Range

0 - 100 gamma/ml Factor 20x - 0 to 2000 ppm

0 - 200 gamma/ml Factor 40x - 0 to 4000 ppm

## Burner 90°

0 - 1000 gamma/ml Factor 200x - 0 to 20,000 ppm

0 - 2000 gamma/ml Factor 400x - 0 to 40,000 ppm

EDTA Extraction - use AB 51 in line

0 - 20 gamma/ml Factor 4x - 0 to 400 ppm

## Standards

Fisher 10,000 gamma/ml ( ml)

10x Dilution 1000 gamma/ml

## Pipette

.5, 1, 2, 3, 5, 8, 10, ml of 1000 gamma/ml

2, 3, 5, 8, 10, 15, 20 ml of 10,000 gamma/ml dilute to 100  
mls with 20% HClO<sub>4</sub>. This gives5, 10, 20, 30, 50, 80, 100, 200, 300, 500, 800, 1000, 1500,  
2000 gamma/mlMo Geochemical AA Setting

Lamp ASL H/C Mo

Current 5 #5 Slit 7A

Wavelength 3133 Dial 260.2

Fuel - Acetylene Flow 12.0 to give 1" red feather

Oxidant - Nitrous oxide Flow 14.0

Burner - AB 50 in line

Caution read the operation using N<sub>2</sub>O and acetylene flame at  
end of general AA procedure

## Range

0 - 10 gamma/ml Factor 2x - 0 to 200 ppm

Rotate burner to max. angle

0 - 50 gamma/ml Factor 10 x 0 to 1000 ppm

0 - 100 gamma/ml Factor 20 x 0 to 2000 ppm

Standards 1000 gamma/mlDissolve .750 gms MoO<sub>3</sub> (acid molybdic) with 20 mls H<sub>2</sub>O, 6  
lumps NaOH, when all dissolved, add 20 mls HCl, dilute to 500 mls  
100 gamma/ml - 10 x dilution

## Pipette

.2, .5, 1, 2, 3, 5, 8, 10 mls of 100 gamma/ml

2, 3, 5, 8, 10 mls of 1000 gamma/ml add 5 mls 10% AlCl<sub>3</sub>  
and dilute to 100 mls with 20% HClO<sub>4</sub>

This gives

.2, .5, 1, 2, 3, 5, 8, 10, 20, 30, 50, 80, 100 gamma/ml Mo

Fe Geochemical AA Setting

Lamp - Fe

- Do not use multi element Fe

Current 10 #4 Slit 2A

Wavelength 3440.6 Dial 317.5

Fuel - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner - PE Short Path 90°

Range

0 - 5000 gamma/ml 0.1 x % - 0 to 10.0%

0 - 10,000 gamma/ml 0.2 x % - 0 to 20.0%

Higher Fe - 10 x dilution

Standards 10,000 gamma/mlWeigh 5.000 gms iron wires, into beaker, add H<sub>2</sub>O, HCl, HNO<sub>3</sub>,HClO<sub>4</sub>, heat to HClO<sub>4</sub> fumes. Add HClO<sub>4</sub> to 100 mls + 100 mlsH<sub>2</sub>O, warm, dilute to 500 mls

Pipette

1, 5, 10, 20, 30, 50, 80 mls 10,000 gamma/ml dilute to 100 mls with 20% HClO<sub>4</sub> to give

100, 500, 1000, 2000, 3000, 5000, 8000 gamma/ml to be equivalent to .2, 1.0, 2.0, 4.0, 6.0, 10.0%, 16.0% Fe in geochem sample

Ni Geochemical AA Setting

Lamp P.E. H/C. Ni or multi element Cu, Ni, Co, Mn, Cr

Current 10 #4, Slit 2A

Wave length 3415 Dial 312.5

Fuel - Acetylene Flow 14.0

Oxidant - Air Flow 14.0

Burner AB 51 in line

Range

0 - 20 gamma/ml Factor 4x - 0 - 400 ppm

0 - 100 gamma/ml Factor 20x - 0 - 2000 gamma

45° 0 - 200 gamma/ml Factor 40x - 0 - 4000 ppm

0 - 500 gamma/ml Factor 100x - 0 - 10,000 ppm

Ni in waters and very low ranges

Wave length 2320 Dial 113

Range 0 - 5 gamma/ml Factor 1x - 0 - 100 ppm

Standards 10,000 gamma/ml1.000 gm pure Ni metal dissolved in HCl, HNO<sub>3</sub>, HClO<sub>4</sub> to perchloric fumes, dilute to 100 ml H<sub>2</sub>O1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in 20% HClO<sub>4</sub>

1, 2, 5, 8, 10 mls of 100 gamma/ml

2, 5, 8, 10 mls 1000 gamma/ml

2, 5, 8, 10 mls 10,000 gamma/ml - dilute to 100 mls in 20%

HClO<sub>4</sub>. This gives

1, 2, 5, 8, 10, 20, 50, 80, 100, 200, 500, 800, 1000 gamma/ml Ni

Combined Standards - Cu, Ni, Co, Pb, Zn is used as a working standard

24 Geochemical AA Setting

Lamp Single Cu or

5 multi element

Current 10 for multi element #4 Slit 7A

4 for single #3 Slit 7A

Wavelength 3247 Dial 280

Burner Techtron AB 51 (For Cu in natural waters)

P.E. Short Path (For geochem)

Fuel Acetylene Flow 14

Oxidant Air Flow 14

Range

0 - 5 gamma/ml Factor 1x to 100 ppm (for low Cu)

0 - 20 gamma/ml Factor 4x to 400 ppm

Burner 90°

0 - 200 gamma/ml Factor 40x to 4000 ppm

Wavelength 2492 Dial 147

Burner in line

Range

0 - 1000 gamma/ml Factor 200x to 20,000 ppm

0 - 2000 gamma/ml Factor 400x to 40,000 ppm

Higher range than 40,000 ppm requires 10x dilution

Standards

10,000 gamma/ml

1.000 gm metal powder, H<sub>2</sub>O, HCl, HNO<sub>3</sub> until dissolved, addHClO<sub>4</sub>, fume dilute to 100 mls1000 gamma/ml 10x dilution above in 20% HClO<sub>4</sub>2000 gamma/ml 20 mls 10,000 gamma/ml - dilute to 100 mls in  
20% HClO<sub>4</sub>100 gamma/ml 10x dilution 1000 gamma/ml dilute to 100 mls in  
20% HClO<sub>4</sub>200 gamma/ml 10x dilution 2000 gamma/ml dilute to 100 mls in  
20% HClO<sub>4</sub>

Pipette

1, 2, 3, 5, 8, 10 mls 100 gamma/ml - dilute to 100 mls with  
20% HClO<sub>4</sub> to give 1, 2, 3, 5, 8, 10 gamma/ml

Combined standards Cu, Ni, Co, Pb, Zn

1, 2, 5, 10, 20, 30, 50, 80, 100, 150, 200 gamma/ml

Pb Geochemical AA Setting

Lamp ASL H/c Pb

Current 5 ma Slit 7A

Wave length 2333 Dial 203

Fuel - acetylene Flow 14

Oxidant - air Flow 14

Burner AB 51 in line

## Range

0 - 20 gamma/ml to read 0 to 80. Factor 5x 0 to 500 ppm

0 - 200 gamma/ml to read 0 to 80. Factor 50x 0 to 5000 ppm

Standards - 10,000 gamma/ml

1.000 pure metal, dissolved in HNO<sub>3</sub>, fumed to HClO<sub>4</sub> make up  
to 100 mls in 20% HClO<sub>4</sub>

1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in  
20% HClO<sub>4</sub>

## Pipette

1, 2, 5, 8, 10 mls 100 gamma/ml

2, 5, 8, 10, 20 mls 1000 gamma/ml dilute to 100 mls in 20%

HClO<sub>4</sub> this gives

1, 2, 5, 8, 10, 20, 50, 80, 100, 200 gamma/ml

Combined Standards Cu, Ni, Co, Pb, Zn, are used as working  
standards

W in Soils and Silts

## Reagents and apparatus

Test tubes - pyrex disposable

Test tubes - screw cap

Bunsen Burner

Flux - 5 parts Na<sub>2</sub>CO<sub>3</sub>

4 parts NaCl

1 part KNO<sub>3</sub> pulverized to -80 mesh7% SnCl<sub>2</sub> in 70% HCl20% KSCN in H<sub>2</sub>O

Extractant - 1 part tri-n-butyl phosphate

9 parts carbon tetrachloride

## Standards

1000 gamma/ml W

.18 gms Na<sub>2</sub>WO<sub>4</sub> 2H<sub>2</sub>O dissolved in H<sub>2</sub>O, make up to 100 mls

100 gamma/ml, 10 gamma/ml by dilution

## Standardization

Pipette .5, 1, 2, 3, 5, 8, 10 ml of 10 gamma/ml

and 1.5, 2 mls of 100 gamma/ml - dilute to 10 mls

continue from step #4

Artificial colors - Nabob pure Lemon Extract, dilute with 1:1  
ethanol and water to match. Tightly seal these for permanent  
standards

Procedure

1. Weigh 1.0 gram sample, add 2 gm flux, mix

2. Sinter in rotary for 2 to 3 minutes (Flux dull red for one minute)
3. Cool, add 10 mls H<sub>2</sub>O, heat in sand bath to boiling, cool, let sit overnight
4. Stir, crush, and mix. Let settle
5. Take 2 ml aliquot into screw cap test tube
6. Add 7 mls SnCl<sub>2</sub>, heat in hot water bath for 5 minutes (80°C)
7. Cool to less than 15°C
8. Add 1 ml 20% KSCN, mix (if lemon yellow; compare color standard 10x)
9. Add ½ ml extractant, cap, shake vigorously 1 minute
10. Compare color

#### Molybdenum in Water Samples

1. Transfer 50 mls to 125 separatory funnel
2. Add 5 ml .2% ferric chloride in conc HCl
3. Add 5 mls of mixed KSCN and SnCl<sub>2</sub>
4. Add 1.2 mls isopropyl ether, shake for 1 minute, and allow phases to separate
5. Drain off water
6. Compare the color of extractant

#### Standardization

Pipette 0, .2, .5, 1, 2, 3, 4, 5, mls of 1 gamma/ml and 1, 1.5, 2, mls of 10 gamma/ml dilute to 50 mls with demineralized H<sub>2</sub>O, and continue step #2.

This equivalent to -

1, 4, 10, 20, 40, 60, 80, 100, 200, 300, 400 ppb Mo

Artificial color - Nabob orange extract dilute with 1:1 H<sub>2</sub>O to methanol to match. Seal tightly

SnCl<sub>2</sub> - 15% in 15% HCl

300 gm SnCl<sub>2</sub> · 2H<sub>2</sub>O + 300 mls HCl, until SnCl<sub>2</sub> dissolved  
dilute to 2 liters

KSCN - 5% in H<sub>2</sub>O

Mixed SnCl<sub>2</sub> - KSCN

3 parts SnCl<sub>2</sub> to 2 parts KSCN

Water Samples Run for AA

1. Cu - 2 gamma/ml reads 80 scale therefore 1 unit = 25 ppb
2. Zn - 1 gamma/ml reads full scale therefore 1 unit = 10 ppb
3. Ni - 2.5 gamma/ml reads 50 scale therefore 1 unit = 50 ppb

Burner: long slot techtron burner in line

Sulphate in Natural Waters

1. Pipette 0.5 ml sulphate reagent mix into a colorimetric tube
2. Add 5 ml water sample and mix
3. Read at 343  $m\mu$  against a demineralized water blank
4. Read again at 400  $m\mu$  and subtract from sulphate reading
5. Calculate ppm sulphate from the graph

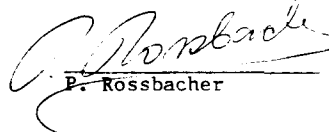
Reagent

Dissolve 54 grams red mercuric oxide (J.T. Baker 2620- Can Lab) in 185 ml 70% perchloric acid and 20 ml H<sub>2</sub>O, shake for one hour. Add 46.3 grams ferric perchlorate [ Fe(ClO<sub>4</sub>)<sub>3</sub> · 6H<sub>2</sub>O ] (GFS 39) and 47 grams aluminum perchlorate [ Al (ClO<sub>4</sub>)<sub>3</sub> · 3H<sub>2</sub>O ] (GFS 2) Add 400 ml water to dissolve, let settle overnight, decant into bottle and make to 1 liter

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 Acument 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.

ROSSBACHER LABORATORY



P. Rossbacher

APPENDIX IV

STATEMENT OF QUALIFICATIONS

NAME	R.G. Kidlark
ADDRESS	972 Birchbrook Place Coquitlam, B.C.
EDUCATION	BSc. Major in Geology University of Toronto 1974
EXPERIENCE	1972 Royal Ontario Museum - Party Chief 1974 Silvermaque Mining - Project Geologist 1974-1976 Brascan Resources - Staff Geologist 1977 Chevron Standard - Senior Assistant 1978 AMAX Minerals Exploration - Senior Assistant 1979 AMAX Minerals Exploration - Senior Assistant

STATEMENT OF QUALIFICATIONS

NAME: A.C. Hitchins

ADDRESS: 601-535 Thurlow Street,  
Vancouver, B.C. V6E 3L6

EDUCATION: University of Toronto - B.A. Sc. 1970  
University of Toronto - M.Sc. 1973

EXPERIENCE: Amax Potash Limited - Geologist - 1972 to present

STATEMENT OF QUALIFICATIONS

NAME V.F. Grundy

ADDRESS 2969 Mathers Avenue  
West Vancouver, B.C.  
V7V 2J7

EDUCATION 3rd year Commerce - University of B.C.  
Vancouver

EXPERIENCE AMAX of Canada Limited - field assistant - 1979

## APPENDIX V

### DESCRIPTION OF ROCK UNITS

Only those rocks exposed on the Red Mountain property (Figure 3) are described below.

#### Ordovician(?)

Units 1a, 1b - Fine grained black to rusty weathering light grey coloured quartzite with minor interbeds of slate, siltstone and sandstone, containing up to 3% disseminated fine grained pyrite. The more arenaceous members are composed of unsorted, subrounded quartz grains up to 0.5 wide in diameter.

The vari-coloured slate Unit 1b consisting of buff to rusty weathering slates interbedded with less than 25% chert and quartzite forms a broad band across the centre of the property. The slates are fine grained, well bedded, vary in colour from purple to brown to grey to black and contain up to 3% disseminated pyrite.

Units 2a, 2b - Interbedded basic volcanics, conglomerates, tuff breccias and fine grained, dark grey-green coloured slates.

#### Jurassic and/or Cretaceous

Unit 3 - A few small scattered outcrops of slightly magnetic, pyrrhotite bearing, melanocratic diorite to gabbro occur on the property.

Unit 4 - Light coloured, leucocratic, subporphyritic biotite granite with phenocrysts of quartz and orthoclase up to 0.5 cm in size. Biotite is locally chloritized and trace amounts of disseminated pyrite and chalcopyrite have been reported.