

1972 Geochemical, Geological & Geophysical
Report

TIMOTHY CREEK PROPERTY WD #1-28 incl.

Located 8 miles north of Lac La Hache
Latitude 51°50' Longitude 121°25' 92 P 14
92 P/14W Clinton Mining Division

By G.M. Leary, R.J. Bailes, G.M. DePaoli and
T.J.R. Godfrey P.Eng. (B.C.)

For Amax Potash Limited

Work was carried out during May 29 to
July 25, 1972

3817

1972 Geochemical, Geological and Geophysical
Report

3817

TITLE	Timothy Creek Property - WD Claims
AUTHORS	G.M. Leary, R.J. Bailes, G.M. DePaoli and T.J.R. Godfrey P.Eng. (B.C.)
DATE	August 1972
COMMODITY	Cu
LOCATION-Area	Lac La Hache
-Mining Division	Clinton
-Coordinates	Longitude 121°25' Latitude 51°50'
-NTS	92 P 14

AMAX VANCOUVER OFFICE

Department of	
Mines and Petroleum Resources	
ASSESSMENT REPORT	
NO. 3817	MAP.....

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	1"=400'-----After Page 6

SUMMARY

The Timothy Creek Property (28 claims) is located eight miles north of Lac La Hache within the Interior Plateau of south-central British Columbia. Geological mapping, geochemical sampling and magnetometer and induced polarization surveys were carried out on the property in 1972.

The property occurs within a regional belt of Nicola Group rocks intruded by several bodies of diorite to monzonite. The claim group was located to cover a small magnetic high possibly reflecting an exposed or near surface intrusive body.

Exposures within and near the property are sparse. None were located within the aeromagnetic high. Those observed consist of Nicola basaltic flows and tuff breccias.

Systematic subsoil geochemical sampling, followed by multi-element analysis, was applied to the grid area covering most of the claim block. Several areas with anomalous Cu-Ni or Zn contents in soils are present. These anomalies are believed to reflect bedrock geochemistry or lithologic units. No anomalies indicating mineralization were detected.

The ground magnetometer survey revealed that the aeromagnetic high can be resolved into a series of high contrast, small elongate magnetic highs aligned in a northwesterly trending belt across the property.

Two induced polarization survey lines were carried out over ground magnetic highs. Results were negative in that variations in frequency effects were slight and indicated lithological changes.

INTRODUCTION

The Timothy Creek Property consists of 28 claims (WD #1-28 inclusive, Blue Group) situated eight miles north of Lac La Hache within the Interior Plateau of south-central British Columbia (Figures 1 and 2). The property is accessible by gravel secondary roads. This report covers work carried out from May 29 to July 25, 1972 including 12 line miles of picket grid construction on which geochemical, geological, magnetic and induced polarization surveys were carried out.

Physiography of the area is typical of the Interior Plateau with flat to gently rolling terrain having a mean altitude of 3500 feet. The claims are treed with largely open stands of poplar, alder and lesser pine and fir. Several small open swamps and marshy timbered areas are present. Much of the property is covered by a thin veneer of glacial till. Drainage is relatively poor except for a westerly flowing creek in the southern portion of the claim block.

Work described in this report is to be applied as one year's assessment to each of the 28 claims comprising the Blue Group (Appendix I)

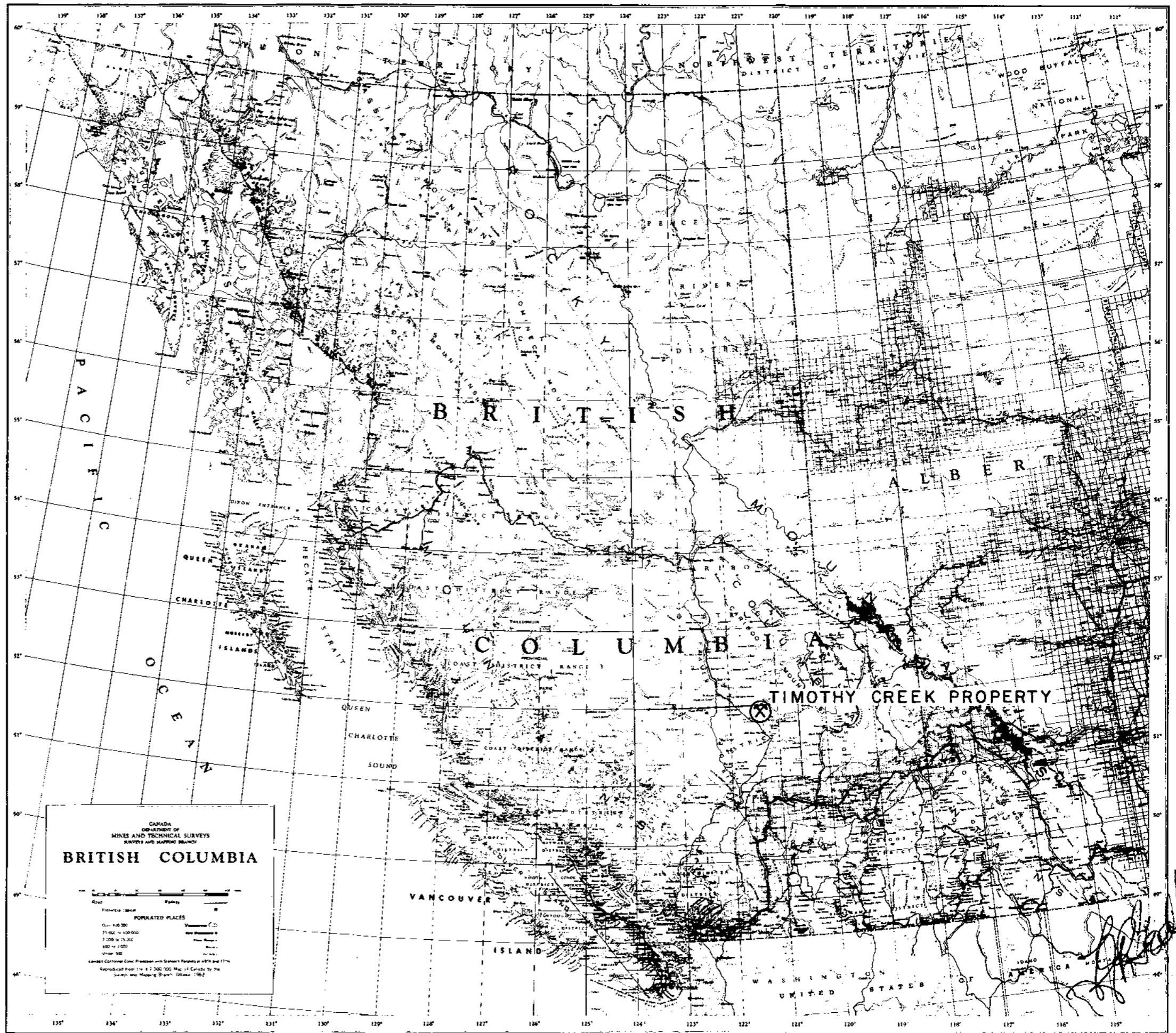
REGIONAL GEOLOGY AND AEROMAGNETICS

The WD claims are situated within the west-central portion of a northwest to northsouth trending belt of Upper Triassic Nicola Group volcanics and sedimentary rocks (Figure 3). This belt of rocks is up to ten miles wide and occupies the region between the Jurassic Tomkomkane batholith on the east and overlying Miocene plateau basalts to the west. Nicola rocks within the belt are locally intruded by probably related diorite to monzonite stocks and dykes.

PROPERTY GEOLOGY

Outcrops are devoid over most of the property except for a few scattered exposures to the south and outside the eastern

Department of
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 NO. 3817 M.P. #1



CANADA
 DEPARTMENT OF
 MINES AND TECHNICAL SURVEYS
 SURVEY AND MAPPING BRANCH

BRITISH COLUMBIA

Scale: 1:500,000
 1 inch = 12.5 miles
 1 centimeter = 0.625 miles

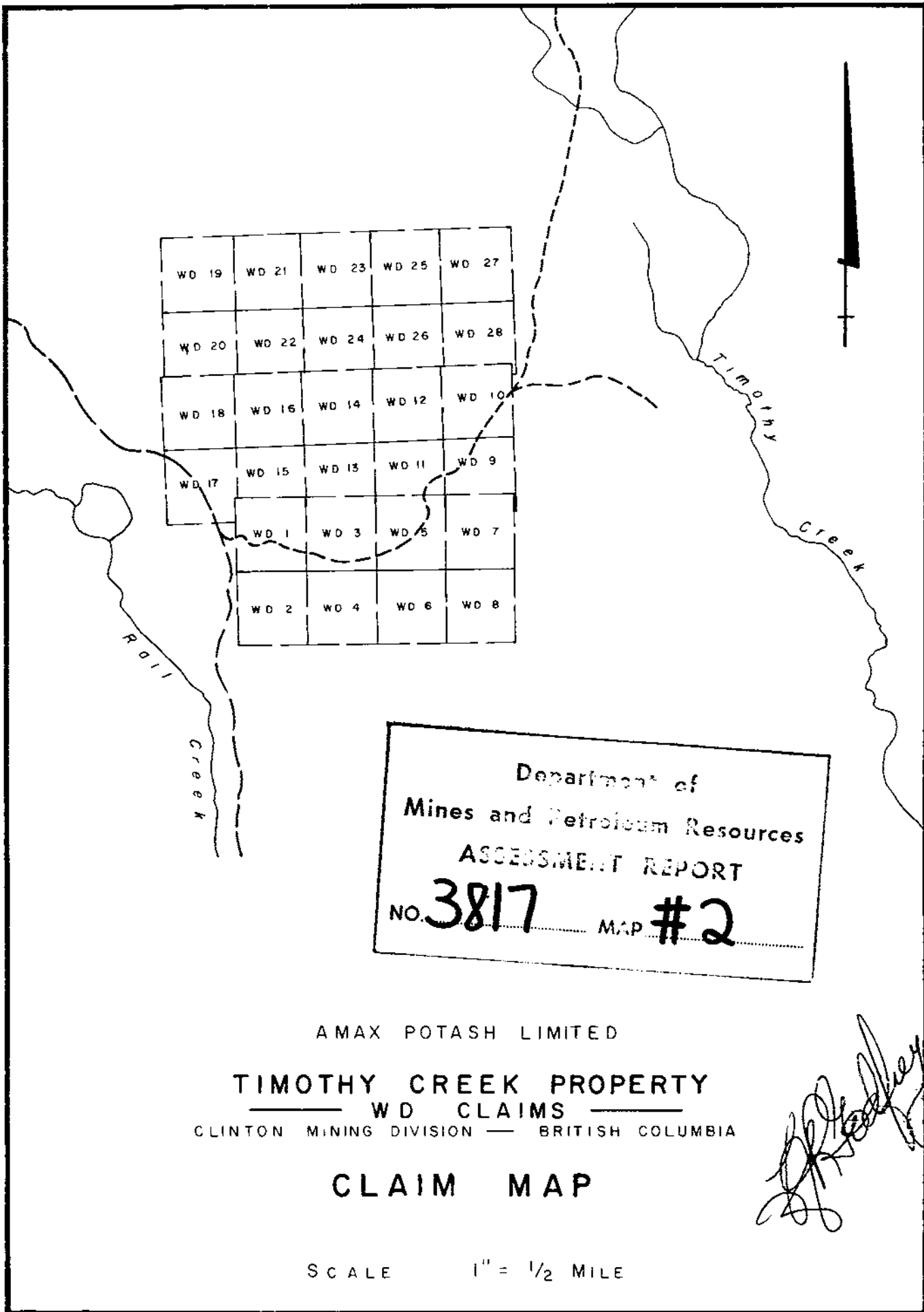
POPULATED PLACES

Over 100,000	Large City
25,000 to 100,000	Medium City
1,000 to 25,000	Small Town
Under 1,000	Village

Canada's Geographical Names Commission
 Reproduced from the 1:500,000 Map of Canada by the
 Survey and Mapping Branch, Ottawa, 1962

LOCATION MAP

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 NO. **3817** MAP # **2**

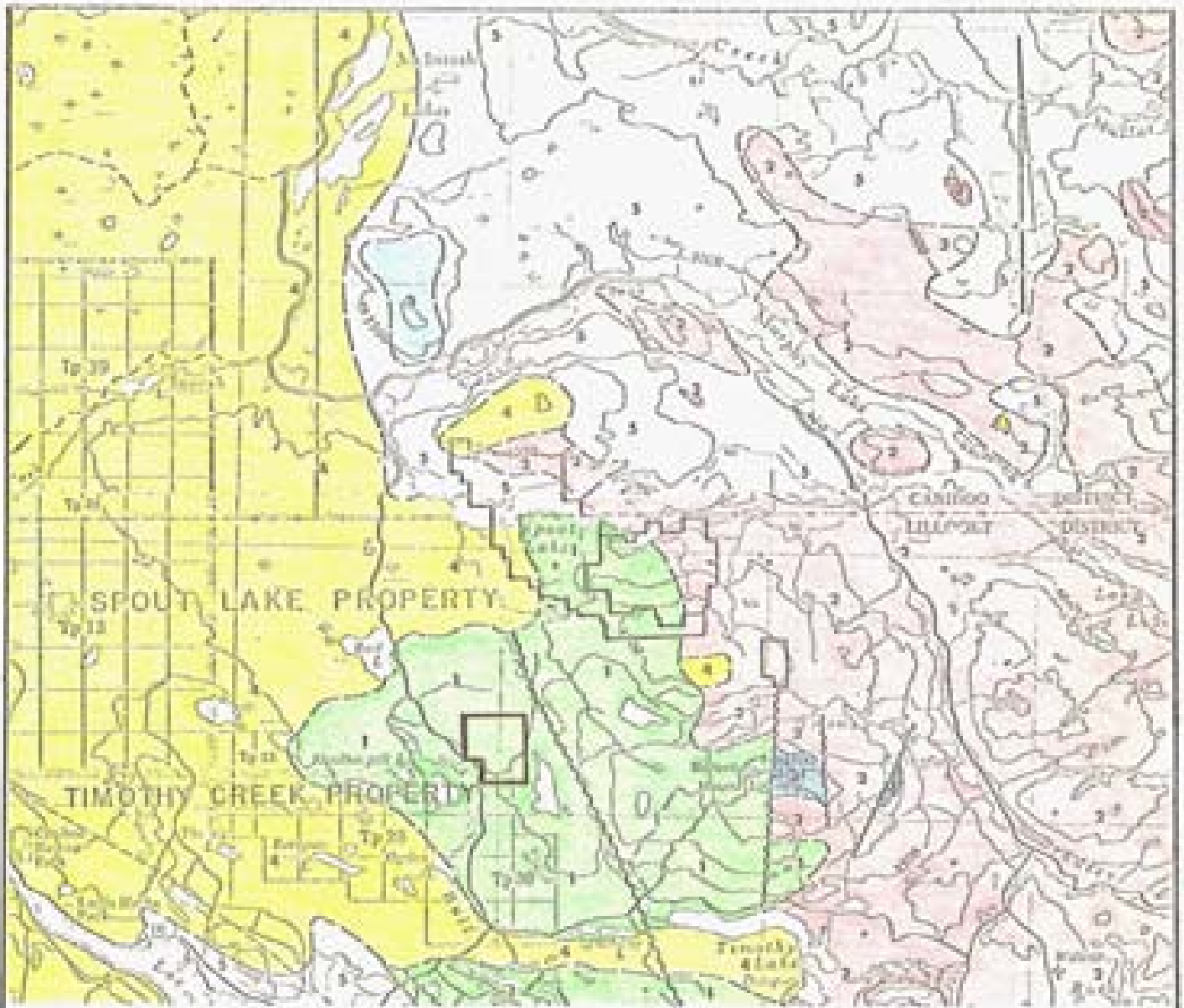
AMAX POTASH LIMITED

TIMOTHY CREEK PROPERTY
WD CLAIMS

CLINTON MINING DIVISION — BRITISH COLUMBIA

CLAIM MAP

SCALE 1" = 1/2 MILE



— L E G E N D —

QUATERNARY

5 Glacial deposits and alluvium.

TERTIARY

4 Plateau Basalts.

3 KANLOOPS GROUP - Basic to acid volcanic rocks.

JURASSIC

2 TARDKANE BATHOLITH - Basic to acid granitic rocks.

UPPER TRIASSIC - LOWER JURASSIC

1 NICOLA GROUP - Volcanic and sedimentary rocks.

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TIMOTHY CREEK PROPERTY

WD CLAIMS

CLINTON MINING DIVISION - BRITISH COLUMBIA

M-3

REGIONAL GEOLOGICAL MAP

SCALE

1 : 250,000

N.P.

N.T.S. Ref. 92 P.M.

FIG. 3

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NO. 3817 MAP #3

3817

M-2

edge of the property (Figure 4). Exposures observed consist of trachytic-textured plagioclase porphyry basalt flows and tuff-breccias. A few exposures to the east of the claim block are weakly gossaned and contain traces of pyrite. No exposures were found within 1/2 mile of the center of the aeromagnetic high occurring in the northwestern portion of the claim block.

GEOCHEMISTRY

A systematic subsoil sampling geochemical survey was conducted over the grid on the WD claims (Figure 4). Samples were taken at 200 foot intervals along grid lines spaced 800 feet apart. A total of 319 soil samples and 3 silt samples were collected. Samples were analyzed at the Amax Burnaby laboratory for "total" Mo, Cu, Ni, Mn, Fe, Ag, Zn and Pb. Details of sample collection and analytical procedures are given in Appendix II.

Physiography of the area was briefly discussed under "Introduction". Soils are generally well drained and comprise slightly mellowed brown forest earths locally gradational into weak podzols. With increasing drainage impedance and waterlogging, gley and humic gley soils predominate. Basin peats are locally present in the most swampy localities. In general the geochemical environment may be considered typical of a recently glaciated, cool and relatively humid northern latitude.

Anomalous threshold values of the metals studied have been determined from log-probability plots and by analogy with similar environments. These are as follows (figures in ppm):

	<u>High Background</u>	<u>Possibly Anomalous</u>	<u>Probably Anomalous</u>
Cu	50	70	100
Ni	40	50	70
Zn	100	140	200
Mn	900	1200	2000
Pb	25	30	40

Fe values exceeding 4.0% are considered abnormally high. Mo and Ag are not present in concentrations above the analytical detection limits (i.e. 1.0 and 0.5 ppm respectively).

All analytical results are given in Appendix III and Cu, Ni and Zn values are shown on Figure 4. Anomalous Cu and Zn areas also are outlined on Figure 4. Anomalous copper areas largely occur as a series of elongate anomalies roughly aligned in a northwesterly trending belt across the property. This belt is flanked on both sides by a number of broad low contrast Zn anomalies. As can be observed on Figure 4 and in Appendix III most of the samples with anomalous copper contents also have enhanced Ni contents. Also, a number of Cu-Ni and Cu anomalous samples were taken from gleysols, humic gleysols or peats. This belt of anomalous Cu and Ni contents in soils broadly correlates with a series of northwesterly trending ground magnetic highs (See Geophysics).

It is believed that geochemical data from the WD claims show no clear evidence of the presence of mineralization. The enhanced Cu-Ni and Zn values are believed likely to largely reflect changes in bedrock geochemistry and related concentration of metals in humus rich samples from swampy environments.

GEOPHYSICS

Ground Magnetometer Survey

Introduction and Theory

During the period June 19 - June 22 approximately 12 line miles of ground magnetometer surveying was completed on the WD claims. The purpose of the survey was to accurately locate and define an aeromagnetic anomaly recognized on a published government (G.S.C.) aeromagnetic map (i.e. Sheet 92 P/14).

The magnetism of all rocks is controlled by their content of ferromagnetic material; i.e. substances, possessing a relatively high susceptibility and capable of acquiring permanent magnetization. Intrusions often are accompanied by widespread hydrothermal alteration zones in which ferromagnetic minerals, principally magnetite, may be redistributed to the periphery of the alteration zones.

Instrument and Procedure

The instrument employed was the Model MF-2 magnetometer manufactured by Sharpe Instruments, a division of Scintrex Ltd., Downsview, Ontario. It operates on the fluxgate principle measuring the vertical component of the earth's magnetic field.

The MF-2 circuitry is temperature compensated to less than 1 gamma per °C from -40°C to +40°C. Its measurement range is from +100,000 gammas to -100,000 gammas and on the most sensitive scale, the sensitivity is 20 gammas per scale division or a readability of 10 gammas. It is a hand held instrument requiring only coarse leveling.

To enable surveying on the most sensitive scale, the earth's field was "bucked out" using the instruments latitude control switch. Station 0+00E, 48+00N was adjusted to read +370 gammas. The earth's total field at this point is approximately 55,000 gammas.

The baseline was first surveyed in a southerly direction, beginning at station 0+00E, 48+00N. Measurements were taken every 100 feet, with particular care taken at stations that were grid cross line intersections. When station 0+00E, 8+00N was reached the baseline was resurveyed in a northerly direction back to the starting station in order to observe and correct for the diurnal variation. In a similar fashion magnetic reference point stations were made on the remaining northern portion of the baseline. The east-west oriented picket lines were then surveyed every 100 feet and diurnal corrections were obtained by tying into the baseline. The correct values were plotted in plan view on a scale of 1"=400' and contoured using a 2000 gamma contour interval. The results are presented on Figure 5.

Results and Discussion

Two prominent ground magnetic anomalies were defined by the survey. The largest anomaly centered about coordinates 32+00N

4+00E trends north-northwest displaying a strike length of 3000 feet. The peak of the anomaly is 16,000 gammas above background and suggests a magnetite concentration near ground surface. The second anomaly is considerably smaller in size and is located at station 64+00N, 21+00W. The intensity of this anomaly also indicates a near surface concentration of magnetite.

The two anomalies lie along a strong north-northwest magnetic trend. A small magnetic feature at 56+00N, 14+00W is also located on this major trend. The only other trend appearing in the isomagnetic contours is north-south.

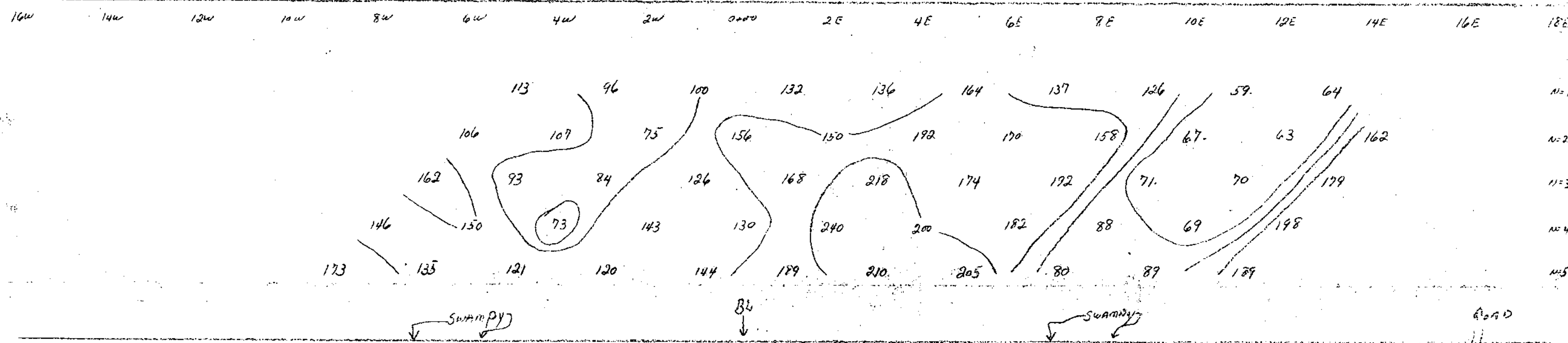
Because of the sparsity of outcrops occurring on the property no correlations can be attempted between magnetic susceptibilities and lithological units.

Induced Polarization Survey

Introduction and Theory

On July 23 - 24, 1972 two traverses of induced polarization/resistivity surveying were completed on the WD claim group. The object of the work was to test the subsurface polarizability associated with two ground magnetic anomalies. The resistivity information obtained is useful in inferring overburden depths, defining abrupt lithological changes, and assessing the importance of any I.P. effects obtained.

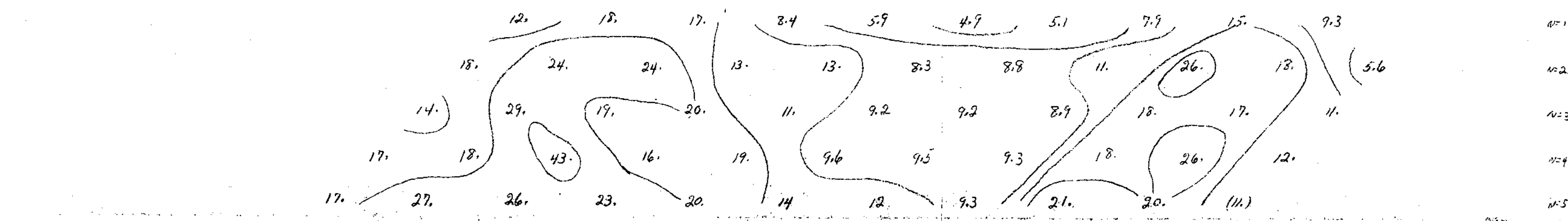
The term induced polarization means electrical polarization (i.e. separation of charges) induced by an applied electric field. The cause of this polarization is changes in the mobilities of ions within a rock. At the interfaces between zones of different mobilities, excesses or deficiencies of ions occur; the concentration gradients developed oppose the current flow and cause a polarizing effect. When mineral grains block the pore passages of rocks and a current is applied, a concentration of ions builds up at the electrolyte (water)-metal interface while awaiting an electrochemical reaction which must occur before the electric



Pa/2 ii

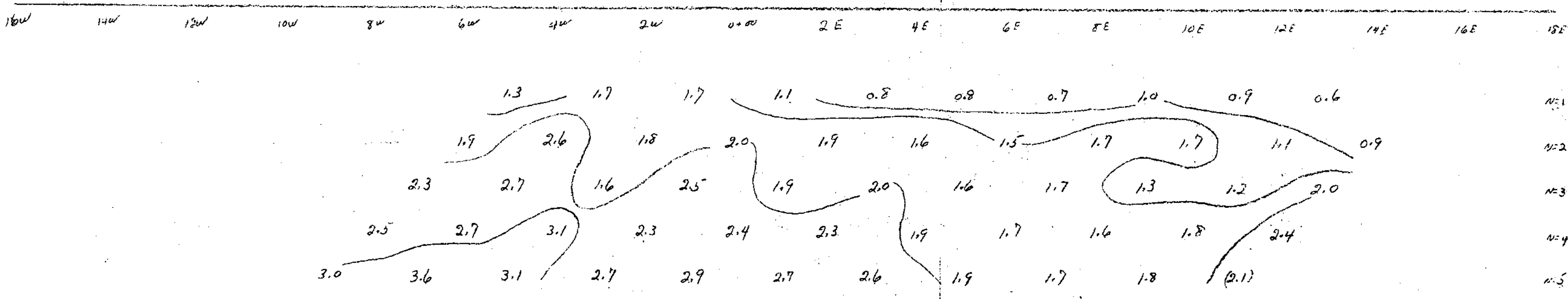
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **3817** MAP **#4**

INSTRUMENT High Power I.P. (Dipole - Dipole)
FREQUENCY 0.3 and 5 c.p.s.
OPERATOR D. F. Morrison
DATE July 1972



M.F.

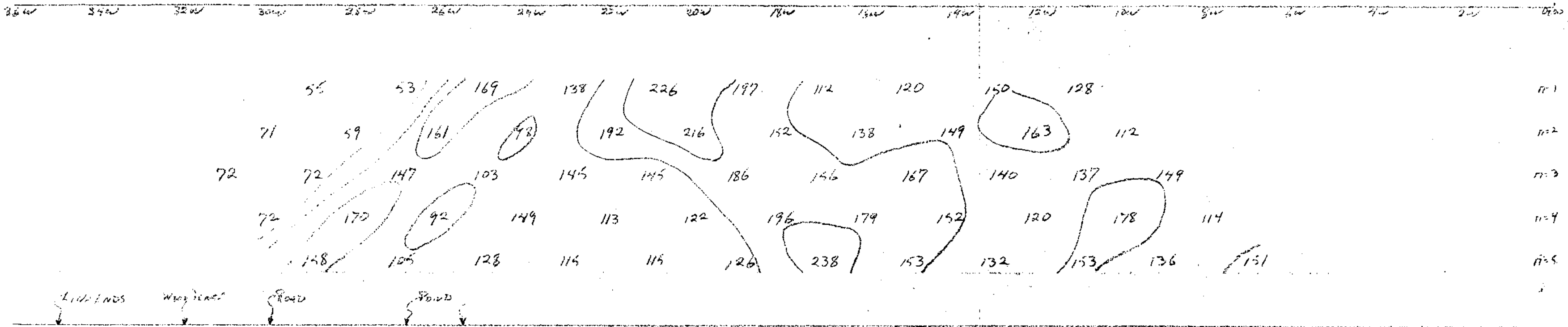
NOTE -
(11) noisy reading



P.E.F.

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TIMOTHY CREEK PROPERTY
W.D. CLAIMS
CLINTON MINING DIVISION - BRITISH COLUMBIA
INDUCED POLARIZATION SURVEY
LINE 32 + 00 N

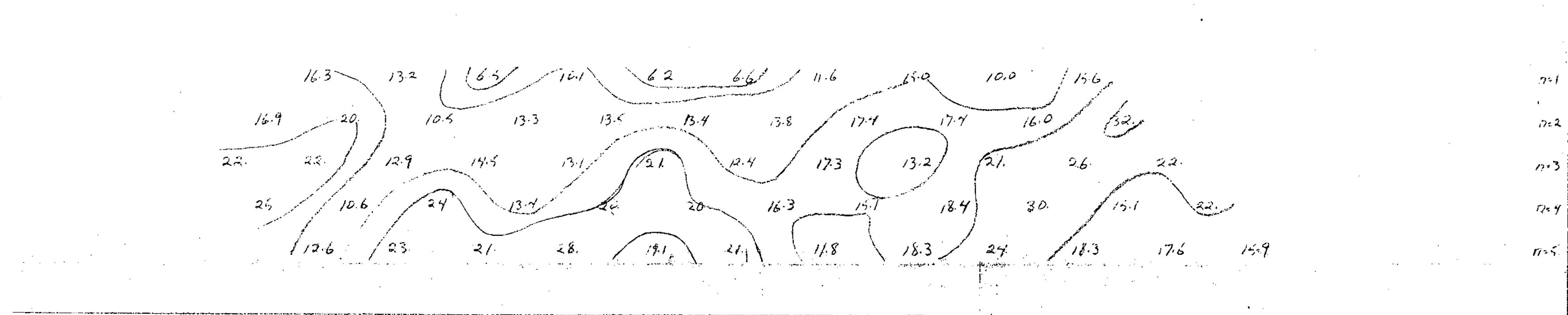
SCALE 1" = 200'
To accompany geochemical, geological and geophysical report on the "TIMOTHY CREEK PROPERTY" by: G. M. De Paoli, R. J. Bailes, G. M. Leary and T. J. R. Godfrey
FIG. 6a



71
72
72
72
72

Pa/27

INSTRUMENT High Power I. P. (Dipole - Dipole)
 FREQUENCY 0.3 and 5 c. p. s.
 OPERATOR D. F. Morrison
 DATE July 1972

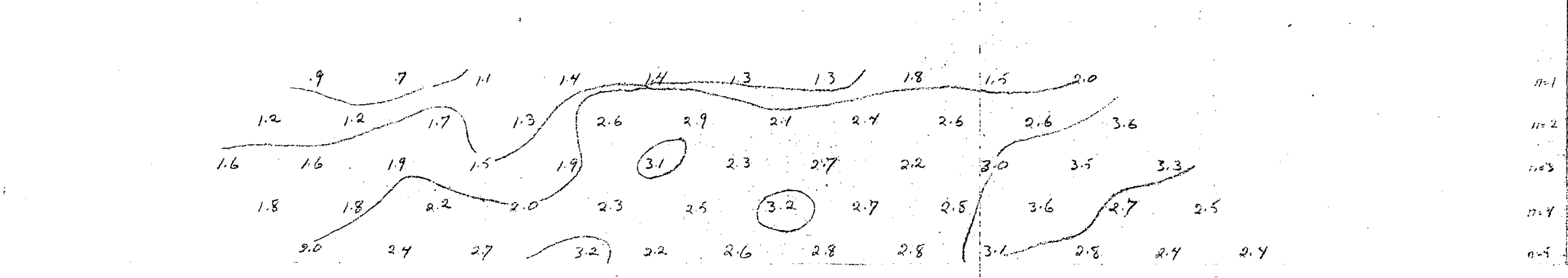


22
25
25

M. F.

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 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 3817 MAP #5

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1.2
1.6
1.8

P. E. F.

AMAX POTASH LIMITED
 TIMOTHY CREEK PROPERTY
 W D CLAIMS
 CLINTON MINING DIVISION - BRITISH COLUMBIA
 INDUCED POLARIZATION SURVEY
 LINE 64+00 N
 SCALE 1" = 200'
 To accompany geochemical, geological and geophysical report on the "TIMOTHY CREEK PROPERTY" by G. M. De Paoli, R. J. Bailes, G. M. Leary and T. J. R. Godfrey
 FIG. 6b

charge can be transferred from an ion in the electrolyte to a free electron in the metal. The forces which oppose the current flow are said to polarize the interface and the added voltage necessary to drive the current across this barrier is known as "overvoltage".

It takes a finite time to build up overvoltages and one finds that the impedances of these zones (Warburg Impedance) decreases with increasing frequency. In the frequency domain system that was employed the decrease in the Warburg Impedance was measured between current applied at 0.3 hertz (AC 1) to current applied at 5.0 hertz (AC 2).

Instrument and Procedure

A multiple frequency McPhar induced polarization system Model P660, was employed in measuring the polarization and resistivity parameters. The transmitter is a manually variable voltage source. The output current can be selected from both polarities and varies from direct current to automatically alternating output frequencies of 0.05, 0.1, 0.3, 1.25, 2.5 and 5.0 hertz.

On this survey the low and high frequencies employed were 0.3 and 5.0 hertz. Power was obtained from a $2\frac{1}{2}$ KW - 400 hertz motor generator. The maximum output current for the transmitting system is 5 amp. while the maximum output voltage is 690 volts.

The receiver employed was the new 1969 A.C. P660 model. This is a potentiometer type where the amplified and filtered signal is compared with a reference voltage. It is powered by six 8V alkaline transistor batteries and draws 7.5 ma. Total weight including carrying case and batteries is 5 pounds.

An in line dipole-dipole array was employed in the survey. Dipole length was 200 feet and measurements were taken on five separations ($n = 1, 2, 3, 4, 5$). Survey procedure required the preparation of a "set-up" station near the center of each line.

The receiver and its motor generator power supply remained stationary at the set-up position and wires in increasing three hundred foot intervals were strung out in both directions. Care was taken to ensure that the wires were well separated to prevent inductive coupling effects. The ends of the wires were connected to four stainless steel rods which had been hammered into the ground. Where possible the receiving dipole also utilized the stainless steel rods for electrode connections. Once the receiver dipole moved past the last steel rod emplaced for the transmitting set-up connections were made via porous pots. Radio contact between the receiver and transmitter operators coordinated power "on" and "off" periods.

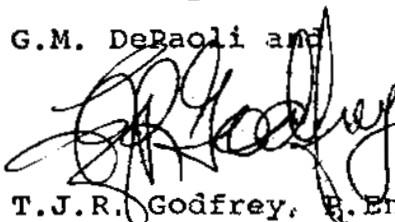
Results and Discussion

The data is presented in a pseudosection format and displays the measured apparent resistivities, per cent frequency effects and the calculated metal factors. No striking anomalies were obtained and the per cent frequency effects generally indicate a polarizable content of less than 1.0% by volume.

Line 64+00N has a high background of generally uniform apparent frequency effect values between 2.0 and 3.0%. At the western end of this line a decrease in the P.F.E. values is accompanied by a decrease in resistivity. This situation is most often the result of an increasing overburden depth.

Line 32+00N is characterized by a more irregular frequency effect distribution. These changes in subsurface polarizability may be a reflection of minor lithological variations.

G.M. Leary, R.J. Bailes,
G.M. DePaoli and



T.J.R. Godfrey, B. Eng. (B.C.)

AMAX Vancouver Office

<u>Claim Name</u>	<u>Group</u>	<u>Record Numbers</u>	<u>Anniversary Date</u>
WD #1-28 incl.	Blue	26896-26923 incl.	August 4, 1972
<u>Period of Work</u> - May 29 to July 25, 1972			
<u>Summary of Work</u>			
	- Line Cutting	- 12 line miles	
	Geochemical Survey	- 322 samples	
	Magnetometer Survey	- 12 line miles	
	I.P. Survey	- 1 3/4 line miles	
<u>Personnel and Salaries</u>			
G.M. Leary, MSc. Geologist In Charge, 601-535 Thurlow St., Vancouver	1 day @ \$60.00/day		\$ 60.00
C.J. Hodgson, PhD. Geologist, 601-535 Thurlow St., Vancouver, B.C.	1 day @ \$60.00/day		60.00
G.M. DePaoli, BSc. Geophysicist, 601-535 Thurlow St., Vancouver, B.C.	1 day @ \$50.00/day		50.00
R.J. Bailes, BSc. Geologist, 36 Greenwich Bay, Winnipeg, Man.	15 days @ \$30.00/day		450.00
D.R. Ramage, Jr. Assistant, 1124 Mayor Magrath Drive, Lethbridge, Alberta	15 days @ \$16.00/day		240.00
S.P. Dobrowolski, Jr. Assistant, 1950 Cardinal Drive, Kamloops, B.C.	4 days @ \$16.00/day		64.00
G.C. Stock, Jr. Assistant, 1725 W 16 Ave., Vancouver, B.C.	15 days @ \$22.00/day		330.00
<u>Room and Board</u>			
52 man days @ \$10.00/day			520.00
<u>Geochemical Survey</u>			
322 samples collected and analyzed for Mo, Cu, Ni, Mn, Fe, Ag, Zn and Pb @ \$3.00/sample			966.00
<u>Magnetometer Survey</u>			
Rental of MF-2 Fluxgate Magnetometer	3 days @ \$9.00/day		27.00
<u>Induced Polarization Survey</u>			
Dennis Morrison, I.P. Contractor, Box 418, Gravenhurst, Ont.	1 day @ \$200.00/day		200.00

Declared before me at the City
of Vancouver, in the
Province of British Columbia, this 31
day of August 1972, A.D.

Elizabeth K. Boyd

John Sweeney
A Commissioner for taking Affidavits within British Columbia and
A Notary Public in and for the Province of British Columbia,
Sub-Mining Recorder

Vehicle - 16 days @ \$10.00/day

\$ 160.00

Report Preparation and Drafting

200.00

TOTAL \$3,327.00
=====

This work is to be applied for one year on each of the
WD #1-28 inclusive claims.

Declared before me at the City
of Vancouver, in the
Province of British Columbia, this 31
day of August 1972, A.D.

Jan. Shivers

A Commissioner for taking Affidavits within British Columbia
A Notary Public in and for the Province of British Columbia.

Sub-Mining Recorder

APPENDIX III - GEOCHEMICAL ANALYTICAL RESULTS

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16 / 72

TYPE SAMPLES Rock & Soil

PROJECT 375

LOCATION Luc Va Huchon

REQUESTED BY C.J. Hodgson

DISPOSITION OF REJECTS discarded

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb		No.
01	12WRT 30		1	90	20	260	4.6	.5	320	28	Cu + Zn	01
02	5 31		1	32	28	520	3.7	.5	74	18		02
03	32		1	26	24	220	3.6	.5	64	22		03
04	33		1	20	26	520	3.7	.5	20	22		04
05	24 6.3		1	42	40	920	4.0	.5	24	20		05
06	35		1	20	32	440	3.2	.5	72	16		06
07	36		1	16	26	470	3.4	.5	76	20		07
08	37		1	14	20	1160	2.3	.5	168	16	} weakly enhanced Zn	08
09	38 6.1		1	20	24	960	2.5	.5	146	20		09
10	39		1	18	20	1020	2.6	.5	156	16		10
11	40		1	24	36	500	4.0	.5	124	20		11
12	41		1	16	22	380	3.5	.5	92	16		12
13	42 6.8		1	20	24	440	3.3	.5	88	18		13
14	43		1	28	32	420	3.4	.5	76	22		14
15	44		1	20	30	400	3.4	.5	62	16		15
16	45		1	20	28	420	3.4	.5	56	18		16
17	46 6.4		1	84	52	560	3.4	.5	60	18	Cu + Ni	17
18	47		1	37	42	240	2.9	.5	60	20		18
19	48		1	20	24	520	2.5	.5	64	20		19
20	49		1	14	22	300	2.7	.5	46	16		20
21	50 6.2		1	20	28	600	3.0	.5	48	16		21
22	51		1	14	22	300	2.7	.5	46	16		22
23	52		1	12	20	720	2.2	.5	20	20		23
24	53		1	20	32	460	2.4	.5	72	18		24
25	54 6.0		1	12	24	600	3.0	.5	64	10		25
26	55		1	12	28	720	3.2	.5	112	16		26
27	56		1	8	20	600	2.7	.5	74	12		27
28	57		1	12	30	340	2.9	.5	116	18		28
29	58 5.8		1	10	16	440	2.4	.5	108	12		29
30	59		1	12	20	460	2.4	.5	48	14		30
31	60		1	12	20	640	2.0	.5	142	20		31
32	61		1	16	22	360	2.9	.5	54	20		32
33	62 6.1		1	18	30	520	2.7	.5	92	20		33
34	63		1	20	24	400	2.4	.5	58	16		34
35	64		1	28	22	1240	2.6	.5	92	16		35
36	65		1	74	40	1160	3.5	.5	64	22		36
37	66 6.4		1	16	26	660	3.0	.5	22	16		37
38	67		1	14	30	360	3.7	.5	64	18		38
39	12WRS-68		1	14	24	320	3.2	.5	52	16		39
40	79											40

COMMENT:

DATE SAMPLES RECEIVED _____

DATE REPORTS MAILED _____

ANALYST _____

31

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE

June 16 / 72

TYPE SAMPLES

soil

PROJECT

375.

LOCATION

Loc. La - Hache.

REQUESTED BY

C. J. Hodgson

DISPOSITION OF REJECTS

discarded.

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb	No.
01	72.WRS-69		1	16	20	440	3.0	.5	56	12	01
02	70	6.5	1	12	20	720	3.9	.5	42	14	02
03	71		1	14	22	600	3.2	.5	60	12	03
04	72		1	16	26	360	3.0	.5	52	14	04
05	73		1	20	20	320	3.9	.5	50	12	05
06	74	6.7	1	28	28	440	3.6	.5	56	14	06
07	75		1	30	26	520	3.4	.5	52	14	07
08	76		1	80	32	360	3.2	.5	52	16	08
09	77		1	60	28	360	3.2	.5	54	16	09
10	78	6.2	1	22	18	440	3.5	.5	44	14	10
11	79		1	16	20	360	3.1	.5	44	18	11
12	80		1	12	20	440	3.1	.5	52	18	12
13	81		1	28	16	400	3.0	.5	52	18	13
14	82	6.8	1	34	16	400	3.1	.5	46	18	14
15	83		2	40	22	1600	3.0	.5	44	18	15
16	84		3	60	30	220	2.3	.5	52	30	16
17	85		3	42	22	270	1.1	.5	72	32	17
18	86	7.9	1	158	48	200	0.9	.5	34	32	18
19	87		1	156	54	520	3.4	.5	42	24	19
20	88		1	38	24	540	3.7	.5	60	26	20
21	89		1	40	22	710	2.5	.5	46	16	21
22	90	6.9	1	60	32	1020	3.2	.5	76	16	22
23	91		1	32	28	400	4.0	.5	62	18	23
24	92		1	18	14	470	3.6	.5	68	16	24
25	93		1	25	24	470	3.0	.5	40	18	25
26	94	6.5	1	16	16	200	3.0	.5	42	18	26
27	95		1	14	16	340	3.0	.5	40	12	27
28	96		1	16	20	520	3.4	.5	60	26	28
29	97		1	32	22	640	3.7	.5	52	16	29
30	98	7.0	1	38	24	340	4.1	.5	42	16	30
31	99		1	124	60	280	3.7	.5	56	18	31
32	100		1	65	30	320	3.5	.5	44	14	32
33	101		1	26	18	320	2.5	.5	40	14	33
34	102	6.7	1	28	24	400	3.0	.5	60	12	34
35	103		1	46	54	620	2.8	.5	96	20	35
36	104		1	26	32	720	3.2	.5	76	18	36
37	105		1	22	18	360	2.2	.5	44	16	37
38	106	6.5	1	16	16	360	2.2	.5	64	12	38
39	72.WRS-107		1	20	16	400	2.1	.5	44	14	39
40	G10		1								40

Mo+Pb

Cu+Ni

Cu+Ni

COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16/72

TYPE SAMPLES Soil

PROJECT 375

LOCATION Lac. La. Hache

REQUESTED BY C. J. Hodgson

DISPOSITION OF REJECTS discarded

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb		No.
01	12 WRS-108		1	22	16	370	2.1	5	44	12		01
02	109		1	24	20	360	2.7	5	40	12		02
03	H. 110	6.5	1	30	20	520	2.3	5	44	14	Humus	03
04	111		1	84	40	1140	3.0	5	72	16		04
05	H. 112		1	50	36	400	2.9	5	60	16	Humus	05
06	113		1	112	52	720	4.2	5	72	20	Cu + Ni	06
07	114	6.3	1	22	20	360	2.6	5	44	12		07
08	115		1	8	8	440	1.4	5	40	8		08
09	116		1	16	20	320	2.2	5	56	12		09
10	117		1	14	18	320	2.0	5	56	10		10
11	118	6.8	1	10	12	200	2.7	5	40	10		11
12	119		1	12	18	320	2.4	5	44	14		12
13	120		1	20	14	360	2.6	5	40	10		13
14	121		1	34	22	400	2.7	5	32	10		14
15	122	5.8	1	12	12	200	1.5	5	32	8		15
16	123		1	24	28	370	3.0	5	116	14		16
17	124		1	16	12	400	2.0	5	50	12		17
18	125		1	12	14	270	2.0	5	54	10		18
19	126	5.8	1	10	14	440	1.2	5	70	8		19
20	127		1	8	16	300	2.3	5	72	8		20
21	H. 128		1	168	88	360	2.7	5	60	20	Cu + Ni Humus	21
22	129		1	24	18	340	2.7	5	40	12		22
23	130	5.8	1	14	12	340	2.6	5	36	12		23
24	131		1	20	16	260	2.7	5	164	12		24
25	H. 132		1	24	12	170	0.6	5	20	8	Humus	25
26	H. 133		1	40	20	120	0.3	5	12	8	Humus	26
27	H. 134	1.2	1	96	46	460	3.6	5	52	14	Cu + Ni Humus	27
28	H. 135		1	116	120	300	3.2	5	70	18	Humus	28
29	H. 136		1	124	74	1070	4.6	1.0	22	20	Humus	29
30	137		1	18	16	240	1.9	5	44	8		30
31	138	6.6	1	30	24	400	2.7	5	42	16		31
32	H. 139		1	14	16	270	2.5	5	48	16	Humus	32
33	140		1	18	18	320	2.1	5	40	16		33
34	141		1	26	30	470	2.7	5	64	16		34
35	142	6.5	1	18	16	320	2.2	5	22	14		35
36	143		1	38	36	740	3.1	5	56	18		36
37	144		1	20	28	420	3.2	5	92	16		37
38	145		1	16	28	280	2.4	5	60	16		38
39	12 WRS-146	6.1	1	20	24	340	2.5	5	56	14		39
40	146		1				1.9		324			40

COMMENT:

DATE SAMPLES RECEIVED _____

DATE REPORTS MAILED _____

ANALYST _____

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16/72

TYPE SAMPLES Soil

PROJECT 375

LOCATION Lac. La Placche

REQUESTED BY C.J. Hodgson

DISPOSITION OF REJECTS discarded

33

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb		No.
01	ZWRS-147		1	16	22	320	2.3	.5	52	18		01
02	148		1	14	14	220	1.7	.5	44	10		02
03	149		1	20	14	340	2.2	.5	40	12		03
04	150	6.6	1	18	18	270	2.0	.5	54	12		04
05	151		1	16	16	300	2.1	.5	66	8		05
06	152		1	22	16	200	2.2	.5	36	10		06
07	153		1	56	34	670	3.0	.5	74	16		07
08	H. 154	7.0	1	(160)	(66)	740	3.5	.5	52	14	} Cu + Ni	08
09	H. 155		1	(132)	(56)	320	2.2	.5	52	16		09
10	156		1	(82)	(52)	440	(4.0)	.5	62	18		10
11	157		1	40	28	470	2.7	.5	52	16		11
12	158	6.9	1	36	28	660	3.7	.5	50	16		12
13	159		1	32	32	600	3.1	.5	57	16		13
14	160		1	36	24	560	3.4	.5	42	16		14
15	161		1	68	30	420	3.7	.5	44	18		15
16	162	6.8	1	36	20	360	3.2	.5	44	16		16
17	163		1	(116)	.42	520	3.0	.5	44	16		17
18	164		1	16	18	400	2.7	.5	(156)	14		18
19	165		1	16	16	360	2.0	.5	64	14		19
20	166	7.1	1	18	18	300	2.9	.5	52	12		20
21	167		1	18	14	360	1.9	.5	36	12		21
22	168		1	20	.42	220	2.9	.5	(100)	20		22
23	169		1	18	22	220	2.1	.5	54	10		23
24	170	6.3	1	18	26	420	2.9	.5	64	12		24
25	171		1	18	22	320	2.5	.5	52	12		25
26	172		1	16	18	400	2.9	.5	36	10		26
27	173		1	20	22	420	3.3	.5	42	10		27
28	174	7.0	1	24	24	270	2.4	.5	44	10		28
29	175		1	20	18	300	2.2	.5	32	8		29
30	176		1	64	32	240	3.0	.5	64	16		30
31	177		1	38	26	320	3.2	.5	52	16		31
32	H. 178	7.1	1	48	32	600	3.4	.5	56	14	Humes	32
33	179		1	44	28	320	3.7	.5	52	16		33
34	180		1	(92)	.42	480	2.7	.5	44	12		34
35	181		1	18	20	400	3.6	.5	42	12		35
36	182	1.3	1	32	24	320	3.6	.5	52	16		36
37	183		1	18	18	320	2.0	.5	46	14		37
38	184		1	18	20	240	2.0	.5	52	16		38
39	ZWRS-185		1	15	2.8	220	2.7	.5	46	20		39
40						120	1.4		76			40

COMMENT:

DATE SAMPLES RECEIVED _____
 DATE REPORTS MAILED _____
 ANALYST _____

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16/72
 PROJECT 375
 REQUESTED BY C.J. Hodgson

TYPE SAMPLES Soil
 LOCATION lac. ka. Hache
 DISPOSITION OF REJECTS discarded

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb		No.
01	12 WRS-186	7.0	1	24	38	360	2.2	.5	56	16		01
02	187		1	26	28	600	2.4	.5	62	18		02
03	188		1	132	66	160	2.1	.5	60	28	Cu+Ni+?Pb	03
04	189		1	12	28	240	2.8	.5	92	20		04
05	190	6.3	1	18	28	520	3.0	.5	76	16		05
06	191		1	22	32	620	2.4	.5	56	24		06
07	192		1	22	28	260	2.7	.5	86	24		07
08	193		1	20	24	400	2.9	.5	82	22		08
09	194	6.2	1	20	34	360	3.0	.5	76	20		09
10	195		1	12	22	620	2.4	.5	104	16		10
11	196		1	16	22	520	2.8	.5	122	18		11
12	197		1	28	36	500	3.3	.5	76	24		12
13	198	6.3	1	12	24	520	2.4	.5	100	16		13
14	199		1	20	28	440	2.5	.5	76	20		14
15	200		1	22	28	300	2.3	.5	42	18		15
16	201		1	16	4	220	2.0	.5	40	14		16
17	202	6.6	1	18	22	320	2.6	.5	22	16		17
18	203		1	20	20	300	2.2	.5	34	14		18
19	204		1	20	26	260	2.4	.5	40	18		19
20	205		1	30	32	440	3.2	.5	44	20		20
21	206	6.9	1	36	30	360	3.2	.5	52	20		21
22	207		1	172	68	300	3.2	.5	70	24	Cu+Ni	22
23	208		1	52	34	720	3.0	.5	62	28		23
24	209		1	16	18	400	3.0	.5	74	22		24
25	210	6.3	1	16	18	440	3.1	.5	22	26		25
26	211		1	32	24	320	4.2	.5	76	32		26
27	212		1	24	24	570	3.6	.5	100	20		27
28	213		1	12	20	320	2.9	.5	20	14		28
29	214	6.2	1	14	26	340	3.3	.5	76	16		29
30	215		1	10	20	400	2.6	.5	72	14		30
31	216		1	16	28	720	2.9	.5	56	52	Pb-Zn	31
32	217		1	16	26	320	2.9	.5	104	20		32
33	218	6.0	1	14	22	280	2.7	.5	100	16		33
34	219		1	20	24	340	3.5	.5	60	20		34
35	220		1	20	32	280	3.7	.5	126	20		35
36	221		1	16	24	460	2.4	.5	116	16		36
37	222	6.0	1	16	24	320	3.1	.5	24	16	x	37
38	H. 223		1	40	36	300	3.3	.5	40	22		38
39	12 WRS 224		1	32	32	320	2.8	.5	56	20		39
40	62		1	30				.5		20		40

COMMENT:

DATE SAMPLES RECEIVED _____

DATE REPORTS MAILED _____

ANALYST _____

AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16 / 72

TYPE SAMPLES Soil & silt

PROJECT 375

LOCATION Lac La Hache

REQUESTED BY C. J. Hodgson

DISPOSITION OF REJECTS discard

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	As	Zn	Pb		No.
01	220		1	36	30	600	2.9	.5	44	16		01
02	226	6.7	1	32	28	520	3.3	.5	56	36		02
03	227		1	64	42	280	2.9	.5	72	28		03
04	228		1	42	34	760	2.0	.5	42	24		04
05	H 229		1	(220)	(104)	340	2.7	.5	52	(28)	hi Cu-Ni	05
06	230	6.1	1	20	22	620	2.3	.5	64	16		06
07	231		1	22	28	520	2.9	.5	40	20		07
08	232		1	40	28	780	3.2	.5	56	18		08
09	233		1	16	20	320	3.3	.5	56	14		09
10	234	6.1	1	14	16	600	3.0	.5	42	16		10
11	235		1	14	20	370	3.0	.5	52	18		11
12	236		1	16	16	620	2.5	.5	52	18		12
13	237		1	16	18	440	2.2	.5	60	16		13
14	238	6.2	1	14	20	440	2.9	.5	72	18		14
15	239		1	24	28	440	3.4	.5	70	18		15
16	240		1	32	24	760	3.3	.5	66	20		16
17	H L 241		1	(140)	24	240	1.1	.5	36	16	? hi Cu	17
18	H S 242	6.8	1	(120)	20	120	0.5	.5	16	12	5 to Fe/Mn	18
19	243		1	12	22	480	3.2	.5	42	16		19
20	H 244		1	(240)	(52)	940	1.4	.5	38	26	Cu + Ni	20
21	H L 245		1	24	20	600	1.6	.5	36	18	Humps	21
22	S 246	6.4	1	16	14	560	2.2	.5	36	14	"	22
23	247		1	32	16	920	2.7	.5	52	12		23
24	248		1	22	20	640	3.0	.5	60	12		24
25	249		1	(42)	32	440	2.2	.5	42	16		25
26	250	6.8	1	40	28	760	3.4	.5	52	18		26
27	251		1	44	26	720	3.7	.5	52	16		27
28	252		1	16	16	370	2.8	.5	50	14		28
29	253		1	14	14	280	2.6	.5	40	12		29
30	254	6.7	1	16	24	400	3.0	.5	42	16		30
31	255		1	20	24	460	3.5	.5	44	16		31
32	256		1	(260)	(72)	400	2.5	.5	40	20	Cu + Ni	32
33	257		1	24	28	560	2.2	.5	56	16		33
34	H 258	6.4	1	(164)	38	120	1.2	.5	32	12	hi Cu, low Fe/Mn	34
35	259		1	20	32	500	4.0	.5	44	20		35
36	260		1	22	24	280	2.5	.5	36	16		36
37	261		1	16	18	500	2.2	.5	40	12		37
38	262	6.7	1	20	22	400	2.3	.5	54	16		38
39	ZWRS-263		1	16	22	320	2.2	.5	60	16		39
40							0.9	.5				40

COMMENT:

DATE SAMPLES RECEIVED _____
 DATE REPORTS MAILED _____
 ANALYST _____

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AMAX EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16, 1972
 PROJECT 375
 REQUESTED BY C. J. Hodgson

TYPE SAMPLES Soil & silt
 LOCATION Lac. La. Hache
 DISPOSITION OF REJECTS discarded

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Aq	Zn	Pb	No.
01	264		1	28	32	400	3.4	.5	66	18	01
02	265		1	20	14	160	0.7	.5	24	10	02
03	266	6.0	1	56	28	380	1.0	.5	36	32	03
04	267		1	20	22	460	2.9	.5	60	18	04
05	268		1	18	24	620	2.9	.5	52	16	05
06	269		1	24	30	640	3.4	.5	60	16	06
07	270	6.2	1	16	20	720	2.6	.5	136	14	07
08	271		1	20	26	560	2.8	.5	144	16	08
09	272		1	14	22	760	2.7	.5	140	14	09
10	273		1	12	20	960	2.6	.5	116	14	10
11	274	1.0	1	24	30	240	2.9	.5	108	20	11
12	275		1	22	28	620	3.3	.5	100	18	12
13	276		1	20	24	1240	2.5	.5	104	16	13
14	277		1	20	26	1120	3.2	.5	80	20	14
15	278	1.2	1	32	38	470	3.5	.5	72	32	15
16	279		1	24	24	460	3.3	.5	74	30	16
17	280		1	12	20	440	2.5	.5	72	16	17
18	281		1	36	24	560	3.2	.5	96	22	18
19	282	6.3	1	24	24	520	3.0	.5	90	18	19
20	283		1	18	18	1240	2.1	.5	160	16	20
21	284		1	16	18	700	2.4	.5	62	16	21
22	285		1	28	24	620	2.6	.5	62	20	22
23	286	0.8	1	36	28	270	3.2	.5	44	20	23
24	287		1	54	34	220	2.1	.5	62	20	24
25	288		1	212	94	600	2.0	.5	40	.28	25
26	289		1	16	20	360	2.6	.5	62	16	26
27	290	0.4	1	16	20	520	2.6	.5	74	16	27
28	291		1	22	32	360	2.7	.5	60	16	28
29	292		1	16	20	760	1.9	.5	64	16	29
30	293		1	12	20	700	2.3	.5	92	16	30
31	294	0.8	1	16	24	760	2.5	.5	196	18	31
32	295		1	14	22	640	2.7	.5	60	16	32
33	296	0.5	1	16	12	400	2.0	.5	32	12	33
34	297		1	10	20	220	2.1	.5	44	16	34
35	298		1	22	34	920	2.5	.5	142	24	35
36	299		1	16	16	720	2.6	.5	40	14	36
37	300	6.0	1	22	24	400	2.2	.5	40	16	37
38	301		1	14	28	760	2.6	.5	108	16	38
39	302		1	18	18	360	2.7	.5	52	14	39
40	310					500	2.7	.5	74	20	40

heavily enhanced Zn

Cu/Ni = .28 Pbs

COMMENT:

DATE SAMPLES RECEIVED _____
 DATE REPORTS MAILED _____
 ANALYST _____

AMMA EXPLORATION INC. ANALYTICAL REPORT

BURNABY LABORATORY - 2225 SPRINGER AVE. - BURNABY 2, B.C.

DATE June 16 / 72
 PROJECT 375
 REQUESTED BY C.J. Hodgson

TYPE SAMPLES soil
 LOCATION Lac. La. Hache
 DISPOSITION OF REJECTS discard

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb	Zn	No.
01	2WRS-303		1	24	22	740	3.0	.5	344	14	42	01
02	304	2.1	1	12	20	670	2.2	.5	40	14	42	02
03	305		1	30	22	200	2.6	.5	42	18	60	03
04	306		1	34	28	440	3.4	.5	52	20	42	04
05	307		1	16	18	520	2.2	.5	156	12	40	05
06	308	2.9	1	16	20	560	3.1	.5	76	16	112	06
07	309		1	2	12	200	2.3	.5	60	16	20	07
08	310		1	20	26	400	3.6	.5	68	16	56	08
09	311		1	16	20	420	3.1	.5	44	16	42	09
10	312	7.5	1	24	24	440	2.3	.5	72	16	42	10
11	313		1	22	20	1640	2.7	.5	104	16	44	11
12	H.L 314		1	132	22	240	1.9	.5	48	14	44	12
13	S 315		1	20	20	960	2.1	.5	64	16	72	13
14	316	2.9	1	20	24	540	2.3	.5	200	16	52	14
15	317		1	12	24	600	2.0	.5	142	16	52	15
16	318		1	14	20	220	2.3	.5	240	14	140	16
17	319		1	20	24	400	3.2	.5	72	16	96	17
18	320	4.1	1	22	26	520	2.0	.5	60	20	120	18
19	321		1	26	24	560	3.4	.5	40	22	56	19
20	322		1	20	18	960	2.2	.5	42	16	92	20
21	323		1	20	20	440	2.3	.5	42	14	42	21
22	324	6.7	1	16	20	920	2.9	.5	56	16	40	22
23	325		1	16	20	440	2.2	.5	120	16	60	23
24	326		1	24	28	1540	3.5	.5	16	22	80	24
25	327		1	20	24	1040	2.7	.5	12	16	240	25
26	H. 328	2.6	1	160	50	220	2.9	.5	140	20	162	26
27	329		1	36	32	620	4.1	.5	52	28	50	27
28	330		1	64	34	200	3.0	.5	72	22	76	28
29	331		1	32	30	1760	2.3	.5	44	20	46	29
30	H 332	1.0	1	150	36	310	2.7	.5	56	28	124	30
31	H. 333		1	162	36	320	1.1	.5	10	32	52	31
32	334		1	32	24	900	2.5	.5	142	24	44	32
33	335		1	32	46	1000	2.0	.5	70	20	64	33
34	336	2.3	1	32	22	562	2.7	.5	70	20	60	34
35	337		1	24	28	470	2.5	.5	70	28	76	35
36	338		1	22	30	1060	2.3	.5	70	24	52	36
37	339		1	20	22	400	3.1	.5	70	20	52	37
38	340	2.2	1	16	20	440	2.5	.5	70	22	42	38
39	2WRS-341		1	16	20	240	2.3	.5	70	24	40	39
40	3-4					220	1.9	.5	40		34	40

COMMENT:

DATE SAMPLES RECEIVED _____
 DATE REPORTS MAILED _____
 ANALYST _____

DATE June 16/72
 PROJECT 375
 REQUESTED BY C.J. Hodgson

TYPE SAMPLES soil
 LOCATION Lac la Pêche
 DISPOSITION OF REJECTS discard

No.	Sample	pH	Mo	Cu	Ni	Mn	Fe%	Ag	Zn	Pb		No.
01	WRS-342		1	60	36	960	3.0	.5	42	20	Humus	01
02	343		1	20	20	600	3.0	.5	40	18		02
03	344	6.4	1	16	18	340	2.9	.5	38	16		03
04	345		1	18	22	960	2.1	.5	127	16		04
05	346		1	16	28	640	3.2	.5	136	20		05
06	347		1	12	20	300	2.9	.5	76	16		06
07	348	6.0	1	20	28	440	3.5	.5	64	16		07
08	349		1	20	24	400	3.6	.5	64	16		08
09	350		1	26	20	220	3.6	.5	24	18		09
10	351		1	20	16	740	2.7	.5	40	14		10
11	O.T. 352		1	70	16	440	5.2	.5	132	32		11
12	WRS-353		1	60	28	360	4.7	.5	78	48		12
13												13
14												14
15												15
16												16
17												17
18												18
19												19
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36												36
37												37
38												38
39												39
40												40

COMMENT:

DATE SAMPLES RECEIVED _____
 DATE REPORTS MAILED _____
 ANALYST _____

APPENDIX II

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 SO_4^{--} in waters.

Amax Exploration, Inc.
Vancouver Office.

September 1970

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.

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.

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 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 pulverized 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.

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-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, Mo, Pb, Zn, Ag, Fe, Mn, Ni and Co determination by a Perkin-Elmer 290B atomic absorption spectrophotometer. Analytical procedures are given on the following pages.

ANALYTICAL PROCEDURESSilver

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 3281A 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% HClO₄. 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 calcu-
lated 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, H₂O, HCl, HNO₃, HClO₄, fumed to HClO₄ -
make up to 100 mls H₂O

1000, 100 gamma/ml and 100 ml by dilution in 20 % HClO₄

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% HClO₄ 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, HNO₃, and fumed into
HClO₄, dilute to 1 liter

Pipette

1, 2, 10, 20 mls into 100 ml vol flasks diluted to mark
with 20% HClO₄

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% HClO₄. This gives

5, 10, 20, 30, 50, 80, 100, 200, 300, 500, 800, 1000, 1500,

2000 gamma/ml.

Mo 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 N₂O 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/ml

Dissolve .750 gms MoO₃ (acid molybdic) with 20 mls H₂O, 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% AlCl₃and dilute to 100 mls with 20% HClO₄

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 H₂O, HCl, HNO₃,HClO₄, heat to HClO₄ fumes. Add HClO₄ to 100 mls + 100 mlsH₂O, warm, dilute to 500 mls

Pipette

1, 5, 10, 20, 30, 50, 80 mls 10,000 gamma/ml dilute to 100
mls with 20% HClO₄ to give100, 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

Fule - 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/ml

1.000 gm pure Ni metal dissolved in HCl, HNO₃, HClO₄ to perchloric fumes, dilute to 100 ml H₂O

1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in 20% HCl

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%

HClO₄. This gives

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

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

Cu 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, H₂O, HCl, HNO₃ until dissolved, add

HClO₄, fume dilute to 100 mls

1000 gamma/ml 10x dilution above in 20% HClO₄

2000 gamma/ml 20 mls 10,000 gamma/ml - dilute to 100 mls in
20% HClO₄

100 gamma/ml 10x dilution 1000 gamma/ml dilute to 100 mls in
20% HClO₄

200 gamma/ml 10x dilution 2000 gamma/ml dilute to 100 mls in
20% HClO₄

Pipette

1, 2, 3, 5, 8, 10 mls 100 gamma/ml - dilute to 100 mls with
20% HClO₄ 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 2833 Dial 208

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_3 , fumed to HClO_4 make up to 100 mls in 20% HClO_4

1000 gamma/ml and 100 gamma/ml Successive 10x dilutions in 20% HClO_4

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_4 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_2CO_3

4 parts NaCl

1 part KNO_3 pulverized to -80 mesh

7% SnCl_2 in 70% HCl

20% KSCN in H_2O

Extractant - 1 part tri-n-butyl phosphate

9 parts carbon tetrachloride

Standards

1000 gamma/ml W

.18 gms $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$ dissolved in H_2O , 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 read for one minute)
3. Cool, add 10 mls H_2O , 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 $SnCl_2$, heat in hot water bath for 5 minutes ($80^\circ C$)
7. Cool to less than $15^\circ C$
8. Add 1 ml 20% KSCN, mix (if lemon yellow; compare color standard 10x)
9. Add $\frac{1}{2}$ 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 SnCl₂
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 H₂O, 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 H₂O to methanol to match. Seal tightly

SnCl₂ - 15% in 15% HCl

300 gm SnCl₂ · 2H₂O + 300 mls HCl, until SnCl₂ dissolved

dilute to 2 liters

KSCN - 5% in H₂O

Mixed SnCl₂ - KSCN

3 parts SnCl₂ 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

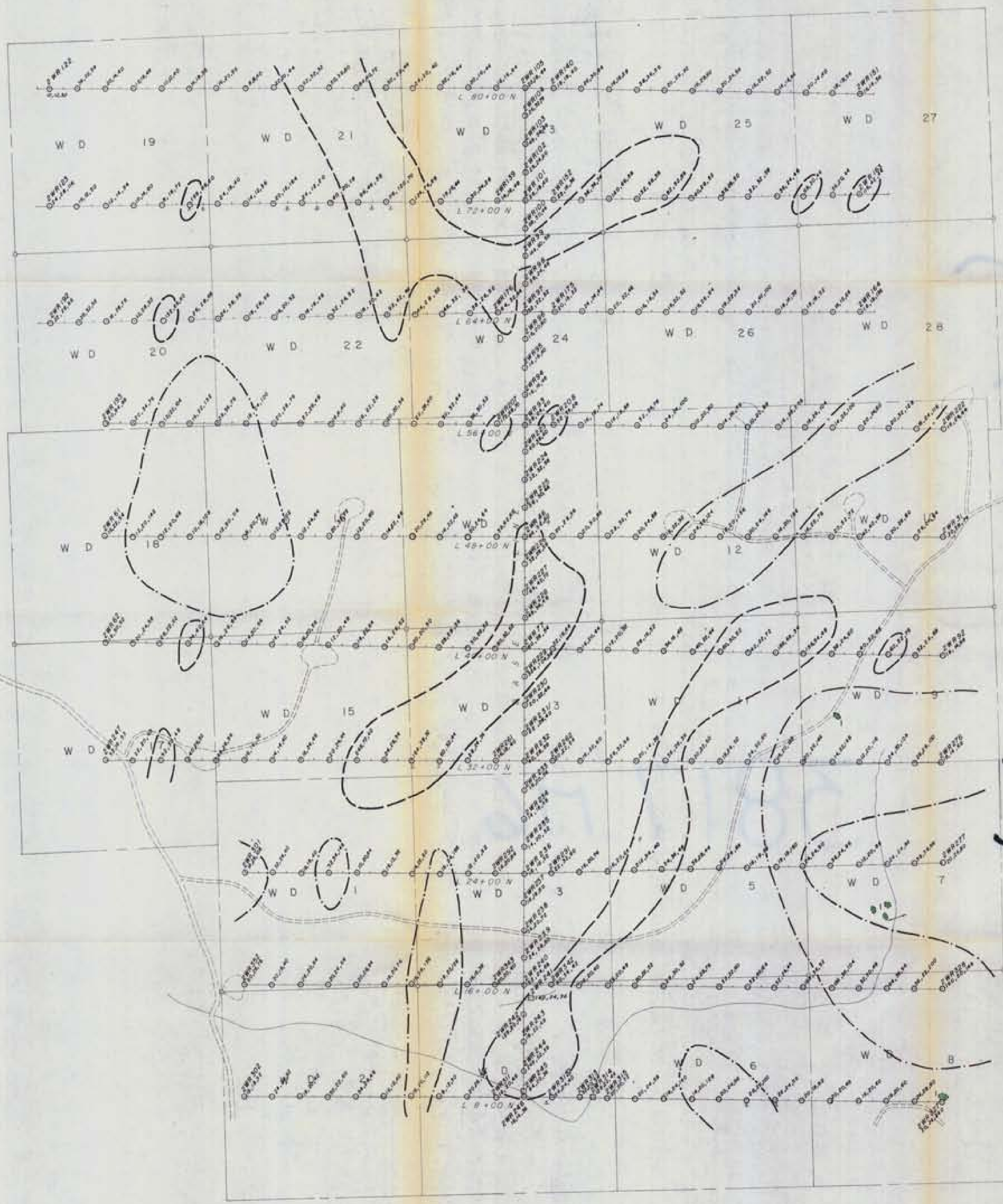
1. Pipette 0.5 ml sulphate reagent mix into a colorimetric tube
2. Add 5 ml water sample and mix
3. Read at 343 *mμ* against a demineralized water blank
4. Read again at 400 *mμ* and subtract from sulphate reading
5. Calculate ppm sulphate from the graph

Reagent

Dissolve 54 grams red mercuric oxide (J.T. Baker 2620- Can Lab) in 185 ml 70% perchloric acid and 20 ml H₂O, shake for one hour. Add 46.3 grams ferric perchlorate [Fe(ClO₄)₃ · 6H₂O] (GFS 39) and 47 grams aluminum perchlorate [Al (ClO₄)₃ · 3H₂O] (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 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.



LEGEND

TRIASSIC TO JURASSIC
 Monzonite
 NICOLA GROUP
 Basaltic tuff - breccia and flows

Outcrop
 Geological contact
 Faulting

Soil sample site, sample number, p.p.m. Cu, Ni, Zn
 Silt sample site, sample number, p.p.m. Cu, Ni, Zn
 Outline of area with copper content of ≥ 50 p.p.m.
 Outline of area with zinc content of ≥ 100 p.p.m.

3817 M-6

Picket line
 Claim post, claim location line
 Claim boundary
 Road
 Stream
 Swamp

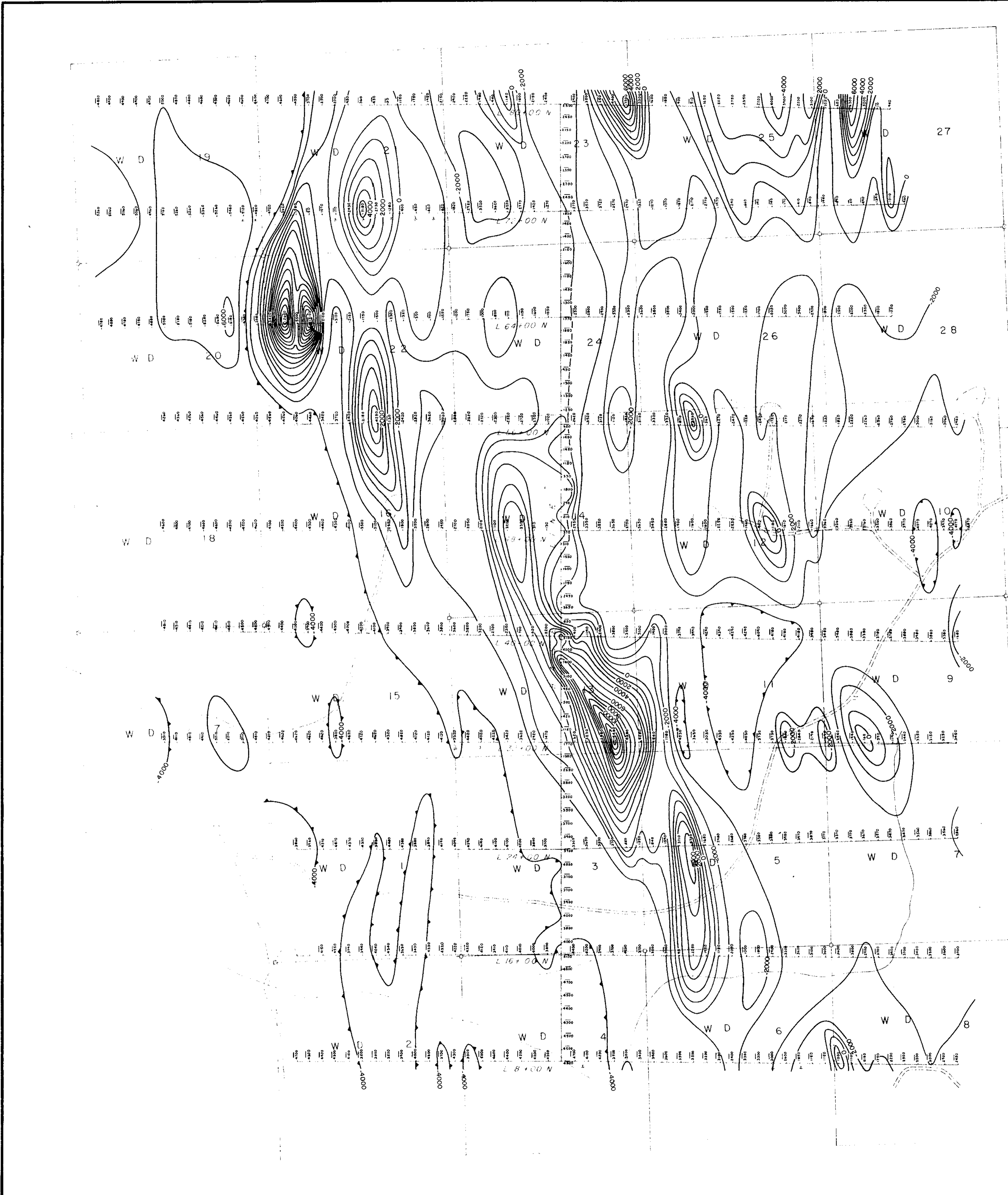
Department of
 Mines and Petroleum Resources
 ASSESSMENT REPORT
 NO. 3817 MAP #6

AMAX POTASH LIMITED
 TIMOTHY CREEK PROPERTY
 W.D. CLAIMS
 CLINTON MINING DIVISION - BRITISH COLUMBIA
 GEOCHEMICAL AND GEOLOGICAL
 MAP

SCALE 1" = 400'

DATE REVISION	DATE PRINTED	Drawn by: H.P.	Date: 10/26/72	FIG. 4
		N.T.S. File	92 P. 14	

To accompany geochemical, geological and geophysical report on the TIMOTHY CREEK PROPERTY by G.M. DePaoli, R.J. Bailes, G.M. Leary and T.J.R. Godfrey



L E G E N D

- Isomagnetic contour.
- Magnetic low.
- Picket line, magnetometric vertical field readings in gammas.
- Claim post, claim location line.
- Claim boundary.
- Road.
- Stream.
- Swamp.

3817 M-7

INSTRUMENT Fluxgate MF-2
 OPERATOR S. P. Dobrowski
 DATE June 1972
 CONTOUR INTERVAL 1000 gammas

Department of
 Mines and Petroleum Resources
 ACCESSIBILITY REPORT
 NO. 3817 MAP #7

AMAX POTASH LIMITED TIMOTHY CREEK PROPERTY W D CLAIMS CLINTON MINING DIVISION — BRITISH COLUMBIA	
GROUND ISOMAGNETIC MAP	
SCALE 1" = 400'	
DATE DRAWN	Drawn by H.P. Date 17/8/72
DATE PRINTED	N.T.S. File 92 P 14
FIG. 5	
To accompany geochemical, geological and geophysical report on the TIMOTHY CREEK PROPERTY by G.M. DePaoli, R.J. Bailes, G.M. Leary and T.J.R. Godfrey.	