1971 Geochemical and Geophysical
Report

3807

TITLE	Lennac Lake Cu Property
AUTHORS	G.M. Leary and J.F. Allan, P.Eng. (B.C.)
DATE	July 1972
COMMODITY	Cu
LOCATION-Area	Babine Lake
-Mining Division	Omineca
-Coordinates	Latitude 54°45', Longitude 126°20'
-NTS	93 L 16 and 9

AMAX Vancouver Office

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SUMMARY

The Lennac Lake Copper Property is located in the Babine Lake area of Central B.C. within a relatively flat, glaciated and largely overburden covered lobe of the Nechako Plateau 15 air miles south-southwest of the Granisle porphyry copper deposit. The property consists of 132 claims staked by AMAX crews in early July 1971. Field work on the property in 1971 was of a preliminary nature and designed to define the area or areas of interest requiring detailed exploration. It consisted of geological mapping, geochemical sampling, trenching, and construction of an access road and camp site area.

The property is underlain by a northeasterly-dipping, Jurassic volcanic sequence consisting largely of andesitic tuff-breccias intruded by a northeasterly trending series of biotite quartz diorite porphyry dykes. A large porphyry dyke up to 5000 feet wide underlies the northwestern corner of the property. An en echelon series of small porphyry dykes arranged in a northwesterly trending zone occur in the central portion of the property and are centered within a northwesterly trending pyrite-propylitic zone measuring up to 4500 feet wide and at least 12,000 feet long. Copper mineralized zones are indicated to be roughly circular or ellipsoidal in plan and up to 3000 or 4000 feet in diameter. The West Zone is characterized by chalcopyrite, chalcocite and pyrite occurring in a quartz vein stockwork associated with secondary K-feldspar and biotite in a porphyry dyke. Surface grades from channel and bulk chip samples across lengths ranging from 2 to 25 feet range from .04 to .26% Cu. Best assay result obtained was .26% Cu across 20 feet. The East Zone consists of a series of showings in volcanic rocks that are characterized by chalcopyrite and pyrite occurring along fractures and in a quartz-carbonate vein stockwork with associated bleaching. The East Zone was not sampled but surface grades are estimated to be similar to those from the West Zone.

126° 20'

54°45'

W.P. = Witness Post

YELLOW GROUP

ORANGE GROUP

BLUE GROUP

GREEN GROUP

Camp Site

Trench

Trench

Trench

Lennac Lake

THEZAR CLAIM BLOCK

FULTON LAKE ACCESS ROAD

Paul Lake

AMAX ACCESS ROAD

BULKLEY VALLEY FOREST ACCESS ROAD

TOPLEY – TOPLEY LANDING ROAD

True North

-27°-

Magnetic North

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3807 MAP #1

AMAX POTASH LIMITED

LENNAC LAKE

COPPER PROPERTY

CLAIM GROUPING MAP

SCALE: 1 inch = 2,640 feet

Fig. 2

Multi-element geochemical results from preliminary sampling, taking into account negative physio-chemical factors and high metal background in specific rock units, clearly reflects the East and West copper mineralized Zones as composite, homogeneous, moderate contrast Cu-Zn-Mo anomalies. In addition, two possibly significant Cu-Zn-Mo anomalies are present within the property where as yet no outcrops or angular float have been located.

INTRODUCTION

General Statement

The Lennac Lake Copper Property is located within the Nechako Plateau of Central British Columbia near the Granisle (Granby Mining) and Newman Peninsula (Bell Copper Ltd.) porphyry copper deposits. The prospect was discovered and staked (132 claims) in 1971 by AMAX prospecting crews. This report covers the results of 1971 preliminary field work.

Location and Access

The property is located within a northerly-trending lobe of the Nechako Plateau 15 air miles south-southwest of the Granisle deposit of $8\frac{1}{2}$ air miles southwest of Topley Landing (Figures 1 and 2). Access is available by vehicle along a gravel road from Topley on Highway 16 and by an access road, constructed by AMAX in 1971, leading from the Fulton Lake access road (Figure 2).

Physiography

The Nechako Plateau within the property is characterized by flat to very gently rolling topography with altitudes ranging from 3000 to 3500 feet. At least one period of continental glaciation with ice movement to the east-southeast has occurred in the area resulting in a scoured and striated drumlinoid landscape with numerous lakes, swamps and outwash channels. Recent drainage, though largely impeded and/or intermittent, is mainly to the northeast.

Much of the property is probably covered by a thin veneer of glacial till. Outwash sands and gravels occur along old glacial channels and in some areas are up to greater than 200 feet thick. Outcrop areas largely occur near the tops of hills and along tops of drumlin structures in relatively flat areas.

The property is covered by an immature thick forest growth of deciduous and coniferous trees largely consisting of

spruce, jack pine and poplar. Thick alder patches occur locally and deadfall is widespread. In general however, traversing is not difficult except in thick alder or deadfall areas and where thick growths of small immature jackpine and spruce are present.

Property Status

On July 9 and 10, 132 full-sized mineral claims (i.e. Thezar #1-132) were located to cover the known area of interest. Claims were recorded on July 27, 1971 at Smithers. A list of claims, record and tag numbers and anniversary dates are given in Appendix I.

1971 Work Program

All work carried out on the property during the 1971 field season (i.e. intermittently from July 11 to October 20) was of a preliminary nature and designed to define the area or areas of interest within the property requiring detailed exploration. This work consisted of geochemical sampling, geological mapping and prospecting along claim location lines and intermittent pace and compass lines (i.e. coverage along lines oriented at 110° and spaced 1600 or 1400 feet apart). Also, construction of a five mile long main access road, approximately $1\frac{1}{2}$ miles of subsidiary access roads and trenches totalling 2500 feet in length was completed. Also, ten channel and semi-bulk rock chip samples were taken over lengths ranging from 2 feet to 25 feet for assay. In addition, a camp site area was cleared.

PROPERTY GEOLOGY

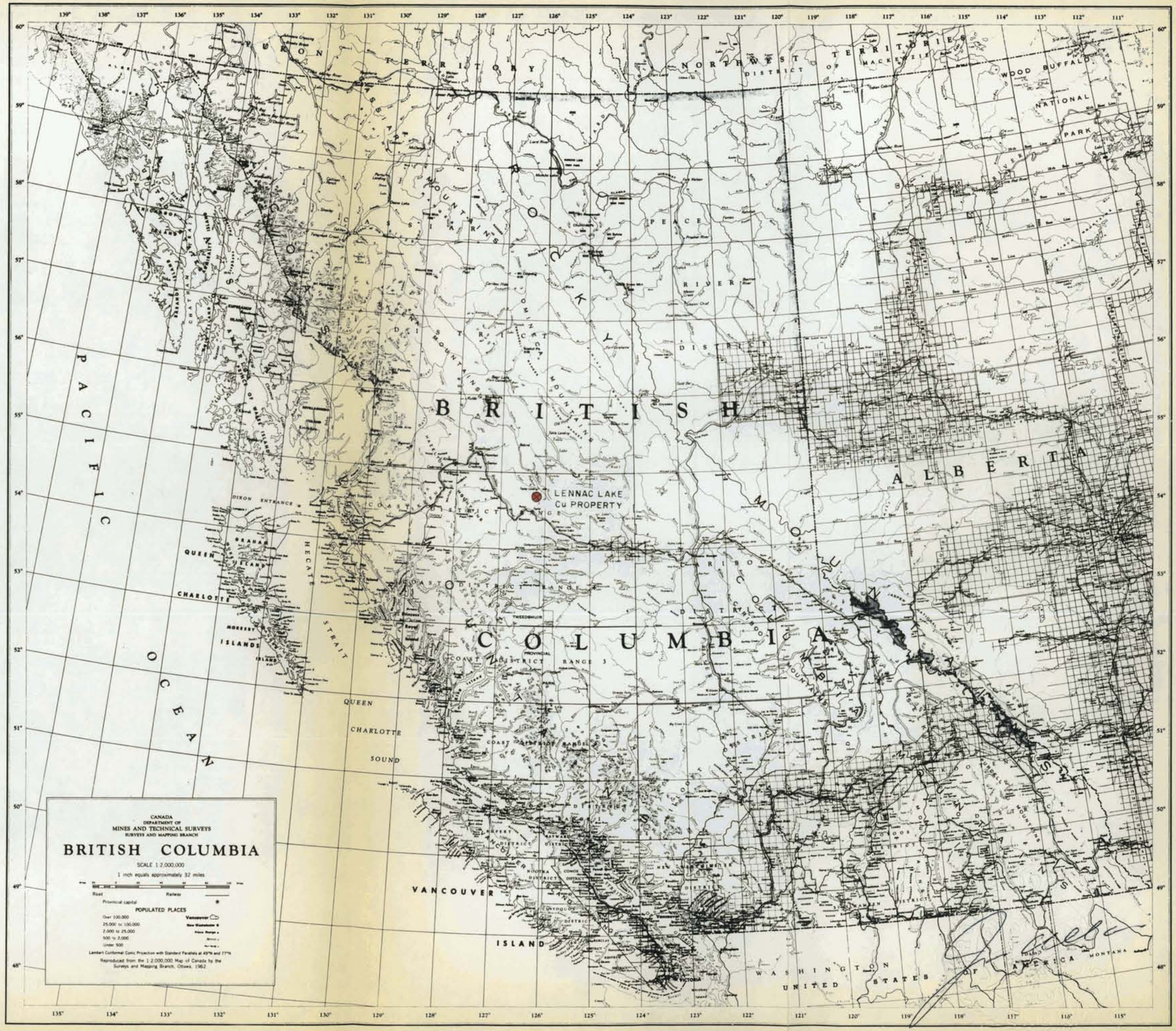
Introduction (Figure 4)

Geological mapping was carried out along claim lines and intermittent pace and compass lines. Outcrops are scarce and mainly limited to tops and flanks of hills and occasionally on top of drumlinoid features in relatively flat-lying areas. In many cases bedrock is inferred from angular, probably frost-heaved blocks -- particularly where abundant over a restricted area.

Summary Statement

The property is underlain by a northeasterly dipping sequence of Jurassic basic to acid volcanic and equivalent intrusive rocks and minor sedimentary rocks of the Hazelton Group. Northerly-trending and vertically dipping volcanic and sedimentary rocks of the Takla(?) Group of Upper Triassic age occur outside the property to the east. Hazelton Group rocks are intruded by a series of northeasterly-trending biotite-bearing quartz diorite porphyry dykes of probable Early Tertiary age. These dykes consist of a dyke-like stock up to 5000 feet wide and an en echelon series of narrow dykes (dykes up to 1000 feet wide) arranged in a northwesterly-trending zone. Several copper showings define two mineralized zones (East and West Zone) that are centered within a large pyritic-propylitic zone. The pyrite zone measures up to 4500 feet wide and at least 12,000 feet long.

The east and west copper mineralized zones are both indicated to be roughly circular or elipsoidal in plan and to have maximum diameters of up to 3000 or 4000 feet. The West Zone is characterized by chalcopyrite and pyrite occurring in a quartz vein stockwork associated with secondary K-feldspar and biotite in a porphyry dyke. Surface grades from channel and bulk chip samples across lengths ranging from 2 to 25 feet range from .04 to .26% Cu. Best assay result obtained was .26% Cu across twenty feet. The



GENERAL LOCATION MAP FIG. 1

East Zone consists of a series of similar showings in volcanic rocks characterized by chalcopyrite and pyrite occurring along fractures and in a quartz-carbonate vein stockwork associated with bleaching. The East Zone was not sampled but surface grades are estimated to be similar to the West Zone.

Description of Rock Units

Takla (?) Group

Rocks tentatively assigned to the Takla Group of Upper Triassic age consist of chert and volcanic sedimentary-breccia and minor massive dacite to andesite flows and tuffs (Unit 1). These rock types are shown on Figure 4 in a restricted area outside the property to the east. Based on probably correlative exposures of conglomerate and sedimentary breccia outside the map-area to the north and bedding attitudes, these rock types appear to form a north-south trending largely sedimentary unit that has apparent stratigraphic and structural discordance with Hazelton strata to the west.

Hazelton Group

Hazelton Group strata of Lower to Middle Jurassic age occur widespread and from limited data appear to form a moderately northeasterly-dipping sequence of andesitic to rhyolitic volcanic rocks and minor argillite and conglomerate. A basaltic to andesitic intrusive-extrusive complex of probable Hazelton age separates the Hazelton Group property from Takla (?) Group strata. Individual mappable units of the Hazelton Group are briefly described in the following sections.

Red-Purple Volcanic Unit

This unit underlies the southwestern portion of the property (Unit 2). It consists predominantly of lapilli tuffs to breccias characterized by angular red to maroon, green and purple andesitic fragments and grey, angular feldspar grains in a dense, fine grained, purple to green groundmass. Also, locally

present are green to purple, massive, feldspathic andesitic flows or agglomerates with round andesitic bombs up to three inches across.

Grey-Green Volcanic Unit

This unit trends northwesterly across the central portion of the property (Unit 3). It typically consists of massive, grey-green coloured andesitic to dacitic flows, tuffs and breccias characterized by abundant light grey feldspar fragments or phenocrysts in a dense, fine grained, light to very dark grey-green groundmass. Flows and tuffs and breccias all appear similar in that the groundmass in tuffs is not distinctly pyroclastic and in breccias the fragments and groundmass are identical (i.e. probably flow breccias).

Minor horizons typical of the red purple volcanic unit are intercalated with this unit. Also present in one region (within the eastern part of the pyritic-propylitic zone) are horizons of light colored, crudely banded, porphyritic rhyolite flows (Units 3a).

Rhyolite Breccia

Rhyolite breccia (Unit 4) is only found in two restricted areas located in the northwestern corner of the property and within the eastern portion of the pyritic-propylitic zone. It is not known whether this unit is intrusive or extrusive. It consists of angular, occasionally porphyritic, rhyolitic fragments up to two inches across in a fine to medium grained, fragmental rhyolitic groundmass. Fragments and groundmass are generally moderately to intensely argillized.

Undifferentiated Volcanic & Minor Sedimentary Rocks

This unit (i.e. Unit 5) is not considered as a stratigraphic unit as are Units 2 and 3 but as undifferentiated Hazelton Group rocks. It includes an area of very poorly exposed massive, green andesitic flows (?); red, green and/or purple tuff-breccias

and flows and minor argillite and conglomerate to the northeast and north of the region underlain by Units 2 and 3.

Intrusive-Extrusive Complex

A complex of cupriferous basic to intermediate extrusive and intrusive rocks (Units 6a and 6b) occurs as an indicated large westerly - lobate body occurring within the northeastern and eastern portion of the property. The complex separates probable Takla from Hazelton Group strata. It is poorly exposed, particularly near its fringe, but appears to consist of an intrusive shell and largely extrusive core. The shell (Unit 6a) consists of porphyritic basalt characterized by large laths of plagioclase (up to $1\frac{1}{2}$" long) in a dark, fine grained, massive basaltic to medium grained dioritic groundmass. The shell phase was only found in contact with country rocks in one area (i.e. outside the property to the east) where it was indicated to intrude the Takla (?) Group. Porphyritic basalt at the contact was characterized by variously strong-cut plagioclase laths and abundant inclusions of Takla (?) Group rocks. The contact trace appeared slightly irregular and discordant with Takla (?) strata.

The inner portion of the complex (Unit 6b) is characterized by an indicated bedded suite of rock units similar to the shell phase along with green andesitic tuff-breccas and flows. Sparse chalcopyrite, pyrite and malachite occur throughout the complex as disseminated grains, with or without associated haloes of propylitic assemblage minerals, and in veinlets and epidotized areas as described above.

Biotite-Hornblende-Feldspar-Quartz Porphyries

Units 2, 3 and 5 of the Hazelton Group are intruded by a northeasterly trending series of biotite quartz diorite porphyry dykes. These consist of a main, wide dyke-like stock in the northwestern portion of the property and a centrally located en echelon series of dykes arranged in a northwesterly trending zone.

Dykes are all mineralogically and texturally similar except for the amount of hornblende phenocrsyts present and for the presence or absence and type of sulphide minerals. The dykes have been tentatively classified as barren (Unit 7a), pyritic (Unit 7b) or chalcopyrite mineralized (Unit 7c).

Porphyries can be described together as consisting of medium to coarse grained euhedral to subhedral phenocrysts of plagioclase (25%), quartz (5-10%), biotite books (3-8%) and hornblende (1-5%) in an aphanitic light to dark grey groundmass. Phenocrysts locally exhibit weak lineation and/or foliation.

Barren dykes include the large dyke-like stock and a few of the dykes within the en echelon series. Of the latter, only one occurs within the pyritic-propylitic zone and is definitely post-mineral. These dykes are typically coarsely jointed and contain nearly equal amounts of hornblende and biotite books (i.e. approximately 10% total mafics) and show weak deuteric alteration consisting of argillization of plagioclase and chloritization of mafics. Exposures of the dyke-like stock are commonly somewhat rubbly.

Pyritic dykes only occur within the pyrite-propylitic zone and are characterized by consistantly containing an estimated 3-4% disseminated pyrite. Hornblende appears relatively fresh in most cases whereas biotite is commonly moderately altered to chlorite and sericite. Plagioclase is commonly weakly to moderately argillized.

Only one chalcopyrite mineralized porphyry body (probably a dyke) is known on the property and is within the West mineralized Zone. Chalcopyrite, chalcocite and pyrite occur in a quartz vein stockwork in this porphyry.

Structure

Structural elements present include attitudes of stratigraphic panels and intrusive rocks (see Description of

Rock Units), faults, shear zones, foliation, jointing, and fracturing.

No faults have been defined on the property. However, a shear zone is known within the chalcopyrite-mineralized porphyry in the West Zone. It is approximately 30 feet wide, strikes northwesterly and dips steeply to the east. It is characterized by gouge and highly granulated mineralized porphyry with locally abundant malachite staining.

Foliation attitudes were locally obtained from porphyry dykes exhibiting oriented phenocrysts. Foliation commonly trends northeasterly and dips vertically.

Jointing is moderately to intensely developed within and around the fringe of the pyritic-propylitic zone. Steeply dipping northeasterly and northwesterly trending joint attitudes greatly predominate. Pyrite-propylitic mineral assemblages along joints and chalcopyrite mineralized fractures or joints and quartz veins in porphyry and volcanic rocks commonly have attitudes similar to barren joint systems.

Fracturing (i.e. random breaks between joints) has been best developed within the East and West mineralized Zones and was important in localizing quartz veining and chalcopyrite mineralization in addition to joint systems.

Alteration

Alteration types on the property and their characteristic mineral assemblages known to be present are propylitic (chlorite, epidote, and calcite) argillic (clay minerals) or potassic (K-feldspar and biotite). Bleached volcanic rocks probably due to argillization and silicification are also present.

Propylitic alteration occurs widespread throughout volcanic rock units 2, 3 and 5 within the outline of the pyrite-propylitic zone. Alteration is characterized by varying degrees of development of medium green coloration due to pervasive

replacement of mafics and plagioclase by chlorite and epidote with associated calcite.

Pervasive weak argillization of plagioclase phenocrysts and the groundmass in pyritic porphyry dykes and selective bleaching of fragments in volcanic rocks is present between the East and West mineralized Zones.

Potassic alteration is only known to occur within the chalcopyrite mineralized porphyry body in the West Zone.

Quartz Veining

Stockwork development of chalcopyrite bearing quartz and quartz-carbonate veins are present, respectively, in the West and East mineralized Zones. In both zones, veins are controlled by joint systems and fractures. In the West Zone, the distinction between quartz veins and fractures is difficult since most "fractures" have a thin filling of quartz and selvage of secondary K-feldspar. However, due to ease of recognition of discrete veins as opposed to tight fractures, a vein is arbitrarily chosen as being greater than 1/16" in width and a fracture less than 1/16" in width. Chalcopyrite, pyrite, minor chalcocite and traces of molybdenite occur in quartz veins and along fractures.

In the East Zone, a mineralized quartz-carbonate (calcite) vein stockwork occurs in the northwestern portion over an area about 300 feet in diameter in propylitized and bleached andesitic outcrops and angular float adjacent to a barren porphyry dyke. Vein widths range from 1/16" to 1/4" and frequency ranges from 1 to 10 veins per foot (average 3-4 per foot). Veins contain pyrite, chalcopyrite, magnetite, very minor molybdenite and sparse epidote.

MINERALIZATION

Summary Statement

Pyrite and copper sulphides, respectively, are limited laterally to the areas defined by the outline of the pyrite-propylitic zone and east and west copper mineralized zones (i.e.

East and West Zone). Pyrite is the only sulphide mineral recognized outside the East and West Zones. Present within these zones are pyrite, chalcopyrite, malachite, molybdenite and magnetite. Chalcocite was only found to occur in the West Zone. Yellow-brown to rusty limonite occurs widespread. Maroon limonite was only observed within the East Zone. Visually estimated and analytical grades of copper over lengths of ten feet or more within exposed portions of the East and West Zone range from .04 to .3% Cu.

Pyrite Mineralized Zone

Pyrite occurs throughout a northwesterly-trending zone as defined by the limits of the pyrite-propylitic zone (i.e. limit of pyrite mineralization and significant propylitic alteration). This zone measures up to 4500 feet wide and at least 12,000 feet long. Pyrite content is estimated to range between 1/2 to 10%. It occurs disseminated, along fractures and joints and in quartz-carbonate or quartz veinlets in volcanic rocks and chalcopyrite mineralized porphyry.

Copper Mineralized Zones

Two copper mineralized zones (i.e. East and West Zones) occur within the pyrite zone. Each are indicated to be roughly circular or ellipsoidal in plan and to have a maximum diameter of up to 3000 to 4000 feet. Preliminary trenching with a small cat (John Deere 450B) was carried out in both zones.

West Zone

The West Zone is centered about a copper mineralized porphyry intrusion that contains fine grained disseminated pyrite and fine grained pyrite, chalcopyrite, chalcocite, magnetite and traces of molybdenite in quartz veins and along fractures (See Quartz Veining). Chalcocite commonly occurs coating grains of chalcopyrite. Malachite occurs widespread along fractures and locally abundant within the shear zone shown on Figure 4. Highly pyritized volcanic rocks adjacent the mineralized porphyry on the

east and northeast locally contain minor chalcopyrite and malachite.

Ten channel or semi-bulk (i.e. continuous chips taken randomly along edges of outcrop and angular blocks of sub-outcrop) rock chip samples were taken over lengths ranging from 2 to 25 feet from surface outcrop and along the bottom of a 400 foot long trench in porphyry. Assays range from .04 to .26% Cu (weighted average of .1% Cu) with $\leq$ .004% MoS_2 and $\leq$ .04 oz Ag. Best assay obtained was .26% Cu across 20 feet.

East Zone

The East Zone is characterized by a series of copper showings in separate small exposures of volcanic rocks (Unit 3) that roughly define the western, southwestern and southern periphery of an indicated roughly circular copper mineralization zone approximately 3000 feet in diameter. Exposures are typically highly broken rubbly and very small and/or consist of angular, frost-heaved blocks up to two feet across. Volcanic rocks are typically weakly propylitized, weak to intensely bleached and pyritic (2-4%). Fine to medium grained pyrite, chalcopyrite, magnetite and very minor hematite and sphalerite(?) occur predominantly along fractures and to lesser extent disseminated. A stockwork of mineralized quartz-calcite veins is only developed in exposures and sub-outcrop in the northwestern portion of the East Zone. Exposures and trenches in the East Zone were not sampled.

GEOCHEMISTRY

Introduction

Soil sampling was carried out either along pace and compass lines spaced 1600 feet apart or along claim lines and intermittent pace and compass lines giving coverage along lines spaced 1400 feet apart. All sample lines were oriented at 110 degrees. Soil samples were taken at 400 foot intervals along traverse lines. Over the main copper showing in porphyry, slightly more detailed sampling was carried out over a limited area (i.e. lines spaced 300 to 800 feet apart and soil samples collected at 400 or 200 foot intervals. A total of 463 geochemical samples were collected on an immediately adjacent the property (mainly soils; remainder include water, silt and rock chip samples). Except for water samples, all geochemical samples were analyzed by atomic absorption for Cu, Mo, Zn, Pb, Ag, Fe, Mn, Ni and Co. Water samples were only analyzed for Cu, Mo and Zn. A series of color coded element geochemical maps present data for Cu, Mo and Zn (i.e. Figures 5a, b and c). A composite geochemical anomaly map is also included (Figure 5d). Outlined on this map are definitely significant and possibly significant composite anomalies taking into account negative physiochemical factors and high metal background in specific rock units.

Geochemical Environment

Physiography of the area was discussed in an earlier section.

Soils developed in the area are largely wooded brown types overlying bedrock, till or outwash sands and gravels. They are commonly thin (i.e. up to approximately $1\frac{1}{2}$ feet thick) and moderately acid (i.e. pH ranging from 4.8 to 6.9 and averaging approximately 5.8). Humic enriched soils (gleysols and peats) are common in topographic depressions, adjacent intermittent drainage channels and in swamps.

Geochemical Results

Two roughly circular moderate contrast anomalies (up to 2500 feet in diameter) coincide with the East and West copper mineralized Zones. The anomaly coinciding with the West Zone is a homogeneous Cu anomaly (up to 730 ppm Cu in soil over mineralized porphyry). Over the East Zone anomalous Cu, Zn and/or Mo contents in soil define a heterogeneous anomaly.

G.M. Leary

July 1972

J.F. Allan, P.Eng. (B.C.)

APPENDIX I

Claim Data and Statement of Costs

Claim Name	Tag No.	Record No.	Anniversary Date
Thezar # 1-100	249201M-249300M	100129-100228	July 27, 1972
Thezar #101-132	228101M-228132M	100229-100260	July 27, 1972

Period of Work - July 11 and October 20, 1971

Summary of Work - Geochemical Survey - 11 square miles
Geological Mapping - 11 square miles
Geochemical Analysis - 463 (soil,silt,water)
Cu,Mo,Pb,Zn,Ag,Ni,Mn and F
Access Road Construction - 6½ miles long, 12' wid
Trenching - 2500 lineal feet, 12' wide

Personnel and Salaries

G.M. Leary, MSc. - Geologist - 601-535 Thurlow Street, Vancouver,B.C
25 days @ $55.00/day $1,375.00

R.E. Lett, MSc. - Geochemist - 601-535 Thurlow Street, Vancouver, B.C
8 days @ $50.00/day 400.00

J.T. Cooper - Jr. Assistant - 12-6320 E.Blvd.,Vancouver, B.C.
8 days @ $15.00/day 120.00

P.A. Marshall - Sr. Assistant - 305 Wharncliffe Rd.N,London, Ontario
6 days @ $25.00/day 150.00

D.N. Turnbull - Jr. Assistant - 1776 E 64 Ave.,Vancouver, B.C.
3 days @ $15.00/day 45.00

B.W. Munday - Slasher - Box 2342, Smithers, B.C.
45 days @ $20.00/day 900.00

L.J. Watt - Slasher - Box 703, Vanderhoof, B.C.
45 days @ $20.00/day 900.00

F.J. Ferguson - Slasher - 601-535 Thurlow St.,Vancouver, B.C.
9 days @ $40.00/day 360.00

D.G. MacIntyre - Sr.Assistant - 691 W 32 Ave.,Vancouver, B.C.
1 day @ $25.00/day 25.00

Board - 150 man days @ $10.00/day 1,500.00

Geochemical Sample Analyses -
463 (soil,silt,water) samples @ $3.00/sample 1,389.00

Helicopter Transport to Claim Group -
2½ hrs. @ $155.00/hour 375.00

Access Road, Construction and Trenching - John Deere 450B with operator 50 days @ $90.00/day	$4,500.00
Assays - 10 samples Cu, Mo and Ag @ $10.00/sample	100.00
Vehicle - 50 days @ $20.00/day	1,000.00
Drafting and Report Preparation	300.00
	$13,439.00

This work is to be applied for one year on

Thezar #1-26 inclusive and Thezar #30-132 inclusive,

and for two years on

Thezar #27-29 inclusive

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5, 1971 — TYPE SAMPLES Soils

PROJECT 338 — LOCATION Central B.C.

REQUESTED BY G. LEARY — DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CRS-100	5.5	1	28	30	16	280	4.1	.5	148	16			01
02	101		1	14	16	8	280	2.5	.5	62	12			02
03	102		1	24	24	8	230	3.2	.5	140	12			03
04	103		1	24	20	8	320	2.5	.5	88	12	✓		04
05	104	6.5	1	12	18	8	240	2.5	.5	60	12			05
06	105		1	12	16	8	320	2.7	.5	72	12	✓		06
07	106		1	20	20	8	320	2.4	.5	64	16			07
08	107		1	20	20	10	200	2.9	.5	94	12			08
09	108	6.3	1	8	16	8	360	2.3	.5	56	12			09
10	109		1	16	20	10	240	2.6	.5	72	12			10
11	110		1	16	18	12	520	3.4	.5	136	12			11
12	111		1	8	12	8	180	2.2	.5	66	10			12
13	112	6.5	1	20	18	14	220	3.4	.5	84	12			13
14	113		1	20	20	12	280	3.4	.5	128	14			14
15	114		1	12	16	6	180	1.9	.5	62	8			15
16	115		1	12	12	6	400	2.1	.5	58	16	✓		16
17	116	5.6	1	28	14	12	360	3.3	.5	80	12			17
18	117		1	16	26	10	200	2.9	.5	112	12			18
19	118		1	8	16	8	160	1.5	.5	76	16	✓		19
20	119		1	44	28	8	160	2.6	.5	68	24	✓		20
21	120	6.0	1	20	26	12	320	3.4	.5	112	20			21
22	121		1	16	16	12	260	3.3	.5	68	16			22
23	122		1	22	28	12	270	3.1	.5	96	16			23
24	123		1	24	36	14	360	3.7	.5	126	24	✓		24
25	124	6.2	1	22	16	10	340	2.8	.5	66	10			25
26	125		1	20	16	12	260	3.2	.5	86	14			26
27	126		1	16	18	12	440	3.4	.5	94	16			27
28	127		1	36	24	14	710	3.2	.5	124	16			28
29	128	5.9	1	16	14	9	240	2.8	.5	90	14			29
30	129		1	16	16	8	280	2.7	.5	72	12			30
31	130		1	20	16	10	360	2.9	.5	78	14			31
32	131		1	28	24	12	540	3.6	.5	76	16			32
33	132	5.8	1	16	18	12	240	2.7	.5	124	16			33
34	133		1	24	18	9	280	2.9	.5	78	16			34
35	134		1	28	20	12	240	3.2	.5	66	12			35
36	135		1	16	8	5	140	2.4	.5	82	12			36
37	136	5.6	1	16	14	4	180	2.5	.5	62	12			37
38	137		1	24	24	12	280	3.1	.5	72	14			38
39	71CRS-138		1	14	12	10	400	2.6	.5	124	16			39
40	[illegible]		1	120	70	14	820	2.7	.5	[illegible]	[illegible]			40

COMMENT:

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AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 4, 1970 TYPE SAMPLES Soil

PROJECT 338 LOCATION Central BC.

REQUESTED BY G Leavy DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CRS-143		1	12	16	18	220	2.5	.5	80	12			01
02	CRS-144	5.2	1	12	16	16	200	2.7	.5	132	14			02
03	145		1	32	20	32	440	3.3	.5	92	16			03
04	146		1	100	38	12	360	1.3	.5	32	12	✓		04
05	147	6.9	1	22	22	19	320	2.6	.5	90	14			05
06	148		1	48	34	28	560	3.5	.5	148	20			06
07	149		1	28	24	28	580	3.4	.5	256	16			07
08	150		1	10	12	16	140	2.4	.5	96	12			08
09	151	5.5	1	16	20	24	1060 1060	2.7	.5	182	16			09
10	152		1	18	20	20	360	2.8	.5	116	16			10
11	153		1	18	20	20	240	2.6	.5	64	12			11
12	154		1	7	8	14	140	1.9	.5	188	20			12
13	155	6.3	1	8	18	18	280	2.8	.5	204	16			13
14	156		1	18	20	20	320	2.8	.5	92	16			14
15	157		1	12	16	16	170	2.3	.5	92	16			15
16	158		1	14	16	16	200	2.7	.5	96	20			16
17	159	5.2	1	18	20	20	250	2.9	.5	96	14			17
18	160		1	26	28	24	220	3.3	.5	158	14			18
19	161		1	18	20	20	400	2.8	.5	84	12			19
20	162		1	8	8	16	200	2.2	.5	96	12			20
21	163	5.1	1	12	16	20	380	2.2	.5	124	12			21
22	164		1	14	18	18	350	2.6	.5	100	8			22
23	165		1	20	22	22	280	2.8	.5	60	12			23
24	166		1	18	24	20	240	2.9	.5	84	12			24
25	167	5.9	1	16	20	20	360	2.7	.5	104	12			25
26	168		1	20	24	32	980 940	4.1	.5	188	16			26
27	169		1	12	18	24	460	3.0	.5	128	16			27
28	170		1	18	28	25	260	3.3	.5	160	12			28
29	171	5.4	1	14	18	18	250	2.1	.5	76	8			29
30	L 173		1	12	20	26	1360 1360	3.5	.5	96	14			30
31	S 174		2 T	12	24	24	240	3.3	.5	108	14			31
32	175			16	19	28	1120 1070	3.2	.5	192	20			32
33	176	6.4	1	26	28	28	1020	3.8	.5	116	20			33
34	177		1	18	16	20	280	3.0	.5	80	16			34
35	178		1	16	28	24	200	3.3	.5	120	20			35
36	179		1	12	20	20	240	2.7	.5	110	12			36
37	180	5.1	1	18	24	25	270	3.1	.5	100	16			37
38	CRS-181		1	12	18	23	280	2.5	.5	168	16			38
39	71CRS-182		1	16	20	26	460	3.0	.5	156	20			39
40	B-1		10	124	24	28	480	40	1.5	211	36			40

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AIMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5, 1971 TYPE SAMPLES Soil

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G. LEARY DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb	Mn		No.
01	71CRS-183		1	16	22	28	8[illegible]	3.4	.5	168	20	1120		01
02	189	6.1	1	13	21	20	5[illegible]0	2.7	.5	136	16	720		02
03	185		1	24	22	18	3[illegible]0	3.2	.5	88	16	480		03
04	186		1	14	14	18	[illegible]0	2.6	.5	108	16	800		04
05	187		1	16	18	17	[illegible]0	2.7	.5	80	12	580		05
06	188	5.5	1	20	20	19	[illegible]0	2.6	.5	68	16	660		06
07	189		1	21	24	20	[illegible]0	3.1	.5	72	20	300		07
08	190		1	16	26	18	[illegible]0	2.8	.5	244	20	320		08
09	191		1	16	20	20	[illegible]0	2.9	.5	68	16	360		09
10	192	5.6	1	8	14	12	[illegible]0	2.1	.5	76	16	200		10
11	193		1	12	16	15	[illegible]0	2.5	.5	80	16	240		11
12	194		1	22	20	20	[illegible]0	3.0	.5	104	16	720		12
13	195		1	27	24	16	[illegible]0	2.9	.5	68	16	400		13
14	196	6.4	1	20	24	18	[illegible]0	2.9	.5	100	20	440		14
15	197		1	16	20	14	[illegible]0	2.3	.5	56	16	240		15
16	71CRS-198		1	14	16	14	[illegible]0	2.4	.5	72	16	240		16
17	B-1		Co	124	24	26	400	4.0	1.5	264	36	520		17
18														18
19														19
20														20
21														21
22														22
23														23
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39														39
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AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5, 1971 TYPE SAMPLES Soils

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G. Leary DISPOSITION OF REJECTS SAVE.

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CRS-139		1	14	16	18	440	3.1	.5	114	12			01
02	140		1	14	18	20	340	3.2	.5	136	14			02
03	141	6.1	1	20	18	17	300	3.0	.5	120	14			03
04	142		1	12	16	16	200	3.0	.5	76	12			04
05	T-199		18	316	10	21	320	2.9	.5	42	14			05
06	S-200		10	x730	12	28	360	4.1	.5	112	12			06
07	201	6.0	1	52	12	12	220	2.0	.5	44	10			07
08	202		24	168	12	11	180	1.9	.5	42	10			08
09	203		3	36	9	8	140	1.9	.5	52	12			09
10	204	5.8	1	40	20	27	520	5.2	1.0	250	26			10
11	205		1	58	16	24	160	5.8	1.5	164	24			11
12	206		1	104	26	27	500	4.6	.5	106	22			12
13	207		1	20	17	18	310	2.9	.5	118	14			13
14	208	5.4	1	12	20	18	700	2.5	.5	108	12			14
15	209		1	32	30	24	600	3.8	.5	180	22			15
16	210		1	16	12	14	280	3.1	.5	82	16			16
17	211		1	28	28	20	220	3.5	.5	84	16			17
18	212	6.1	1	16	20	16	200	3.1	.5	84	14			18
19	213		1	16	16	18	260	3.9	.5	128	20			19
20	214		1	60	20	13	1000	2.4	1.0	56	16	✓		20
21	215		1	76	22	18	500	3.2	.5	104	14			21
22	216	5.3	1	16	22	16	260	3.0	.5	100	12			22
23	217		1	16	20	16	300	2.9	.5	90	10			23
24	218		1	12	14	20	320	3.6	.5	76	18			24
25	219		1	16	20	20	180	3.5	.5	84	16			25
26	220	5.6	1	130	24	20	200	3.2	.5	103	16	✓		26
27	221		1	78	28	20	900	3.0	.5	76	18	✓		27
28	222		4	50	16	22	440	4.5	.5	128	20			28
29	223		1	84	32	23	420	4.2	.5	110	18	✓		29
30	224	5.7	1	60	26	24	340	4.3	.5	162	20			30
31	225		1	64	18	26	420	4.8	.5	204	20			31
32	226		1	20	15	18	640	2.9	.5	128	18			32
33	227		1	14	24	18	600	3.5	.5	84	18			33
34	228	6.8	1	16	20	14	240	3.4	.5	68	12			34
35	229		1	16	20	24	600	4.5	1.0	204	22			35
36	230		1	14	16	19	700	3.0	.5	176	16			36
37	231		1	15	24	18	360	3.4	.5	94	12			37
38	232	5.7	1	20	20	16	440	3.6	.5	120	14			38
39	71CRS-233		1	16	16	12	320	2.8	.5	100	12			39
40	234		1	24	20	19	400	3.1	.5	64	20			40

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APPENDIX II

Geochemical Analytical Results

APPENDIX III

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 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 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 $Hx1O_3$ 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 ppm = .0292 oz/ton

conversion factor

oz/ton = .0292 x ppm Ag

Zn Geochemical AA Setting

Lamp Zn

Current 8 #3 Slit 20A

Wave length 2138 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_2O, HCl, HNO_3, $HClO_4$, fumed to $HClO_4$ - make up to 100 mls H_2O

1000, 100 gamma/ml and 100 ml by dilution in 20 % $HClO_4$

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% $HClO_4$ 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, and fumed into $HClO_4$, dilute to 1 liter

Pipette

1, 2, 10, 20 mls into 100 ml vol flasks diluted to mark with 20% $HClO_4$

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

Pippette

.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% $HClO_4$. 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 N_2O 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 MoO_3 (acid molybdic) with 20 mls H_2O, 6 lumps NaCH, 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% $AlCl_3$ and dilute to 100 mls with 20% $HClO_4$

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/ml

Weigh 5.000 gms iron wires, into beaker, add H_2O, HCl, HNO_3, $HClO_4$, heat to $HClO_4$ fumes. Add $HClO_4$ to 100 mls + 100 mls H_2O, warm, dilute to 500 mls

Pipette

1, 5, 10, 20, 30, 50, 80 mls 10,000 gamma/ml dilute to 100 mls with 20% $HClO_4$ 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

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, HNO_3, $HClO_4$ to perchloric fumes, dilute to 100 ml H_2O

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% HCl04. 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, H_2O, HCl, HNO_3 until dissolved, add $HClO_4$, fume dilute to 100 mls

1000 gamma/ml 10x dilution above in 20% $HClO_4$

2000 gamma/ml 20 mls 10,000 gamma/ml - dilute to 100 mls in 20% $HClO_4$

100 gamma/ml 10x dilution 1000 gamma/ml dilute to 100 mls in 20% $HClO_4$

200 gamma/ml 10x dilution 2000 gamma/ml dilute to 100 mls in 20% $HClO_4$

Pipette

1, 2, 3, 5, 8, 10 mls 100 gamma/ml - dilute to 100 mls with 20% $HClO_4$ 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 Na_2WO_4 $2H_2O$ 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°C)
7. Cool to less than 15°C
8. Add 1 ml 20% KSCN, mix (if lemmon 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 $SnCl_2$
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_2O, 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_2O to methanol to match. Seal tightly

$SnCl_2$ - 15% in 15% HCl

300 gm $SnCl_2 \cdot 2H_2O$ + 300 mls HCl, until $SnCl_2$ dissolved

dilute to 2 liters

KSCN - 5% in H_2O

Mixed $SnCl_2$ - KSCN

3 parts $SnCl_2$ 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 H_2O, shake for one hour. Add 46.3 grams ferric perchlorate $[Fe(ClO_4)_3 \cdot 6H_2O]$ (GFS 39) and 47 grams aluminum perchlorate $[Al(ClO_4)_3 \cdot 8H_2O]$ (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.

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5, 1971 — TYPE SAMPLES Soils

PROJECT 338 — LOCATION Central B.C.

REQUESTED BY G. Leary — DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	ICRS-234		1	28	18	14	360	2.7	.5	98	12			01
02	235		1	20	16	12	200	2.4	.5	72	12			02
03	236		1	16	16	12	160	2.4	.5	86	10			03
04	237		1	28	26	19	240	3.4	.5	124	15			04
05	238		1	36	22	14	240	2.7	.5	88	18			05
06	239		1	22	24	16	320	2.9	.5	80	16			06
07	240		1	36	30	20	600	3.5	.5	128	20			07
08	241		1	18	22	14	320	2.6	.5	98	18			08
09	242		1	36	26	16	480	3.6	.5	106	20			09
10	ICRS-243		1	20	28	28	940	4.5	.5	82	24			10
11	A-1 ~~988~~		17	60	64	64	253	1.7	2.0	88	17			11
12														12
13														13
14														14
15														15
16														16
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COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE Aug 6, 1971 TYPE SAMPLES Rock + Soil

PROJECT 338 [CBC] LOCATION

REQUESTED BY G. Leary DISPOSITION OF REJECTS Save

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	%Fe	Ag	Zn	Pb			No.
01	71 CMT 110		1	12	4	12	320	2.0	.5	26	8			01
02	111		1	144	16	36	560	5.2	1.0	54	26			02
03	112		1	24	12	22	460	3.6	.5	62	16			03
04	113		1	20	10	8	140	1.5	.5	28	16			04
05	114		1	10	8	12	240	1.1	.5	28	30			05
06	115		1	4	8	8	180	0.2	.5	46	28			06
07	116		4	40	5	10	300	1.6	.5	52	8			07
08	117		1	20	8	12	420	1.6	.5	36	14			08
09	118		1	28	12	18	720	3.4	.5	72	12			09
10	T 119		1	16	12	16	640	2.5	.5	76	12			10
11	S 121	6.1	1	20	14	17	180	2.9	.5	144	20	✓		11
12	122		1	14	14	12	200	1.8	.5	88	18			12
13	123		1	16	16	14	240	2.2	.5	82	16			13
14	124		1	22	16	16	320	2.3	.5	98	14			14
15	125	6.5	1	12	18	14	200	2.2	.5	54	16			15
16	126		1	14	20	16	220	2.3	.5	72	20			16
17	127		1	10	14	15	260	2.2	.5	164	18			17
18	128		1	12	14	14	200	2.0	.5	60	10			18
19	129	6.4	1	10	14	16	260	2.4	.5	126	16			19
20	130		1	12	14	12	120	2.6	.5	84	16			20
21	131		1	12	16	16	120	2.4	.5	98	16			21
22	S 132		1	8	8	12	160	1.9	.5	44	12			22
23	T 133		1	60	32	18	600	2.5	.5	174	124			23
24	S 134	5.6	1	22	26	16	220	2.7	.5	112	14			24
25	135		1	12	12	15	240	2.5	.5	98	16			25
26	136		1	16	20	17	620	2.8	.5	126	16			26
27	137		1	16	16	18	340	2.7	.5	104	24			27
28	138	6.5	1	16	20	14	260	2.4	.5	80	18			28
29	139		1	16	18	24	1080	3.4	.5	216	23			29
30	140		1	18	18	16	220	3.2	.5	100	20			30
31	142		1	14	16	16	260	2.7	.5	152	16			31
32	143	6.3	1	16	20	15	280	2.3	.5	76	18			32
33	144		1	16	22	14	380	2.7	.5	100	16			33
34	145		1	14	16	12	180	2.4	.5	68	14			34
35	146		1	16	20	16	180	2.9	.5	104	18			35
36	147	5.8	1	14	20	16	300	2.6	.5	104	16			36
37	148		1	14	19	18	280	3.0	.5	164	20			37
38	149		1	36	32	24	520	3.8	.5	140	28			38
39	71CMS 150		1	16	20	20	240	3.6	.5	134	22			39
40			1	24	24	22	1120	2.91	.5	70	28			40

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE Aug 6, 1971 TYPE SAMPLES Rock & Soil

PROJECT 335 LOCATION

REQUESTED BY G. Leary DISPOSITION OF REJECTS Save

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	%Fe	Ag	Zn	Pb			No.
01	71CMS151	6.0	1	28	20	19	400	3.4	.5	96	20			01
02	71CMT152		1	28	20	27	880	4.2	.5	124	24			02
03														03
04														04
05														05
06														06
07														07
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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE July 12, 1971 TYPE SAMPLES Soil

PROJECT 338 LOCATION Cent B. C.

REQUESTED BY G. Leary DISPOSITION OF REJECTS Discard

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	%Fe	Ag	Zn	Pb	Cr		No.
01	71 CCS 356	6.3	1	48	30	16	200	2.4	.5	56	18			01
02	357		1	16	24	8	240	2.5	.5	160	14			02
03	358		1	30	28	10	280	3.0	.5	120	16			03
04	359		1	56	32	12	260	4.6	.5	176	28			04
05	360	5.6	1	14	20	6	240	2.1	.5	68	12			05
06	361		1	18	22	8	220	2.8	.5	80	18			06
07	362		1	14	25	6	160	3.1	.5	80	16			07
08	363		1	22	20	4	240	2.2	.5	76	12			08
09	363*	5.2	1	26	21	6	230	2.9	.5	120	16			09
10	364		1	12	16	4	120	2.3	.5	56	12			10
11	365		1	10	15	4	140	2.3	.5	48	10			11
12	366		1	14	16	8	200	2.3	.5	60	8			12
13	367	5.9	1	24	24	12	280	3.5	.5	208	14			13
14	368		2	144	40	20	1560	4.1	1.0	236	20			14
15	369		1	22	22	8	190	3.0	.5	66	12			15
16	370		1	14	18	6	220	2.4	.5	68	12			16
17	371	5.8	1	18	18	4	160	2.3	.5	68	12			17
18	372		1	14	16	4	140	2.5	.5	92	14			18
19	374		1	22	24	6	280	2.8	.5	80	14			19
20	375		1	14	17	4	140	2.0	.5	102	12			20
21	376	5.3	1	18	24	12	160	3.0	.5	156	16			21
22	377		1	10	16	10	160	2.2	.5	88	14			22
23	378		1	10	13	8	220	2.6	.5	136	16			23
24	379		1	40	34	14	260	3.5	1.0	152	20			24
25	380	6.7	1	30	27	16	360	3.1	1.0	240	18	✓		25
26	381		1	14	19	12	160	3.1	.5	140	14			26
27	382		1	22	24	16	550	3.2	.5	120	18			27
28	383		1	14	18	14	160	2.6	.5	124	14			28
29	384	5.5	1	12	20	14	160	3.1	.5	164	14			29
30	385		1	14	22	16	320	3.3	.5	152	14			30
31	386		1	10	17	12	100	2.3	.5	88	10			31
32	387		1	12	26	14	110	3.0	.5	150	14			32
33	388	5.7	1	16	22	14	440	2.8	.5	112	14			33
34	389		1	12	20	14	120	2.4	.5	106	12			34
35	390		2	52	44	22	680	4.1	1.0	184	20			35
36	391		1	20	20	16	200	2.4	.5	80	12			36
37	392	5.6	1	20	24	16	360	3.1	.5	112	16			37
38	393		1	18	24	18	260	3.2	.5	148	14			38
39	71 CCS 394		1	52	20	12	190	2.8	.5	208	14			39
40	1		1	16	22	12	280	2.5		61	16			40

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE July 12, 1971 TYPE SAMPLES Soil

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G. Leary DISPOSITION OF REJECTS Discard

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	% Fe	Ag	Zn	Pb			No.
01	71 CCS 395		1	18	20	16	560	2.5	.5	100	14			01
02	396	6.6	1	18	22	14	220	2.6	.5	80	16			02
03	396*		1	24	20	12	240	3.6	.5	96	20			03
04	397		1	20	24	12	230	3.0	.5	100	16			04
05	398	6.0	1	20	24	16	220	3.3	.5	124	18			05
06	399		2	118	44	20	600	4.6	1.5	156	26	✓		06
07	400		1	28	78	12	190	2.5	.5	68	18			07
08	401		1	30	20	18	540	3.1	.5	104	18			08
09	402	5.2	1	14	12	12	200	2.3	.5	80	16			09
10	403		1	14	16	16	180	2.5	.5	100	14			10
11	404		1	18	24	16	170	2.8	.5	136	16			11
12	405		8	520	21	16	410	2.9	.5	120	14			12
13	407	4.8	1	26	16	16	280	4.0	1.0	208	22			13
14	408		1	14	18	16	160	2.4	.5	72	14			14
15	409		1	16	20	15	160	3.1	.5	124	16			15
16	410		1	22	28	16	250	3.5	.5	152	16			16
17	411	5.1	1	20	24	20	180	3.3	.5	124	16			17
18	413		1	22	20	24	1040	3.9	.5	140	20			18
19	415		1	40	23	30	380	4.0	.5	84	18			19
20	416		1	16	14	16	320	2.7	.5	104	16			20
21	417	6.7	1	24	24	18	300	3.4	.5	108	20			21
22	418		1	32	20	16	290	2.7	.5	100	16			22
23	419		1	20	23	18	190	3.0	.5	124	16			23
24	420		1	20	16	8	520	3.3	.5	140	18			24
25	421	5.8	1	12	20	16	380	3.3	.5	106	16			25
26	422		1	24	20	24	320	3.5	.5	100	18			26
27	423		1	12	8	16	380	2.8	.5	74	14			27
28	424		1	30	16	18	220	3.1	.5	64	16			28
29	425	6.4	1	52	26	25	880	3.8	.5	164	22	✓		29
30	427		1	20	16	20	200	3.1	.5	110	14			30
31	428		1	14	14	14	160	2.7	.5	88	10			31
32	429		1	26	28	20	360	3.9	.5	108	22			32
33	430	6.3	1	20	16	20	280	2.9	.5	130	14			33
34	431		1	16	19	16	160	3.1	.5	92	14			34
35	432		1	34	20	32	1040	4.0	1.0	224	26			35
36	433		1	14	20	20	320	3.1	.5	110	18			36
37	434	5.3	1	16	12	16	280	3.0	.5	114	18			37
38	435		1	26	28	24	480	3.8	.5	132	22			38
39	71CCS 436		1	20	17	20	360	3.1	.5	104	16			39
40			1	20	18	20	320	2.1	.5	64	8			40

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE July 19/71 TYPE SAMPLES soil

PROJECT 338 LOCATION Cont - B.C.

REQUESTED BY S. Leary DISPOSITION OF REJECTS discard

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CC5437		1	10	8	6	230	2.1	.5	72	16			01
02	438		1	16	16	8	140	3.1	.5	100	20			02
03	71CC5397*		1	20	20	10	240	3.1	.5	104	18			03
04	R-1		1	22	28	12	360	2.9	.5	72	24			04
05														05
06														06
07														07
08														08
09														09
10														10
11														11
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COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5/71 — TYPE SAMPLES —

OJECT 338 — LOCATION Central B.C.

REQUESTED BY G. Leary — DISPOSITION OF REJECTS Save

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	PICC5598		1	16	18	8	140	2.0	.5	66	10			01
02	600		1	16	18	8	180	2.5	.5	68	8			02
03	601		1	16	16	8	240	2.7	.5	72	8			03
04	602	5.3	1	16	22	10	170	2.8	.5	140	12			04
05	603		1	16	28	12	400	3.2	.5	204	8			05
06	604		1	20	20	10	320	2.9	.5	60	18			06
07	605		1	24	20	10	320	2.9	.5	100	24			07
08	606	6.3	1	24	24	16	1040	3.3	.5	94	28			08
09	607		1	14	22	10	280	3.2	.5	96	24			09
10	608		1	24	28	10	280	3.2	.5	88	12			10
11	609		1	16	22	12	760	2.7	.5	96	18			11
12	610	5.5	1	22	12	6	220	3.0	.5	72	16			12
13	611		1	12	22	7	180	2.7	.5	102	16			13
14	612		1	12	16	6	70	1.9	.5	72	16			14
15	613		1	20	24	12	360	3.1	.5	114	18			15
16	614	6.0	1	16	20	12	200	3.0	.5	100	16			16
17	615		1	20	24	10	160	2.9	.5	106	16			17
18	616		1	12	20	8	120	2.2	.5	76	12			18
19	617		1	12	18	8	240	2.4	.5	88	14			19
20	618	5.6	1	14	22	10	120	2.8	.5	112	16			20
21	619		1	24	18	14	360	3.3	.5	74	14			21
22	620		1	16	16	10	480	2.9	.5	90	16			22
23	621		1	16	24	8	360	2.7	.5	92	16			23
24	622	6.0	1	16	20	8	360	2.7	.5	132	14			24
25	623		2	60	36	16	2100	4.2	1.0	172	28			25
26	624		1	24	18	10	120	2.6	.5	64	14			26
27	625		1	32	32	14	480	3.4	.5	112	20			27
28	626	5.8	1	20	18	10	280	3.0	.5	118	18			28
29	627		1	16	16	8	160	3.4	.5	84	16			29
30	628		1	12	18	8	280	2.5	.5	120	14			30
31	629		1	36	34	34	2640	5.1	1.0	276	32			31
32	630	5.9	1	76	24	8	280	2.6	.5	88	12			32
33	631		2	24	32	14	360	3.5	.5	134	12			33
34	632		28	156	24	16	200	5.9	1.0	120	48			34
35	633		2	54	28	16	330	3.9	.5	112	16			35
36	634	6.6	2	64	48	24	2400	10.0	1.0	500	38			36
37	635		1	12	22	8	760	2.4	.5	68	14			37
38	636		1	24	32	12	720	3.1	.5	100	18			38
39	PICC5637		1	20	28	12	280	3.3	.1	92	18			39
40	1		1	152	14	18	880	3.3	.1	2	16			40

COMMENT:

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5/71 TYPE SAMPLES

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G. Leary DISPOSITION OF REJECTS Save

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CC5637	6.3	1	28	22	16	380	3.4	.5	84	12			01
02	639		1	16	18	12	280	2.3	.5	76	8			02
03	640		1	16	24	14	240	2.4	.5	80	10			03
04	641		1	20	22	14	600	2.8	.5	104	12			04
05	690	6.4	1	20	20	14	280	2.6	.5	82	16			05
06	691		1	8	10	8	240	2.1	.5	68	12			06
07	692		1	24	24	16	240	3.2	.5	98	16			07
08	693		1	16	20	14	320	2.9	.5	90	12			08
09	694	6.0	1	12	16	14	320	3.0	.5	148	18			09
10	695		1	12	16	14	300	3.0	.5	152	16			10
11	696		1	12	12	10	120	2.4	.5	102	10			11
12	697		1	12	14	12	120	2.4	.5	110	12			12
13	698	5.8	1	16	14	13	400	3.0	.5	112	14			13
14	699		1	16	16	14	360	2.9	.5	86	16			14
15	700		1	16	18	16	280	2.8	.5	160	12			15
16	701		1	292	28	32	1760	4.0	.5	172	22			16
17	71CC5702	6.0	1	32	20	20	790	3.2	.5	108	16			17
18	71CC5520		1	16	16	16	490	2.9	.5	238	18			18
19	MG-1		1	126	26	20	840	2.9	.5	10	14			19
20														20
21														21
22														22
23														23
24														24
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COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE Aug. 5/71 TYPE SAMPLES

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G Leary DISPOSITION OF REJECTS Save

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	%Fe	Ag	Zn	Pb			No.
01	71 CCS 560		1	16	14	16	200	2.5	.5	60	6			01
02	561		1	20	14	14	360	2.8	.5	88	12			02
03	562		1	12	12	12	280	2.3	.5	64	12			03
04	563	6.0	1	16	16	14	440	2.8	.5	84	14			04
05	564		1	20	16	16	320	3.5	.5	110	16			05
06	565		1	16	16	14	260	2.7	.5	80	14			06
07	566		1	16	10	18	400	3.9	.5	236	32			07
08	567	6.3	1	10	8	14	800	2.5	.5	152	16			08
09	568		1	12	4	12	200	2.5	.5	104	16			09
10	569		1	284	24	16	480	3.5	1.0	80	24			10
11	570		1	32	14	17	1880	2.6	.5	112	20			11
12	571	5.5	1	20	18	12	320	3.6	.5	90	16			12
13	572		1	24	14	12	220	3.5	.5	100	16			13
14	573		1	16	12	12	340	3.0	.5	126	16			14
15	574	5.4	1	20	12	20	1400	3.5	.5	328	20			15
16	575		1	24	16	14	350	3.2	.5	136	16			16
17	576		1	20	14	14	280	2.9	.5	96	16			17
18	577		1	18	16	14	360	2.6	.5	78	16			18
19	578	5.3	1	20	14	12	270	2.3	.5	70	12			19
20	579		1	18	12	12	240	1.7	.5	58	12			20
21	580		1	16	12	12	160	2.1	.5	48	16			21
22	581		1	24	22	16	480	3.2	.5	98	22			22
23	582	6.0	1	12	14	12	280	2.2	.5	92	14			23
24	583		1	18	14	12	240	2.5	.5	80	16			24
25	584		1	12	10	11	180	2.1	.5	76	14			25
26	585		1	12	8	12	200	2.6	.5	72	12			26
27	586	6.8	1	20	20	16	440	3.3	.5	84	16			27
28	587		1	16	14	12	200	2.3	.5	62	12			28
29	588		1	12	12	10	200	2.1	.5	72	12			29
30	589		1	12	16	11	200	2.1	.5	72	12			30
31	590	5.8	1	16	14	13	180	2.6	.5	86	12			31
32	591		1	12	12	11	160	1.8	.5	74	12			32
33	592		1	8	8	8	200	2.1	.5	62	18			33
34	593		1	24	26	16	440	2.8	.5	118	18			34
35	594	6.2	1	26	12	16	600	2.1	.5	92	18			35
36	595		1	12	8	12	120	2.0	.5	78	12			36
37	596		2	36	34	20	1200	3.2	.5	118	20			37
38	597		1	24	18	12	240	2.4	.5	90	14			38
39	71 CCS 598	5.9	1	32	16	16	240	2.9	.5	150	16			39
40	R.A-1		1	134	34	22	840	3.7	.5	114	41			40

COMMENT:

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DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 4, 1971 TYPE SAMPLES soils

PROJECT 338 LOCATION CBC

REQUESTED BY Q. LEARY DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb	Mn		No.
01	71CCS-642	5.8	1	12	16	18	16	1.9	.5	56	12	200		01
02	643		1	12	16	16	1	1.7	.5	80	12	240		02
03	644		1	24	24	30	1	3.4	.5	132	16	1160		03
04	646		1	22	27	27		2.9	.5	700	14	680		04
05	647	5.0	1	16	24	22		2.9	.5	112	12	220		05
06	648		1	16	22	21		2.7	.5	92	16	240		06
07	649		1	8	14	16		2.1	.5	124	10	240		07
08	650		1	14	20	18		2.4	.5	88	8	200		08
09	651	5.3	1	8	14	16		2.1	.5	80	8	200		09
10	652		1	34	40	48		4.5	.5	228	16	680		10
11	653		1	18	20	32		3.5	.5	400	16	840		11
12	654		1	12	16	19		2.7	.5	96	8	180		12
13	655	6.0	2	132	64	40		4.7	3.0	752	16	1120	✓	13
14	656		1	28	26	25		2.5	.5	152	12	540	✓	14
15	657		1	56	24	20		1.9	.5	96	8	360	✓	15
16	658		1	16	20	20		2.4	.5	80	16	280		16
17	659	6.7	1	16	24	22		2.5	.5	100	4	280		17
18	660		1	12	16	16		1.8	.5	84	6	160		18
19	661		1	12	20	20		2.0	.5	76	8	240		19
20	662		1	12	24	22		2.4	.5	92	12	200		20
21	663	5.2	2	24	29	30		3.6	.5	136	8	480		21
22	664		2	16	24	28		2.8	.5	220	12	640		22
23	665		1	9	18	22		2.7	.5	112	16	480		23
24	666		1	16	26	24		2.8	.5	144	16	720		24
25	667	5.9	1	16	24	20		3.1	.5	116	10	360		25
26	668		1	32	28	32		3.4	.5	184	20	2040		26
27	669		1	38	26	29		3.5	.5	204	60	680		27
28	670		1	22	24	24		2.8	.5	700	16	480		28
29	671	7.0	1	32	28	24		3.2	.5	120	20	720		29
30	672		1	12	18	16		2.1	.5	64	10	200		30
31	673		1	14	24	22		3.0	.5	116	12	680		31
32	674		1	14	20	24		2.9	.5	208	16	1060		32
33	675	5.6	1	24	28	28		3.3	.5	208	16	400		33
34	676		1	16	22	20		2.3	.5	92	12	420		34
35	677		1	56	28	27		3.2	1.0	108	20	960		35
36	678	6.1	2	60	44	41		4.5	1.0	352	24	2080	✓	36
37	679		1	20	22	20		3.0	.5	88	12	320		37
38	680		1	48	32	32		3.7	.5	136	20	1540		38
39	681		1	14	22	24		3.0	.5	104	16	1360		39
40	D-1		60	120	24	24	368	3.5	1.5	44				40

COMMENT:

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 4, 1971 TYPE SAMPLES Soil

PROJECT 338 LOCATION C.B.C

REQUESTED BY G Leary DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb	Mn		No.
01	71CCS-682		1	12	12	12	1[illegible]0	2.4	.5	80	12	200		01
02	683	5.9	1	22	20	16	[illegible]0	2.5	.5	80	14	840		02
03	684		1	12	16	15	[illegible]0	2.3	.5	88	12	280		03
04	685		1	12	16	12	[illegible]0	2.0	.5	100	12	300		04
05	686		1	21	24	25	[illegible]0	4.0	.5	120	16	280		05
06	687	6.4	2	110	56	40	1[illegible]0	5.7	2.0	208	32	1400		06
07	688		1	18	24	16	[illegible]0	2.7	.5	76	12	320		07
08	71CCS-689		2	40	36	30	900	4.0	1.0	172	20	1280		08
09														09
10														10
11														11
12														12
13														13
14														14
15														15
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COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE JAN 11, 1972 TYPE SAMPLES SOILS.

PROJECT LOCATION

REQUESTED BY G. LEARY. DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb.			No.
01	71 CCS 1275	5.6	1	12	12	14	320	2.9	0.5	144	17			01
02	1276		1	136	44	46	2360	5.8	2.0	430	40			02
03	1277		1	26	20	20	220	2.7	.5	76	16			03
04	1278		1	76	20	16	240	2.8	.5	80	15			04
05	1279	5.2	1	20	16	16	240	3.0	.5	100	13			05
06	1280		1	24	20	20	240	3.4	.5	110	18			06
07	1281		1	36	20	20	440	3.2	.5	104	17			07
08	1282		1	24	16	20	360	3.5	.5	108	18			08
09	1283	5.5	1	12	16	14	200	2.6	.5	96	12			09
10	1284		1	8	16	12	130	2.3	.5	78	14			10
11	1285		1	8	14	18	1000	2.2	.5	88	12			11
12	1286		1	20	16	14	280	2.6	.5	82	11			12
13	1287	5.6	1	28	22	16	360	2.8	.5	100	13			13
14	1288		1	68	28	24	600	3.7	.5	180	16			14
15	1289		1	26	24	16	300	3.1	.5	96	13			15
16	1290		1	16	26	20	760	3.5	.5	132	18			16
17	1291	5.2	1	24	20	16	400	2.9	.5	84	14			17
18	1292		1	16	20	18	320	2.8	.5	84	12			18
19	1293		1	142	40	24	1890	2.9	1.5	184	19			19
20	1294		1	72	20	16	200	3.0	.5	116	12			20
21	1295	5.5	1	20	24	20	360	4.0	.5	180	18			21
22	1296		1	24	30	24	260	4.0	.5	164	18			22
23	1297		1	16	14	12	120	2.7	.5	72	14		✓	23
24	1298		1	28	8	6	120	0.3	.5	16	9			24
25	1299	6.0	1	92	48	34	1160	4.9	2.0	188	28			25
26	1300		1	16	20	20	250	2.7	.5	88	14			26
27	1301		1	12	20	16	180	2.7	.5	92	12			27
28	1302		1	24	20	20	400	3.1	.5	108	13			28
29	1303	5.8	1	28	16	16	240	2.7	.5	88	12			29
30	1304		1	24	20	20	240	2.5	.5	100	12			30
31	1305		1	56	24	20	240	3.0	.5	68	15			31
32	1306		1	48	20	16	210	2.7	.5	72	13			32
33	1307	5.6	1	36	24	16	200	2.6	.5	84	12			33
34	1308		1	76	26	24	240	3.3	.5	136	15			34
35	1309		1	16	20	16	340	2.7	.5	92	13			35
36	1310		1	16	24	16	240	2.7	.5	72	16			36
37	1311	5.3	1	16	20	18	270	3.0	.5	68	16			37
38	1312		1	20	26	16	160	2.6	.5	76	14			38
39	71 CCS 1313		1	8	16	16	160	2.5	.5	64	14			39
40	G-1		6	40	16	14	160	2.6	.5	104	24			40

COMMENT:

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ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE JAN. 11, 1972 TYPE SAMPLES SOILS.

PROJECT LOCATION

REQUESTED BY G. Leary DISPOSITION OF REJECTS

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71 CCS 1315		1	20	16	16	280	2.6	0.10	84	15			01
02	1316	5.3	1	12	16	16	360	2.5	.5	76	14			02
03	1317		1	18	20	20	290	2.9	.5	84	13			03
04	1318		2	44	24	24	640	3.4	1.0	106	18			04
05	1319		1	36	20	24	660	3.6	.5	76	18			05
06	1320	6.1	1	36	16	24	370	3.1	.5	132	19			06
07	1321		1	28	20	16	400	2.8	.5	70	16			07
08	1322		1	20	16	20	480	3.4	.5	128	18			08
09	1323		1	26	24	18	360	3.2	.5	92	16			09
10	1324	6.3	1	14	20	16	240	2.8	.5	76	13			10
11	1325		1	12	20	16	360	2.6	.5	108	14			11
12	1326		1	24	24	20	360	3.1	.5	76	16			12
13	1327		1	14	20	16	220	3.2	.5	108	17			13
14	1328	6.3	1	14	20	16	440	2.7	.5	100	16			14
15	1329		1	18	20	20	510	3.0	.5	116	17			15
16	1330		1	12	16	12	220	2.1	.5	76	14			16
17	1331		4	40	20	18	440	3.1	.5	68	18			17
18	71 CCS 1332	5.8	4	58	46	32	1760	3.8	1.5	228	24			18
19			6	40	16	16	240	2.6	.5	112	24			19
20														20
21														21
22														22
23														23
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COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 5, 1971 TYPE SAMPLES Soils

PROJECT 338 LOCATION Central B.C.

REQUESTED BY G Geary DISPOSITION OF REJECTS SAVE

No.	Sample	pH	Mo	Cu	Ni	Co	Mn	Fe%	Ag	Zn	Pb			No.
01	71CLS-476		1	12	14	16	340	2.6	.1	68	24			01
02	477		1	12	18	18	300	3.3	.1	104	26			02
03	478	6.4	1	16	20	16	440	2.7	.1	100	19			03
04	479		1	10	14	16	580	2.4	.1	164	18			04
05	480		1	14	22	16	300	3.1	.1	96	20			05
06	481		1	14	18	16	260	2.7	.1	136	16			06
07	482	6.2	1	28	30	24	500	3.1	.1	96	26			07
08	483		1	20	24	24	2120	3.5	.1	92	24			08
09	485		1	16	24	22	400	3.9	1.0	160	20			09
10	486		1	12	18	18	360	3.5	.1	172	22			10
11	487	6.0	1	14	16	20	700	3.2	.1	176	24			11
12	488		1	15	16	14	400	2.5	.1	88	18			12
13	489		1	24	16	23	460	4.0	.1	164	28			13
14	490		1	14	16	14	240	2.3	.1	56	16			14
15	491	5.9	1	24	24	20	260	3.2	.1	76	22			15
16	492		1	22	26	21	240	3.1	.1	80	20			16
17	493		1	20	20	14	240	2.3	.1	108	20			17
18	494		1	8	15	16	260	3.1	.1	74	22			18
19	495	5.8	1	10	16	16	260	2.8	.1	120	20			19
20	496		1	66	24	21	460	3.4	1.0	78	22			20
21	497		1	24	28	20	600	3.0	.1	122	20			21
22	498		1	48	30	24	780	4.0	1.0	112	28			22
23	499	5.9	1	18	14	16	320	3.8	.1	88	18			23
24	500		1	32	26	20	320	3.7	.1	106	22			24
25	501		1	26	16	12	260	2.5	.1	62	16			25
26	1CLS-502		1	22	20	14	360	2.8	.1	80	20			26
27	CLT-504		1	x1800	22	16	760	3.4	.1	108	22			27
28	71CLL 435		1	24	24	22	520	3.0	.1	74	32			28
29	0.1 ?		20.0	26	16	16	410	2.6	-	66	16			29
30														30
31														31
32														32
33														33
34														34
35														35
36														36
37														37
38														38
39														39
40														40

COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

AMAX EXPLORATION INC. ANALYTICAL REPORT

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

DATE August 12, 1971 TYPE SAMPLES rock chip

PROJECT 338 LOCATION C.B.C

REQUESTED BY G. Leary DISPOSITION OF REJECTS discard.

No.	Sample	~~Au~~	Mo ✓	Cu ✓	Ni ✓	Co	Mn	Fe%	Ag	Zn	Pb.			No.
01	71CLT-503		1	26	12	14	480	3.4	-5	60	16			01
02	505		1	116	20	14	340	3.8	-5	56	12			02
03	508		2	105	16	14	200	2.9	-5	44	10			03
04	71CLT-510		1	^260	12	16	300	2.5	-5	40	16			04
05														05
06														06
07														07
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37														37
38														38
39														39
40														40

COMMENT:

DATE SAMPLES RECEIVED

DATE REPORTS MAILED

ANALYST

126°20'

54°45'

TRUE NORTH
27°
MAGNETIC NORTH

EXPLANATION

SYMBOLS

- Claim boundary line
- Claim location line and claim post
- Road
- Trench
- Stream, intermittent stream
- Swamp
- ⊗ 7ICLT-503 1,26,60 — Rock chip sample site, sample number, ppm Mo, Cu, Zn
- ○ 7ICRS-174 0,12,108 — Soil sample site, sample number, ppm Mo, Cu, Zn
- △ 7ICRW-172 0,0,10 — Water sample site, sample number, ppb Mo, Cu, Zn
- □ 7ICRL-173 1,12,96 — Silt sample site, sample number, ppm Mo, Cu, Zn

Samplers: C – T. Cooper
R – R.E.W. Lett
L – G.M. Leary
M – D. MacIntyre

DISTRIBUTION OF METAL CONTENT IN GEOCHEMICAL SAMPLES

	Mo	Cu	Zn	
WATERS (ppb)				
△	0-1	0	0-10	Background
▲	2-10	Any Detectable Amount	11-20	Positive
▲	>10		>20	Anomalous
SOILS and SILTS (ppm)	Mo	Cu	Zn	
○ □	0-1	0-30	0-130	Background
○ □	2-10	31-70	131-230	Positive
● ■	>10	>70	>230	Anomalous

AMAX POTASH LIMITED

LENNAC LAKE COPPER PROPERTY
THEZAR CLAIM GROUP
OMINECA MINING DIVISION — BRITISH COLUMBIA

PROPERTY GEOCHEMICAL MAP
MOLYBDENUM

1000' 0 1000' 2000'

DATE REVISED		DATE PLOTTED		Drawn by: A.L.M.
				DATE: 22/1/72
				N.T.S. FILE 93-L-16

FIG. 5a

To accompany report: "LENNAC LAKE COPPER PROPERTY" by G.M. Leary and J.F. Allan

126°20'

54°45'

Float consists entirely of glacially transported Hazelton Volcanic Rocks

WEST ZONE

EAST ZONE

AMAX ACCESS ROAD

Lake

Paul Lake

Lennac Lake

Cong.

Arg.

TRUE NORTH

MAGNETIC NORTH

27°

EXPLANATION

EARLY TERTIARY (?)

HORNBLENDE–BIOTITE FELDSPAR QUARTZ PORPHYRIES

- 7c — *Barren Dykes*
- 7b — *Pyritic Dykes*
- 7a — *Chalcopyrite Mineralized Bodies (Dykes?)*

MIDDLE (?) JURASSIC

HAZELTON GROUP

- 6a | 6b — *Intrusive–Extrusive Complex*
  6a – Porphyritic basalt
  6b – Mixed (commonly bedded) porphyritic basalt, microdiorite and andesitic flows and breccias
- 5 — *Undifferentiated Volcanic and Minor Sedimentary Rocks (Arg.–argillite; Cong–conglomerate)*
- 4 △ — *Rhyolite Breccia*
- 3 — *Grey–Green Volcanic Unit (Feldspathic massive tuff breccias and flows)*
  3a – Porphyritic rhyolite flows
- 2 — *Red–Purple Volcanic Unit (Tuff–breccias; agglomerate; minor flows)*

UPPER TRIASSIC (?)

TAKLA (?) GROUP

- 1 — *Chert Breccia; minor dacitic to andesitic flows*

SYMBOLS

- *Bedding attitude (vertical, inclined)*
- *Jointing attitude (vertical, inclined)*
- *Foliation attitude (vertical, inclined)*
- *Chalcopyrite mineralized quartz vein set*
- *Geological contact (defined and approximate; inferred and assumed)*
- *Outcrop*
- x — *Angular float (probably near outcrop)*
- 71CLT-507 — *Channel and bulk sample site (sample number)*
- *Outline of pyrite – propylitic zone*
- *Outline of intensely bleached zone in east mineralized zone*
- *Outline of chalcopyrite mineralized zone (i.e. East Zone and West Zone)*
- *Claim location line and claim post*
- *Road*
- *Trench*
- *Stream, intermittent stream*
- *Swamp*

ASSAY RESULTS
(Channel and Bulk Samples)

Sample No.	Length (type)	% Cu	% MoS	oz Ag
71CLT–506	2' (channel)	.16	.002	.04
71CLT–507	3' "	.09	.001	.02
71CLT–509	4' "	.18	.004	.04
71CLT–788	15' (bulk)	.12	.003	<.04
71CLT–789	25' "	.06	.001	<.04
71CLT–790	12.5' "	.08	<.001	<.04
71CLT–791	25' "	.04	<.001	<.04
71CLT–792	17.5' "	.08	<.001	<.04
71CLT–793	25' "	.06	<.001	<.04
71CLT–794	20' "	.26	.001	.04

AMAX POTASH LIMITED

LENNAC LAKE COPPER PROPERTY
THEZAR CLAIM GROUP
OMINECA MINING DIVISION — BRITISH COLUMBIA

PROPERTY GEOLOGICAL MAP

1000' 0' 1000' 2000'

DATE REVISED	DATE PRINTED	
	17/1/72	Drawn by: A.L.M
		DATE 14/11/72
		N.T.S File 93–L–16

FIG. 4

To accompany report: LENNAC LAKE COPPER PROPERTY by G.M Leary and J.F Allan

126°20'

54°45'

TRUE NORTH
27°
MAGNETIC NORTH

EXPLANATION

SYMBOLS

- Claim boundary line
- Claim location line and claim post
- Road
- Trench
- Stream, intermittent stream
- Swamp
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Samplers: C – T. Cooper
R – R.E.W. Lett
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DISTRIBUTION OF METAL CONTENT IN GEOCHEMICAL SAMPLES

	Mo	Cu	Zn	
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▲	>10		>20	Anomalous
SOILS and SILTS (ppm)	Mo	Cu	Zn	
○ □	0–1	0–30	0–130	Background
● ■	2–10	31–70	131–230	Positive
● ■	>10	>70	>230	Anomalous

AMAX ACCESS ROAD

Lennac Lake

Paul Lake

AMAX POTASH LIMITED

LENNAC LAKE COPPER PROPERTY
THEZAR CLAIM GROUP
OMINECA MINING DIVISION — BRITISH COLUMBIA

PROPERTY GEOCHEMICAL MAP
ZINC

1000' 0 1000' 2000'

DATE RECEIVED		Drawn by: A. L. M.	
	DATE PRINTED	DATE: 22/1/72	FIG. 5c
		N.T.S. FILE 93–L–16	

To accompany report "LENNAC LAKE COPPER PROPERTY" by G.M. Leary and J.F. Allen