1981 Geological and Geochemical

Assessment Report

TITLE	Mount Cook Property
CLAIMS	Grew 1-28
COMMODITY	Pb-Zn
LOCATED	25.6 km west southwest of Ross River, Y.T. Whitehorse Mining District Latitude 61°56'N Longitude 132°55'W 105 F/15
BY	F.R. Harris
FOR	AMAX of Canada Limited
Work Period	July 11-30, 1981

090883

AMAX VANCOUVER OFFICE

This report has been examined by the Geological Evaluation Unit under Section 53 (4) Yukon Quartz Mining Act and is allowed as representation work in the amount of $ 7,225.00 .

Ruth Debicki

Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

Table of Contents

SUMMARY----------1

INTRODUCTION
- Claims Data----------2
- Previous Work----------2

1981 PROGRAM----------3

REGIONAL GEOLOGY----------4

PROPERTY GEOLOGY
- Volcanic Rocks----------5
- Sedimentary Rocks----------5
- Intrusive Rocks----------6
- Structure----------6

MINERALIZATION----------7

GEOCHEMISTRY
- Copper----------8
- Zinc----------8
- Lead----------8
- Silver----------9

Appendices

Appendix I - Statement of Costs - not microfilmed

II - Statement of Qualifications

III- Geochemical Methods

Illustrations

Figure 1	Location Map 1:250,000	after page 2
Figure 2	Claim Map 1:50,000	after page 2
Figure 3	Geological Map 1:5,000	In Pocket
Figure 4	Geochemical Map 1:5,000	In Pocket

SUMMARY

The Mount Cook property consists of 28 contiguous Grew claims in the St. Cyr Range of the Pelly Mountains, 25.6 kilometres southwest of Ross River, Y.T.

The property is located on the southern margin of the Selwyn Basin and is underlain by Upper Devonian to Mississippian argillaceous sedimentary rocks and felsic volcanic rocks. Two small cretaceous biotite quartz monzonite plugs intrude the volcanic and sedimentary strata.

Mineralization is restricted to:

1) a narrow sphalerite shear zone in the volcanic unit,
2) disseminated pyrrhotite with a trace of chalcopyrite in the volcanic unit and;
3) minor molybdenite associated with one of the quartz monzonite plugs.

Soil anomalous in Cu, Pb, Zn and Ag mainly overlie the volcanics and shales just north of the volcanic unit.

INTRODUCTION

The Grew claims are located 25.6 kilometres west southwest of Ross River in the St. Cyr range of the Pelly Mountains, Y.T. (Figure 1).

The claims extend east southeast along a ridge (Figure 2) that includes Mount Cook (2,004 metres). Relief in the area is 600 metres. The area is mainly above treeline except for some of the lower valleys. Access is by helicopter from Ross River, Y.T.

From July 11 to July 30, 1981 a geologist and assistant carried out mapping and soil sampling on the claims. From July 25 to 30, 1981 a second geologist assisted in the geological mapping of the claims.

Results are plotted on a 1:5,000 scale base map (Figures 3 and 4).

Claims Data

A list of the 28 Grew claims with grant numbers and anniversary dates is presented in Table I.

Claim Name	Record Number	Expiry Date
Grew 1-25	YA18310-YA18334	June 20, 1982
Grew 26-28	YA48243-YA48245	Sept. 17, 1981

Previous Work

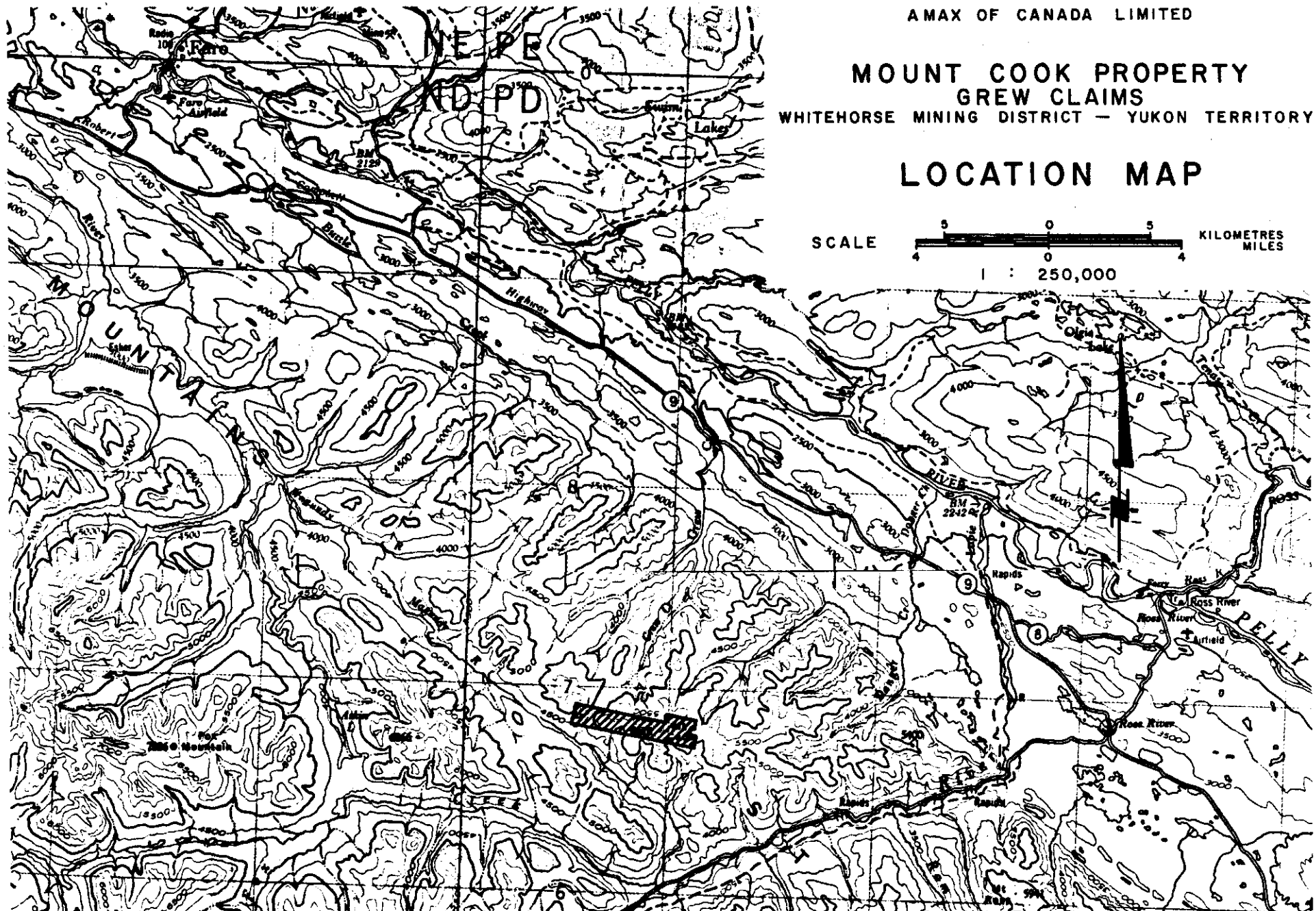
The property was first staked in 1966 by Atlas Exploration who conducted bulldozer trenching. The Grew claims were staked by AMAX in 1977 and were explored with mapping, geochemical and EM surveys in 1977 and 1978.

AMAX OF CANADA LIMITED

MOUNT COOK PROPERTY
GREW CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

LOCATION MAP

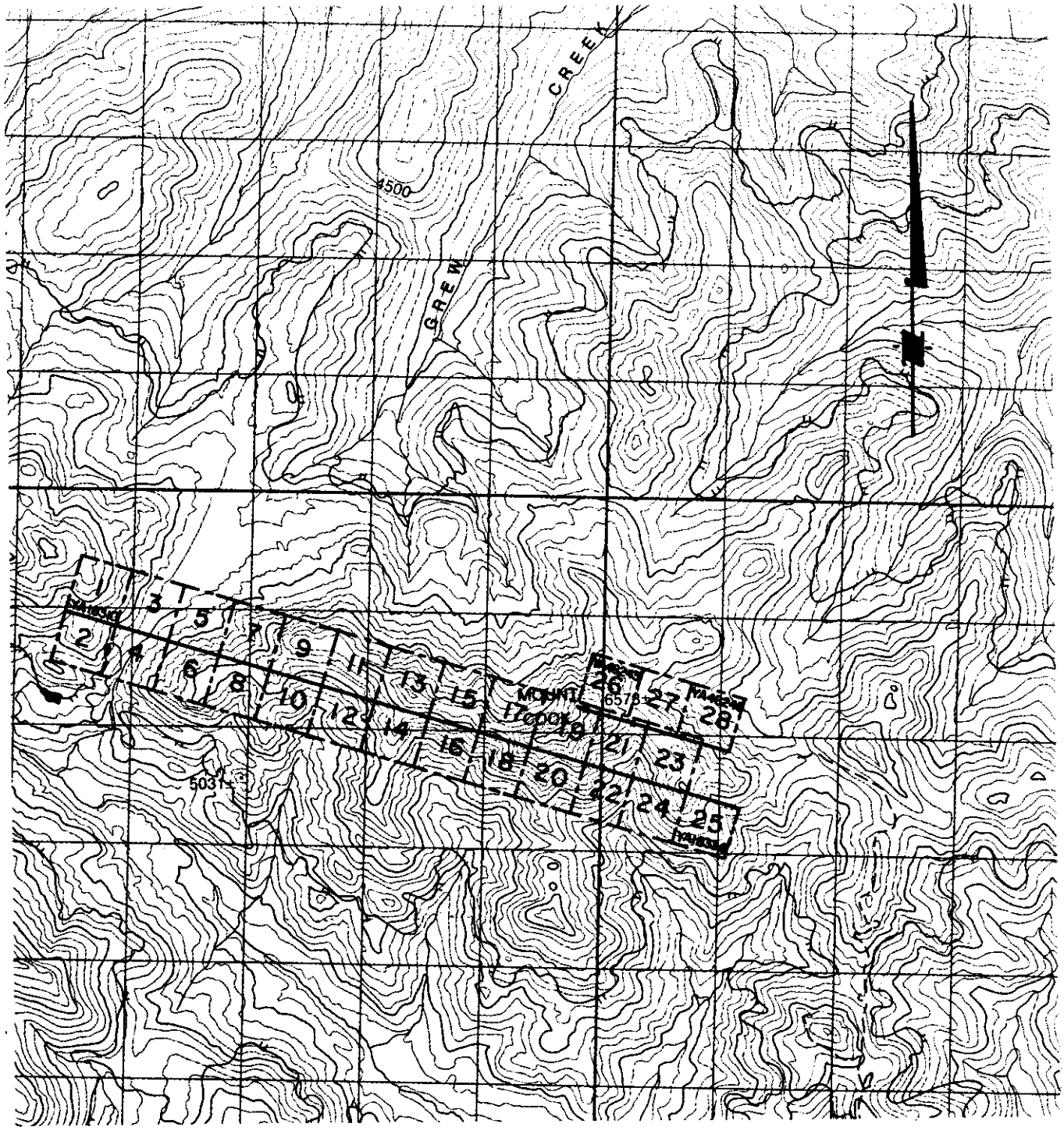
SCALE 5 0 5 KILOMETRES
4 0 4 MILES
1 : 250,000



oct 27/81 Fred T. Harris

N. T. S. Ref. 105 F 15

FIG. 1



AMAX OF CANADA LIMITED

MOUNT COOK PROPERTY

GREW CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

CLAIM MAP

SCALE 1000 0 1000 METRES
4000 0 4000 FEET

1 : 50,000

N. T. S. Ref. 105 F 15

Oct 27/81 Fred K. Harris FIG. 2

1981 PROGRAM

From July 11 to July 30, 1981 the Grew claims were geologically mapped on a scale of 1:5,000 and 370 soil samples were collected and analysed for copper, lead, zinc and silver.

REGIONAL GEOLOGY

The property lies within a transition zone between the Pelly-Cassiar carbonate platform to the southwest and the Selwyn Basin to the northeast.

The northwest trending strata include Upper Cambrian to Triasic fine-grained clastics and carbonate sediments with minor volcanic rocks both of which are cut by small stocks of quartz monzonite. The northwest striking Tintina fault occurs 9.5 kilometres to the northeast and the parallel St. Cyr fault is located two kilometres southwest (Open File Report 486).

PROPERTY GEOLOGY

The property is underlain by a series of volcanic rocks (Unit 1), fine-grained clastic sedimentary rocks, carbonate and barite (Unit 2) which have been intruded by small bodies of diorite (Unit 3) and quartz monzonite (Unit 4).

Volcanic Rocks (Unit 1)

The volcanic unit is up to 700 metres thick at the eastern edge of the property and narrows to two 50 metre bands at the western side of the property. Felsic to intermediate volcanic rocks are predominantly felsic pyroclastics ranging from breccia to tuff with minor amounts of viscicular and porphyritic flows.

The pyroclastic phase contains from two to ten percent pyrrhotite and a trace of chalcopyrite which imparts a strong rust colour. The coarsest pyroclastics are east of Mount Cook where clasts are up to four centimetres across. Pyroclastics become finer grained to the west where tuff predominates. Volcanic flow rocks occur in a 1.5 kilometre long lens on the south side of the volcanic unit. Centre of the flows is just south of Mount Cook. The flows contains only a trace amount of pyrite. Crude vascicular (calcite filled) pillow structures occur 500 metres south of Mount Cook. The volcanic unit is assigned an Upper Devonian to Mississippian age by Templeman-Kluit (Open File Report 486).

Sedimentary Rocks (Unit 2)

Fine grained clastic sedimentary rocks occur north and south of the volcanic unit and include black shale, phyllite, chloritic slate, siltstone and greywacke. Barite

and chert just south of the volcanic unit is one of the few horizons which could be traced along strike. The sediments are metamorphosed to phyllites and slates which obliterates primary sedimentary features. Limestone, calarinite and chrinoidal limestone form a distinct 500 metre wide band extending across the northern portion of the map area.

Intrusive Rocks (Unit 3 and 4)

A small sill of medium grained diorite is located 1.3 kilometres north of Mount Cook. Two small plugs of quartz monzonite 600 and 200 metres across intrude the sedimentary volcanic sequence near Mount Cook.

Structure

Bedded rocks have been strongly compressed in a northeast southwest direction resulting in open to isoclinal folds, slatey cleavage and penetrative foliation. Steeply dipping northerly striking folds near the centre of the claim group disrupt the barite beds and volcanic unit.

MINERALIZATION

The only base metal mineralization located on the claims is a one to three centimetre wide shear zone containing black sphalerite on a hill at the northwest corner of Grew 25.

The pyroclastic portion of the volcanic unit contains from two to ten percent disseminated pyrrhotite and a trace amount of disseminated chalcopyrite.

The small quartz monzonite stock 1.1 kilometres west of Mount Cook is associated with a small quartz veins stockwork which contains a minor amount of molybdenite.

GEOCHEMISTRY

370 soil samples were collected from the B-soil horizon or talus fines. The samples were taken at 50 metre intervals along lines approximately 200 metres apart. Control was maintained with the aid of a hip chain and compass. All samples were analysed for copper, lead, zinc and silver. Background weakly anomalous, moderately anomalous and strongly anomalous values in parts per million for each of the four elements are listed below.

Element	Background	Weakly Anomalous	Moderately Anomalous	Strongly Anomalous
Cu	0-99	100-199	200-299	300+
Pb	0-39	40-99	100-299	300+
Zn	0-249	250-499	500-999	1,000+
Ag	0-0.9	1.0-1.9	2.0-2.9	3.0+

Copper

Anomalous values of copper from 100 to 8,400 correlate with the sulphide rich portion of the volcanic unit which contains a trace of chalcopyrite.

Zinc

Anomalous values of zinc are mainly concentrated in two areas. Values from 250 to 11,800 ppm Zn are located over black shale just north of the volcanic unit 600 metres northeast of Mount Cook. The second area which contains values from 250 to 15,000 ppm Zn is mainly within volcanic breccia 1.1 kilometres east of Mount Cook.

Lead

Soils anomalous and lead are located in two areas.

The largest area (1.0 by 1.5 kilometres) extends east of Mount Cook and contains values from 40 to 2,380 ppm lead. The anomalous area overlies the volcanic unit and black shales to the north. A second area 1.7 kilometres west of Mount Cook contains values from 40 to 1,240 ppm lead. These anomalous values also overlie the volcanic unit and shale to the north.

Silver

Five silver anomalies are located in: Grew 6, Grew 11 and 13, Grew 15 and 16, Grew 23, 24 and 25, and Grew 26. The latter two anomalies contain the highest values. The Grew 23, 24 and 25 anomaly contains values from 1.0 to 7.6 ppm silver and is underlain by volcanic breccia. The Grew 26 anomaly contains values from 1.2 to 7.2 ppm and is underlain by black shale.

Oct 27/81
Date

Fred R. Harris
F.R. Harris

APPENDIX I

STATMENT OF COSTS

STATEMENT OF COSTS

Geological and Geochemical Survey - July 10 - 31, 1981

Personnel Employed -

S.R. Noble-121 McNicoll Avenue, Willowdale, Ontario M.Sc. Senior Assistant; 22 days @ $69.04/day	$1,518.00
A.L. Hogg-41 Maple Avenue, Toronto, Ontario Junior Assistant; 22 days @ $49.31/day	1,084.82
F.R. Harris-601-535 Thurlow Street, Vancouver, B.C. Geologist; 7 days @ $192.00/day	1,344.00
Helicopter - Jet Ranger 1.9 hrs. @ 491.58 incl. fuel Trans North Turbo Air - Whitehorse Inv.#56280, #54833, #54835, #54866	1,424.58
Room and Board - 51 days @ $20/day	1,020.00
Geochemical Analyses - 380 samples Rossbacher Laboratory Inv.#1383	1,399.60
Report Preparation and Drafting -	450
	8,240.18

TNT

TRANS NORTH TURBO AIR LTD.
BOX 4338 WHITEHORSE YUKON Y1
TELEPHONE (403)668 2177 · TELEX · 8 290

ACCOUNT NUMBER	1 60
	54833
INVOICE DATE	21 07 81
A/C TYPE	206 B
AIRCRAFT REGISTRATION	FDJC
FLIGHT DATE (DAY / MONTH / YEAR)	11 07 81
PURCHASE ORDER NO.	

Amax Exploration
CHARTERER

BILLING ADDRESS

FUEL & OILS TNTA / CUST	TNTA FUEL USED	GALS.	FROM
✓	IPA	1.0	RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
FROM YRR				
TO Move Camp to				
Mt. Cook 1071		1.0	3	
		1071	26840	491.58
		K 2 1 8 1 0 AUG 21 1981		

SUB	G.L.	AMOUNT	
6065	0120	450	00
6065	1110	41	58

	1.0	450.00	450.00
WAITING TIME		/HR.	
FUEL	22	1.89 /GAL.	41.58
FUEL		/GAL.	
MEALS & LODGING			
OTHER			
OTHER			
TOTAL		$	491.58

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS

X Stephen Noble
CHARTERER'S SIGNATURE

JOW
INITIALS
PILOT'S SIGNATURE
CO-PILOT'S NAME

ENGINEER'S NAME
WKF Bill Greer
FLIGHT ATTENDANT

Listed pd

TRANS NORTH TURBO AIR LTD.
BOX 4338 WHITEHORSE YUKON Y1A
TELEPHONE (403)668 2177 • TELEX 036-8-290

ACCOUNT NUMBER			/	6	0

54833

Amax Exploration
CHARTERER

BILLING ADDRESS

INVOICE DATE		
21	07	81

A. C. TYPE	AIRCRAFT REGISTRATION
206 B	HD...

FLIGHT DATE	DAY	MONTH	YEAR
	11	07	81

PURCHASE ORDER NO.

FUEL & OIL TNTA	CUST	TNTA FUEL USED	GALS.	FROM
✓		ITA	7.0	RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
FROM YRR				
TO Move Camp to				
Mt. Cook 1071		1.0	3	
		1071	8640	491.58
		K 2	1	8 1 0 AUG 21 1981

SUB	G.L.	AMOUNT
6065	10120	450.00
6065	1110	41.58

	1.0	450.00	450.00
WAITING TIME		/HR.	
FUEL:	22	1.89 /GAL.	41.58
FUEL:		/GAL.	
MEALS & LODGING			
OTHER			
OTHER			
TOTAL		$	491.58

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS

X Stephen Noble
CHARTERER'S SIGNATURE

JDW [signature]
INITIALS PILOT'S SIGNATURE

CO-PILOT'S NAME

WKG ENGINEER'S NAME Bill Greer

FLIGHT ATTENDANT

Listed

TRANS NORTH TURBO AIR LTD.
BOX 4338 WHITEHORSE, YUKON Y1
TELEPHONE (403)668-2177 · TELE. 68-290

ACCOUNT NUMBER			1	6	0

54835

INVOICE DATE: 21 07 81

CHARTERER: Amax Exploration

BILLING ADDRESS: 535 Thurlow Suite 606, Vancouver — #222-204 Lambert, Whitehorse

A/C TYPE: 206B — AIRCRAFT REGISTRATION: CDDL

FLIGHT DATE — DAY 15 MONTH 07 YEAR 81

PURCHASE ORDER NO.

FUEL & OIL: TNTA / CUST	TNTA FUEL USED	GALS.	FROM
TNTA	JP-4	0.3	PR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
From PR to Pickup Steve Noble @ Mt. Cook.		0.3	B	

ACC. CODE CORRECT ... Clear Pay.

06100 503 147.47

CK 21810 AUG 21 1981

SUB	G.L.	AMOUNT
6106	50120	135.00
6106	51110	12.47

	0.3	450.00	135.00
WAITING TIME		/HR.	
FUEL:	6.6	.189 /GAL.	12.47
FUEL:		/GAL.	
MEALS & LODGING			
OTHER			
OTHER			

TOTAL $ 147.47

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble — CHARTERER'S SIGNATURE

JDW — PILOT'S SIGNATURE

INITIALS — CO-PILOT'S NAME

WKL — ENGINEER'S NAME: Nick Greer

FLIGHT ATTENDANT

Entered PD

FLIGHT REPORT

TRANS NORTH TURBO AIR LTD.
BOX 4338, WHITEHORSE, YUKON Y1
TELEPHONE (403)668-2177 • TELE. 68-290

ACCOUNT NUMBER	1 60
	54835

INVOICE DATE: 21 07 81
AREA: B.C. / YUKON / NWT / ALTA.

CHARTERER: Amax Exploration
BILLING ADDRESS: 535 Thurlow Suite 606, Vancouver — #222-204 Lambert, Whitehorse

A/C TYPE: 206B
AIRCRAFT REGISTRATION: FDDG
FLIGHT DATE: DAY 15 MONTH 07 YEAR 81
PURCHASE ORDER NO.

FUEL & OIL: TNTA / CUST.
TNTA FUEL USED: JP-4
GALS.: 0.3
FROM: RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
From RR				
To Pickup Steve Noble @ Mt. Cook.		0.3	B	

ACC. EXP. CORRECT — Flight
06100 503 147.47
CK. 21810 AUG 21 1981

SUB	G.L.	AMOUNT	
6106	50120	135	00
6106	51110	12	47

	0.3 @ 450.00	135	00
	@		
	@		
	@		
WAITING TIME	@ /HR.		
FUEL:	6.6 @ 1.89 /GAL.	12	47
FUEL:	@ /GAL.		
MEALS & LODGING			
OTHER			
OTHER			
TOTAL		$ 147	47

TERMS: NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble — CHARTERER'S SIGNATURE
JDW — INITIALS — PILOT'S SIGNATURE
CO-PILOT'S NAME
WKL — ENGINEER'S NAME: Nick Greer
FLIGHT ATTENDANT

FLIGHT REPORT

NORTH TURBO AIR LTD.

WHITEHORSE, YUKON

036-8-290

EXPLORATION

SEP 18 1981

ADDRESS

OFFICE

ACCOUNT NUMBER	60
	✓ 54866
INVOICE DATE	11 2 0 1 8 8 1
A/C TYPE	206B
AIRCRAFT REGISTRATION	CDD
FLIGHT DATE (DAY / MONTH / YEAR)	29 / 07 / 81
PURCHASE ORDER NO.	

FUEL & OIL-E TNTA	CUST	TNTA FUEL USED	FROM
✓		JP-4 = 1.2	RR

	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
FROM YRR				STEVE NOBLE
TO Move Camp To Ross River		1.2	B	FRED HARRIS
				# 1071 MT COOK

ADD & EXT CORRECT

1071 86840 589.90

K22010 SEP 23 1981

SUB	G.L.	AMOUNT
6066	5920	540 00
6066	5110	49 90

	1.2 @ 450.00	540	00
WAITING TIME	@ /HR.		
FUEL: 26.4	@ 1.89 /GAL.	49	90
FUEL:	@ /GAL.		
MEALS & LODGING			
OTHER			
OTHER			
TOTAL		$ 589	90

TERMS: NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble
CHARTERER'S SIGNATURE

JDM — PILOT'S SIGNATURE
INITIALS — COPILOT'S NAME

WKF — ENGINEER'S NAME: BILL GREER
FLIGHT ATTENDANT

P1704

1183

3-37682

1981

NORTH TURBO AIR LTD.
WHITEHORSE, YUKON

ACCOUNT NUMBER	60
	✓ 543?6
INVOICE DATE	12 08 81
A/C TYPE	206
AIRCRAFT REGISTRATION	FDD
FLIGHT DATE (DAY / MONTH / YEAR)	29 07 81
PURCHASE ORDER NO.	

Exploration
SEP 18 1981
ADDRESS
Van.
OFFICE

FUEL & OIL - TNTA	CUST	TNTA FUEL USED		FROM
✓		JP-4	1.2	RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
FROM YRR				
TO Move Camp To				Steve Noble
Ross River		1.2	B	Fred Harris
				# 1071 Mt Cook

ACC & EXT CORRECT

1071 8680 589.90

222010 SEP 23 1981

SUB	G.L.	AMOUNT	
6066	5920	540	00
6066	5110	49	90

	HOURS	RATE	AMOUNT	
	1.2	450.00	540	00
WAITING TIME		/HR.		
FUEL:	26.4	1.89 /GAL.	49	90
FUEL:		/GAL.		
MEALS & LODGING				
OTHER				
OTHER				
TOTAL			$ 589	90

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble
CHARTERER'S SIGNATURE

JDW — PILOT'S SIGNATURE
INITIALS — COPILOT'S NAME

WKF — ENGINEER'S NAME: Bill Greer
FLIGHT ATTENDANT

P1204
1183

3-37682
1981

TRANS NORTH TURBO AIR LTD.
BOX 4338, WHITEHORSE, YUKON
TELEPHONE (403)668-2177 • TEL. 036-8-290

ACCOUNT NUMBER	60
	56280
INVOICE DATE	20 07 81

CHARTERER: Amax Minerals Exp.

BILLING ADDRESS: 601-535 Thurlow St. Van / #222-204 Lambert St Whse, Y.T

A/C TYPE: 206B — AIRCRAFT REGISTRATION: FMBT

FLIGHT DATE: DAY 16 MONTH 07 YEAR 81

PURCHASE ORDER NO.

FUEL & OIL: TNTA / CUST	TNTA FUEL USED	HRS / GALS.	FROM
✓		.4	RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
From RR To Local		.4		D/O Mt. Cook

ADD & CORRECT

Clement

06100 503 196.63

CK. 21810 AUG 21 1981

SUB	G.L.		AMOUNT	
6045	0620		180	00
6045	T110		16	63

	.4	@ 450.00		180.00
		@		
		@		
		@		
WAITING TIME		@	/HR.	
FUEL:	8.8	@ 1.89	/GAL.	16.63
FUEL:		@	/GAL.	
MEALS & LODGING				
OTHER				
OTHER				

TOTAL $ 196.63

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble
CHARTERER'S SIGNATURE

DWN — PILOT'S SIGNATURE
INITIALS — CO-PILOT'S NAME

ENGINEER'S NAME
WKG — Greer
FLIGHT ATTENDANT

Listed

TRANS NORTH TURBO AIR LTD.
BOX 4338 WHITEHORSE YUKON
TELEPHONE (403)668 2177 • TELEX 036-8-290

ACCOUNT NUMBER	1	6	0

56280

INVOICE DATE: 01 07 81

CHARTERER: Amax Minerals Exp.

BILLING ADDRESS: 601-535 Thurlow St. Van (#222-204 Lambert St Whse, YT.

A/C TYPE: 206B — AIRCRAFT REGISTRATION: FMBT

FLIGHT DATE: DAY 16 MONTH 07 YEAR 81

PURCHASE ORDER NO.

FUEL & OIL: TNTA / CUST	TNTA FUEL USED	HRS GALS.	FROM
/		.4	RR

FROM / TO	MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
FROM RR TO Local		.4		D/o Mt. Cook

ACCOUNT CORRECT
Clement
06100503 196.63
K. 2 8 1 0 AUG 21 1981

SUB	G.L.	AMOUNT
6104	50120	180.00
6104	51110	16.63

	.4	450.00	180.00
WAITING TIME		/HR.	
FUEL	8.8	1.89 /GAL.	16.63
FUEL:		/GAL.	
MEALS & LODGING			
OTHER			
OTHER			

TOTAL $ 196.63

TERMS NET 30 DAYS
1.75% INTEREST PER MONTH (21% PER ANNUM) WILL BE CHARGED ON ALL OUTSTANDING AMOUNTS OVER 30 DAYS.

X Stephen Noble — CHARTERER'S SIGNATURE

DWN — PILOT'S SIGNATURE

INITIALS — CO-PILOT'S NAME

ENGINEER'S NAME

WKG — FLIGHT ATTENDANT

Listed

Rossbacher Laboratory Ltd.

GEOCHEMICAL ANALYSTS & ASSAYERS

2225 S. SPRINGER AVE.,
BURNABY, B.C.
CANADA
TELEPHONE: 299-6910
AREA CODE: 604

AMAX MINERALS EXPLORATION
~~601 - 535 THURLOW ST.~~
VANCOUVER, B.C. V6E 3L6

DATE Aug. 24, 1981

INVOICE NO. 1383

CERTIFICATE NO. as marked, Dover

Project # 1071

ITEM	DESCRIPTION			SUB-TOTAL	TOTAL
401	Geochem. analysis, 4 elements		$ 3.10	$ 1,243.10	
1		3	2.75	2.75	
380	Soil prep.		0.40	152.00	
1	Rock prep.		1.75	1.75	
					$ 1,399.60

ABD & BT CORRECT
APPROVED
DATE Aug 27/81

Project Number	Group Code	Activity Code	Account Code	Sub Code	Amount
1071			36910		1,399.60

CK. 21880 AUG 28 1981

TERMS – NET 30 DAYS

Rossbacher Laboratory Ltd.

GEOCHEMICAL ANALYSTS & ASSAYERS

2225 S. SPRINGER AVE.,
BURNABY, B.C.
CANADA
TELEPHONE: 299-6910
AREA CODE: 604

AMAX MINERALS EXPLORATION
~~601 - 535 THURLOW ST.~~
VANCOUVER, B.C. V6E 3L6

DATE Aug. 24, 1981

INVOICE NO. 1383

CERTIFICATE NO. as marked. → over

Project # 1071

ITEM	DESCRIPTION	SUB-TOTAL	TOTAL
401	Geochem. analysis, 4 elements $ 3.10	$ 1,243.10 ✓	
1	3 2.75	2.75	
380	Soil prep. 0.40	152.00	
1	Rock prep. 1.75	1.75	
			$ 1,399.60

ABD & SKT CORRECT
APPROVED
DATE Aug 27/81

Project Number	Group Code	Activity Code	Account Class	Sub Class	Amount
1071			36910		1,399.60

CK. 21880 AUG 28 1981

TERMS – NET 30 DAYS

APPENDIX II

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

F.R. Harris

Education

University of Western Ontario	- B.Sc. Honours Geology	1961
University of New Brunswick	- M.Sc. Geology	1964

Experience

May 60 - May 64 - Summer employment while attending university with Geological Survey of Canada and the New Brunswick Department of Lands & Mines

May 64 - June 70 - Ontario Department of Mines based in Thunder Bay. Party Chief - mapping and writing final reports on areas ranging from 100 to 150 square miles

July 70 - Amax of Canada Limited - Staff Geologist
Plans, organizes and supervises small property and prospect evaluation programs or assists with the planning and management of large property exploration programs utilizing all exploration techniques.
Selects, applies and interprets the most effective exploration approaches and techniques for any type of exploration survey.

STATEMENT OF QUALIFICATIONS

NAME	S.R. Noble
ADDRESS	121 McNicoll Avenue, Willowdale, Ontario M2H 2B7
EDUCATION	Presently engaged in a Master of Applied Science program in Geology at the University of Toronto. Completed a Bachelor of Applied Science in Geological Engineering at the University of Toronto in the Spring of 1980.
EXPERIENCE	CCH Resources - Junior Assistant - 1979 AMAX of Canada Limited - Senior Assistant - 1980 AMAX of Canada Limited - Senior Assistant - 1981

STATEMENT OF QUALIFICATIONS

NAME	A.L. Hogg
ADDRESS	41 Maple Avenue, Toronto, Ontario M4W 2T8
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APPENDIX III

GEOCHEMICAL METHODS

Procedures for Collection and Processing of Geochemical Samples

Analytical Methods for Ag, Mo, Cu, Pb, Zn, Fe, Mn, Ni, Co and U in sediments and soils; Mo, Cu, Zn, Ni and SO_4^{--} in waters.

Amax Exploration, Inc.
Vancouver Office.

September 1970

SAMPLE COLLECTION

Soils

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

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

Observations as to the nature of the sample and the environment of the sample site are made in the field.

Drainage Sediments

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

Some 200 gm of finer material is collected unless the sediment is unusually coarse in which case the weight is increased to 1 kg. Samples are placed in the same type of Kraft paper bag as are employed in soil sampling. Water samples are taken at all appropriate sites. Approximately 120 mls are sampled and placed in a clean, screw sealed, polythene bottle. Observations are made at each site regarding the environment and nature of the sample.

Kossbacher Laboratory
GEOCHEMICAL ANALYSTS & ASSAYERS

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

April 30, 1974

SUMMARY OF SOME ANALYTICAL TECHNIQUES CURRENTLY IN USE AT ROSSBACHER LABORATORY

A ANALYTICAL TECHNIQUES FOR GEOCHEMICAL SAMPLES

SAMPLE PREPARATION

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

After drying soil and sediment samples they are lightly pounded with a wooden block to break up aggregates of fine particles and are then passed through a 35 mesh stainless steel sieve. The coarse material is discarded and the minus 35 mesh fraction replaced in the original bag providing that this is undamaged and not excessively dirty.

Rock samples are exposed to the air until the outside surfaces are dry; only if abnormally wet are rocks placed in the sample drier. Rock samples are processed in such manner that a fully representative 1/2 g. sample can be obtained for analysis. The entire amount of each sample is passed through a jaw crusher and thus reduced to fragments of 2 mm. size or less. A minimum of 1 kg. is then passed through a pulverizer with plates set such that 95% of the product will pass through a 100 mesh

Rock Chips

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

Soil, sediment and rock samples are packed securely in cardboard boxes or canvas sacks and dispatched by road or air.

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 1.00 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 g 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

screen. Those 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 5% perchloric acids. Racks of tubes are then placed on an electrical hot plate, brought to a gentle boil (½ hour) and digested for 4½ hours. Samples unusually rich in organic material are first ashed 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

Zn Geochemical AA Setting

Lamp Zn

Current 8 #3 Slit 20A

Wave length 2133 Dial 84.9

Fuel - Acetylene Flow 14

Oxidant - Air Flow 14

Burner - P.E. short path 90°

Range

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

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

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

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

Fuel 14 Air 14.5

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

Pure Standard 10,000 gamma/ml

1 gm Zn dissolved, H_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_3 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

Ni Geochemical AA Setting

Lamp Multi element Cu, 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 118

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% HClO

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

2, 5, 9, 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, 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 ½ ml extractant, cap, shake vigorously 1 minute
10. Compare color

Molybdenum in Water Samples

1. Transfer 50 mls to 125 separatory funnel
2. Add 5 ml .2% ferric chloride in conc HCl
3. Add 5 mls of mixed KSCN and $SnCl_2$
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, a continue step #2.

This is 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 [$Al(ClO_4)_3 \cdot 9H_2O$] (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 Acument pH meter. Electrodes are stored in buffer overnight. A 30 minute warm up time is allowed for the instrument each morning. A 10 ml aliquot is taken from water samples for pH measurement.

ROSSBACHER LABORATORY

P. Rossbacher

090883

LEGEND

CRETACEOUS

4 — Quartz monzonite, chilled margins.

UPPER DEVONIAN (?) TO MISSISSIPPIAN

3 — Diorite, equigranular, medium grained.

2 — Sedimentary rocks. 2a Slate, argillite, shale, phyllite, chert, chloritic slate. 2b Siltstone, greywacke.

- 2c — Blocky black chert, argillite, massive barite.
- 2d — Chert, black argillite, nodular barite.
- 2e — Limestone, argillaceous limestone, calcarenite.

1 — Volcanic rocks. 1a Dacite-andesite vesicular flows. 1b Dacite-rhyolite flows. 1c Felsic tuff. 1d Felsic lapilli tuff to breccia.

SYMBOLS

- Outcrop, float.
- Geological contact (defined, approximate, assumed).
- Fault (approximate, assumed).
- Plunge of slickensides.
- Jointing attitude (inclined, vertical).
- Bedding attitude (vertical, inclined, overturned).
- Foliation attitude (inclined).
- Multiple fold (showing attitude, dip of axial plane and plunge).
- Major fold axis (anticline, syncline).
- Quartz vein attitude (inclined, vertical).
- Stockwork.
- Claim post, claim location line.
- Claim boundary.
- Stream.
- Topographic contour (contour interval 20 metres).
- Trail.

AMAX OF CANADA LIMITED

MOUNT COOK PROPERTY
GREW CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOLOGICAL MAP

SCALE 200 0 200 METRES
500 0 500 FEET
1:5,000

To accompany "1981 ASSESSMENT REPORT" by F.R. Harris

L E G E N D

Soil
Silt
Rock chip
} Sample site, sample number, analytical values (ppm Cu,Pb,Zn,Ag)

S Y M B O L S

Claim post, claim location line.
Claim boundary
Stream
Topographic contour (contour interval 20 metres)
Trail

AMAX OF CANADA LIMITED

MOUNT COOK PROPERTY
GREW CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOCHEMICAL MAP

SCALE 200 0 200 METRES / 500 0 500 FEET
1 : 5,000

To accompany "1981 ASSESSMENT REPORT" by F.R. Harris.

Dec 6/81 Vancouver — [illegible]

N.T.S. Ref: 105 F, [illegible]
FIG. 4